Radio Communication

The Journal of the Radio Society of Great Britain

December 1994

Volume 70 No 12

THE VOICE OF AMATEUR RADIO FOR 81 YEARS

IARU Region 3 Conference, Singapore 1994

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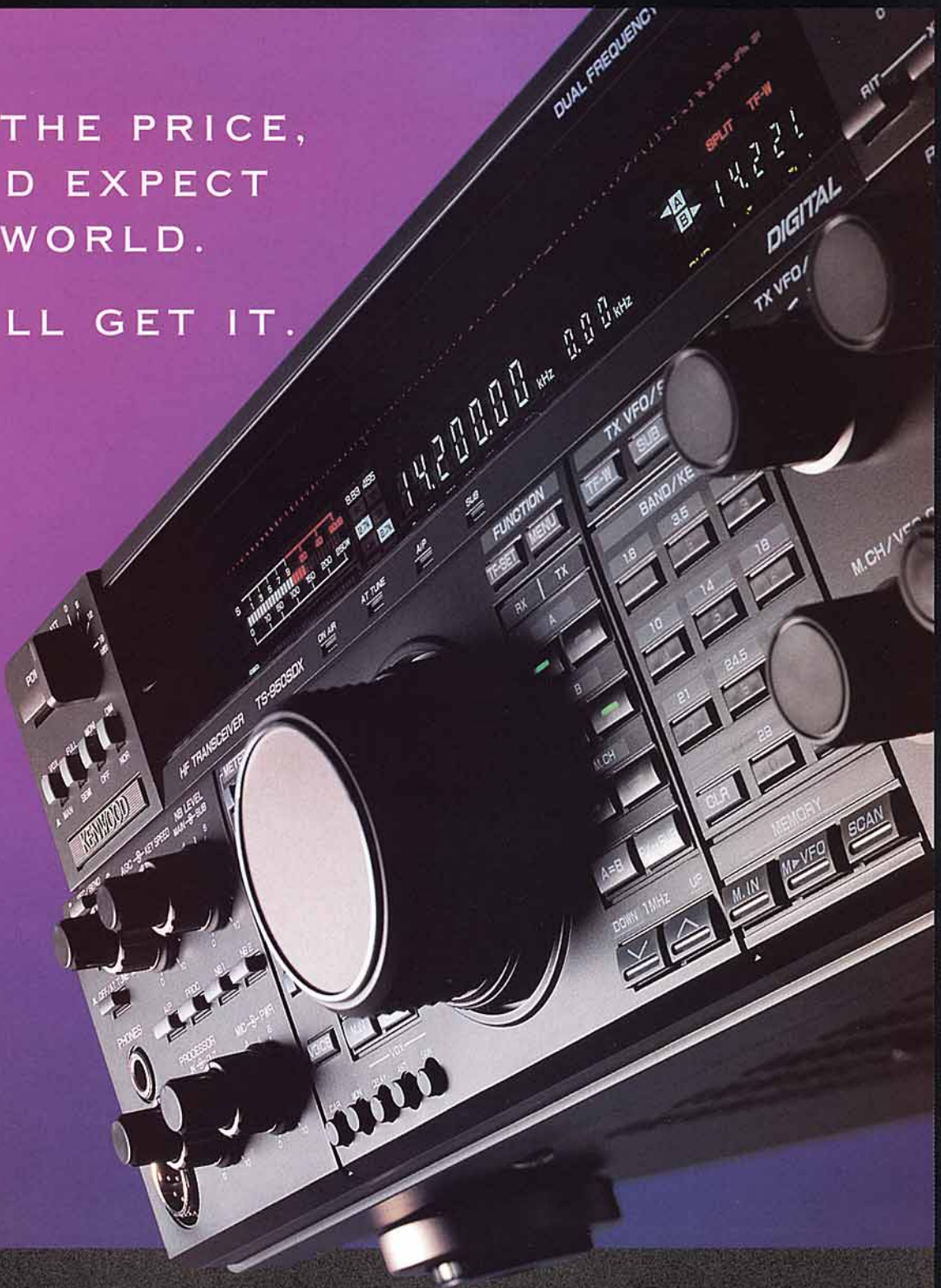
YOU'LL GET IT.



The TS-950SDX is at the very pinnacle of the Kenwood HF transceiver range. And when you look at its specification, that's not surprising.

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The TS-950SDX is part of a range of HF transceivers priced from around £1000 to £3500. And although quality is never cheap, it's still a small price to pay to have the world of radio communications at your command.

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Radio Communication

COVER PICTURE:
Masa Fujioka, JM1UXU who is retiring as Secretary of IARU Region 3, with Michael Owen, VK3KI, Vice President of the IARU.

NEWS AND REPORTS

TECHNICAL FEATURES

REGULARS

REVIEWS

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS
Founded in 1913 incorporated 1926. Limited by guarantee
Member society of the International Amateur Radio Union

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

Membership is open to all those with an active interest in radio experimentation and communication as a hobby. Applications for membership should be made to the Membership Services Department from which full details of Society services may also be obtained.

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UK associate member under 18: £16.00. Family member: £14.00
Corporate (Concessionary): £27.00 over 65 or full time student under 25. (Applications should provide proof of age at last renewal date and/or include evidence of student status.)
Affiliated club or society/registered group (UK): £16.00 (including *Radio Commmunication*). (Subscriptions include VAT where applicable.)

Special arrangements exist for blind and disabled persons. Details are available from RSGB HQ.

Membership application forms are available from RSGB HQ

RSGB Main Switchboard:
01707-659015

from

The President

AS I SIT WRITING this seasonal message it seems that hardly any time has elapsed since I was looking forward to my presidential year with great enthusiasm. Time seems to have flown and I am certainly a year older and maybe a little wiser.

During the year we have seen a number of things happen. For instance, changes to the licensing conditions were announced in July with enhancements in various areas of amateur interest coupled with a slight tightening of the rules associated with unattended operation for digital communications. The number of amateur licences issued, as noted in the *RA Annual Report* for 1993, just published, show a significant increase and this, coupled with the Society's membership figures now showing an upward trend, indicates a bright future for our hobby.

The 1993 President, Peter Chadwick, G3RZP, asked at this time last year whether all the effort was worth it, and then answered positively that it most certainly was. Although 1994 has been quite a difficult year for a number of reasons I, too, can answer the same question just as positively. Working as a volunteer for the RSGB requires a tremendous amount of commitment and is essentially a team effort. No one person is above any other in our National Society and long may that continue.

I must thank all the members of staff, volunteers, fellow council members and my own family for their support and help during the past year. I could not have enjoyed this year so much without it.

Finally I thank you for your continued support during the year and wish you all a happy Christmas and a prosperous New Year.

Ian Suart, GM4AUP, President

and

The General Manager

THROUGHOUT 1994 we have maintained the steady progress in the Society's performance in representing the amateur radio community. In January I appealed to all amateurs to look at their operating standards. Unfortunately we are still plagued by the few who delight in transmitting abuse over the air. Although there have been fewer cases this year, the media still misuses the term 'Radio Ham'. In both cases we all have a role to play in protecting the good name of the Amateur Radio Service.

On a more positive note, the decline in membership has been arrested and over the last three months we have seen the membership figures increase; this is a trend which we will strive to maintain. The quality of service provided by your Headquarters continues to improve and complaints are now almost non-existent. The full-time staff at HQ and all the volunteers are keen that this trend continues.

Over the past three years the profile of the Society has changed and most licensed amateurs and SWL's agree that a strong National Society is needed if the Amateur Radio Service is to enter the 21st century in a buoyant and positive manner. 1995 is the 100th anniversary of radio and the aims and objectives that were laid down 82 years ago at the birth of our Radio Society remain extant today.

All those involved with the work of the RSGB recognise that we have a duty to maintain the aims and objectives that were laid down by our forefathers; this we do by team-work and with your continued co-operation, which is something I know we can rely upon.

On behalf of the HQ staff may I thank you for your continued support and wish you all a happy Christmas and a peaceful and prosperous New Year.

Peter A Kirby, G0TWW, General Manager

NEWS & REPORTS

● AN EMORE 'Globe' radio and a crystal set inside a ceramic Indian figure are just two items in the next vintage radio sale run by Academy Auctioneers and Valuers. The sale on 13 December will also include a number of antique telephones. A catalogue and further details can be obtained by calling Betine Bauer on 0181 579 7466.

● Port Talbot ARS celebrates its 50th Anniversary in 1996 and is calling all ex-members of the Neath-Briton Ferry (now called the Port Talbot) Amateur Radio Society formed in 1946. If you have any information or would like to attend the celebration, contact the Secretary, GW0NKF on 01639 892311.

● THE GRAFTON Radio Society is soon to celebrate its 50th year. In order to write a history of the club, John Wardale, G0DFZ QTHR, would like to hear from past members who may have literature, photos or stories concerning GRS.

● STOLEN from Midland ARS HQ in October: Icom IC-735 S/N 16621; Yaesu FT-890 S/N 2121169 and Tokyo Hy/power ATU. Information to Birmingham Police on 0121 626 6162 or Norman Gutteridge, G8BHE, on 0121 422 9787 (evenings).

● STOLEN from a Blackpool hotel at the end of September: Yupiteru MV-7100 S/N 2110166; IC-32E S/N 71803849. Both are security marked SK14 5JX. Information to Blackpool Police quoting Ref AA15724/94.

● STOLEN from a car parked outside the QTH of G3KTU in Bournemouth in October: Kenwood TM-732E S/N 30702923. Information to J Ault, G3KTU, QTHR.

New RLO

A NEW RSGB Liaison Officer has been appointed for the Tyne and Wear Area. He is Keith Ritson, G0PKR, 14 Dunsdale Road, Holywell, Whitley Bay, Tyne and Wear NE25 0NG; tel 0191 237 1963.

Headquarters Staff Changes

MARKETING COORDINATOR Justine Hodges is taking up a position outside the RSGB. Her post has been filled by Marcia Brimson, formerly Assistant Editor on *RadCom*.

RA Reports Increased Business and Increased Efficiency

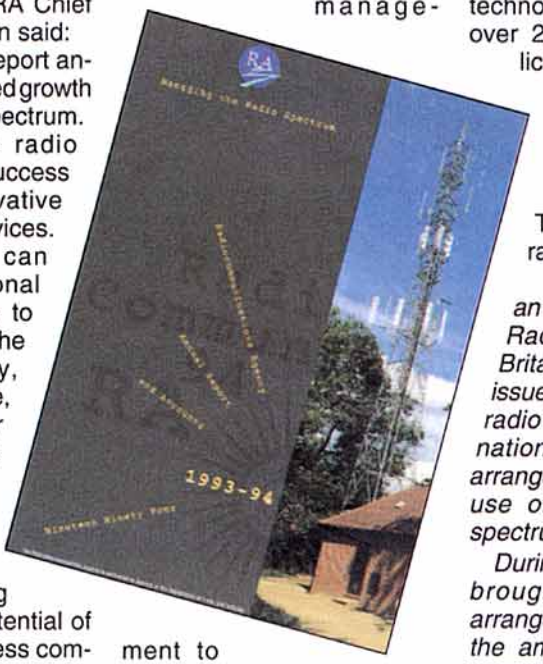
Demand for Spectrum is Still Growing

THE ANNUAL REPORT of the Radiocommunications Agency was launched at a Press Conference in London on 1 November. At the launch RA Chief Executive Jim Norton said:

"I am pleased to report another year of continued growth in the demand for spectrum. This reflects the radio industry's growing success in producing innovative technology and services. Radio services can provide an additional delivery mechanism to meet the needs of the information society, particularly for remote, mobile and smaller users. We in the Agency are delighted to face the challenge of responding to these demands and helping to realise the full potential of radio to boost business competitiveness and enrich the quality of life through cultural, scientific and leisure applications.

"The Agency continues to make significant progress in improving the quality of service to our expanding range of customers, managing the spectrum efficiently and increasing our own internal efficiency. We intend to take further steps towards these goals as set out in our Mission Statement.

"We will be publishing a strategic spectrum plan early next year for consultation and debate so that users can have more ready access to the information they need and can tell us what their spectrum requirements are likely to be. We are continuing with annual customer surveys to find out what our customers want and how we can continue to serve them better. A major review of the future management of the radio spectrum is in progress to provide a framework of spectrum management to take us into the next century. We are developing more sophisticated quality of service measures to reflect the quality of the assignments we give to users.



RA Report and Accounts

THE REPORT makes fascinating reading as it shows the breadth of the Agency's activities and responsibilities. It reports: an increase in overall efficiency of over 4 per cent; income up to £39.4 million from £37.5 million; all but one quality of service targets met; continuing growth in demand for mobile communications from businesses and also from the public; increasing competition; spread of digital technology; an increase of over 25% in fixed services licences and a 4% increase in private mobile radio.

The Radiocommunications Agency Annual Report and Accounts 1994 is available free of charge from the RA Library and Information Service, Waterloo Bridge House, Waterloo, London SE1 8UA.

RA and AR

The section on amateur radio reads:

The Agency maintains an active dialogue with the Radio Society of Great Britain on a wide range of issues affecting the amateur radio community and the national and international arrangements that govern the use of the amateur radio spectrum.

During the year, the Agency brought into force new arrangements for licensing of the amateur radio repeater network. These were intended to make the network more effective, to tighten the management of repeaters, and devolve more responsibility to those who run the repeaters. The RSGB acts as agent for the Agency in the distribution of the appropriate authorisation (notices of variation) to repeater keepers.

The Agency has continued to support efforts by the RSGB and others to promote amateur radio as a rewarding hobby - especially among young people. Once again, the Agency gave its backing to the Young Amateur of the Year Award: Roger Louth (Director, Mobile Services) presented the 1993 award to this year's' winner, Tim Munn, at the RSGB's HF Convention in October 1993.

News From the VHF Committee

Revision of 144-145MHz Band Plan

At the IARU Region I Conference in September 1993 it was agreed that a working party comprising representatives of the national societies of the UK, Germany, France, Finland, Belgium and Denmark should consider changes to the band plan for the bottom Megahertz of the 144MHz band with a view to proposals being discussed at a VHF Managers' meeting early in 1995 and, possibly, formally adopted at the next IARU Region I Conference in September 1996.

Dave Butler, G4ASR, the RSGB's VHF Manager, requested proposals and suggestions earlier this year (*News & Reports*, May). About 40 replies were received and these have now been studied. The VHF Committee is considering the following proposals for a new band plan for 144-145MHz:

144.000 - 144.035	CW/SSB EME
144.035 - 144.125	CW
144.125 - 144.380	CW/SSB
144.380 - 144.400	All narrow band modes
144.400 - 144.510	Beacons
144.510 - 144.710	Data Communications
144.710 - 145.000	All modes

The frequencies quoted are *not* ranges of carrier frequencies. Actual carrier frequencies are to be chosen so that sidebands do not spread outside the relevant range. No attempt has been made to designate frequencies for particular purposes such as calling, emergency communications priority or mailboxes.

The following points should be noted:

1 The allocation for all narrow band modes is intended to be used by narrow band data modes as well as CW and SSB. Data communications within this band must be strictly human-to-human, ie no computers, digipeaters or network nodes.

2 The modulation methods and frequencies used to support data communications in the range 144.510 - 144.710MHz is a matter for decision by the data communications community.

3 At this stage, any decision to adopt 12.5kHz channelisation above 144.5MHz is independent of the re-planning exercise.

4 The frequency range 144.500 - 144.510 is a guard band, no beacons will operate in this frequency range.

The RSGB VHF Committee seeks comments on the above suggestions. In particular we would like your comments on the relative amount of space for SSB/CW, all narrow-band modes and beacons.

12.5kHz channel spacing for 145MHz FM

Also at the 1993 Conference a resolution was passed to adopt 12.5kHz channel spacing for FM operation on the 144MHz band. This was opposed by several societies, including the RSGB, and a dissenting footnote was added to the conference resolution. In spite of our recorded dissent, the VHF Committee would like to investigate the possibility of adopting 12.5kHz channels for FM operation on 145MHz. The advantages in terms of the extra number of channels available are obvious but the transition may be difficult.

One proposal is to decide on three dates (D0, D1 and D2). By D0 we would hope that all transmitter deviations will have been reduced to 12.5kHz specification, by D1 all receiver filters will have been adjusted to the 12.5kHz specification and on D2 the extra channels will be released for general use. This will be a major reorganisation requiring careful coordination. The VHF Committee would welcome comments on the possibility of changing to 12.5kHz FM channelisation, especially the time scale of any changes.

Novice Allocation on 144MHz

The VHF Committee has been considering the possibility of a Novice allocation on the 144MHz band. This could be restricted to certain frequencies and modes. The VHF Committee would welcome comments on such an allocation.

Extra Packet Frequencies on 432MHz

The VHF Committee has been considering proposals for an extra sub-band for packet radio use on 432MHz in order to relieve congestion and improve linking. Various alternative ranges of frequencies have been proposed and are listed below.

1 430.4 - 430.6MHz
2 439.6 - 439.8MHz
3 434.4 - 434.6MHz
4 433.8 - 433.875MHz
5 438.6 - 438.8MHz

It is our intention to allocate *one* of these sub-bands to packet radio. Comments and alternative proposals are sought.

Comments

All comments etc should go to Peter Burden, G3UBX, at 2 Links Road, Penn, Wolverhampton WV4 5RF, via packet radio to G3UBX@GB7MAX or via Internet electronic mail to jphb@scitsc.wlv.ac.uk. If you have already written to Dave Butler, G4ASR, earlier this year, your letters and comments are already on file.

● SATELLITE SUPREMO Ron Broadbent, G3AJJ, has been an RSGB member for 50 years this month.

Two Microwave Committee Vacancies

THE SOCIETY'S MICROWAVE Committee requires additional help, especially with publicity, exhibitions and the promotion of microwaves. The committee is also looking for help with administration matters, such as dealing with correspondence, to ease the Chairman's workload!

At least one new full member and one new corresponding member are envisaged. A full member would need to attend around four meetings per year in London, while a corresponding member would need to attend probably once a year. Access to a PC would be helpful. Essential travelling and out-of-pocket expenses are recoverable.

Interested members should send a brief resume of their experience and interests to the Chairman: Steve Davies, G4KNZ, 14 Herondale, Birch Hill, Bracknell RG12 7ZT.

50MHz Repeaters

THE REPEATER Management Group reports that seven groups submitted 50MHz repeater applications to the RMG by the deadline date. The Society will present an initial batch to the RA and no more applications will be considered until the RA's response is known.

● MORSE classes for the 12WPM test commence Friday evenings 6 - 7.30pm from 13 January at Newbury College. Details from Ray Oliver, G3NDS, on 01672 870892.

The President of Finland, Martti Ahtisaari (left) sees amateur radio demonstrated by Seppo Sisättö, OH1VR (Past President of SRAL); Kari Leino, OH2BC and Raino Hassinen, OH2LYJ. The occasion was the opening of the 25th Annual Conference of the International Institute of Communications held in Tampere on 6 September.

Amateur Radio Tops Licence Figures

LAST YEAR, the number of amateur licences in force dropped for the first time in several decades. This seems to have been a 'blip' because this year the upward trend has been restored. There are now more licences in force for amateur radio than for any other radio service. Amateur licences have gone up by some 6% though Class A licences have dropped.

Amateur Licences

Class	April 93	April 94
Full A	32410	31817
Full B	25791	29717
Novice A	106	139
Novice B	935	1360
Total	**59242**	**63033**

Other major licence figures are (1993 in brackets): Ships 57938 (56190); CB 50704 (53926); PMR 29014 (28205); Paging 10700 (10164); Aircraft 8030 (8551).

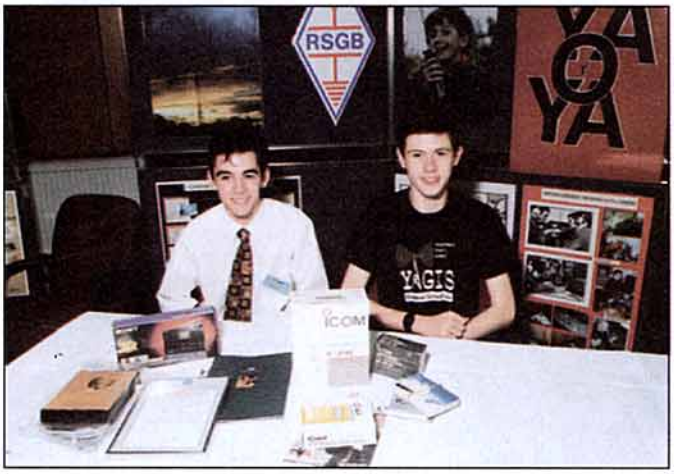
Council Vacancy

IT IS WITH REGRET that we announce the resignation from the RSGB Council of David Gourley, G0MJY. David represented Zone 'B', Midlands, and his resignation is entirely for personal reasons. The President and members of the Council would like to thank David for his contribution to the work of Council and wish him good luck for the future.

Due to the above unforeseen vacancy occurring it is necessary to co-opt a member to represent Zone B on Council for one year ending 31 December 1995.

Corporate Members interested in being considered for the position should reside in the zone (Bedfordshire, Cambridgeshire, Derbyshire, Hereford & Worcester, S Humberside, Leicestershire, Lincolnshire, Northamptonshire, Nottinghamshire, Staffordshire, Warwickshire, W Midlands), have a comprehensive amateur radio background and a willingness to serve the Society as a member of its governing body. The geographical area to be represented is extensive and will require a substantial commitment from the successful applicant. Applications in writing, accompanied by a detailed CV, should reach the Company Secretary by 21 December 1994.

Roger Louth, Head of Mobile Services at the RA presents a certificate to 1994 Young Amateur of the Year Robert Aley, G7SRR.



Young Amateur of the Year Robert Aley, G7SRR, and runner-up Stephen Conner, GM0TET, seen at the RSGB HF and IOTA Convention with their prizes. For the winner: A cheque for £300 from the Radiocommunications Agency, and an invitation to tour the DTI Monitoring Station at Baldock; a Sony general coverage receiver from the RSGB; a packet radio modem from Siskin Electronics; a one-week residential course at Wray Castle College in the Lake District from the Mobile Radio Users' Association. And for the runner up: a hand-portable transceiver from Icom (UK); a £25 book token from the Mobile Radio Users' Association; and a multimeter from Cirkit Distribution.

New RSGB Trophies Manager

THE NEW RSGB Trophies Manager is David Simmonds, G3JKB. His function is to keep track of the Society's many and varied trophies that are presented at a number of events each year.

GB2CW

THE FOLLOWING additions have been made to the RSGB's Morse Practice (GB2CW) Service, full details of which can be found in the *1995 RSGB Call Book*:

Every Monday, Tuesday and Friday at 1830UTC on 145.250MHz, operated by Janice, GW0KPD, Port Talbot, West Glamorgan.

Every Monday, Tuesday, Wednesday and Thursday at 1945 UTC on 145.225MHz, operated by Audrey, G4ULH, Fishponds, Bristol.

● The Society is seeking someone to provide GB2CW transmissions for Novice Licensees on 50MHz or 432MHz in Somerset. Anyone interested is asked to contact the RSGB Morse Practice Co-ordinator, David Pratt, G4DMP, QTHR, telephone 0113 286 0439.

Prize Winners

THE FOLLOWING have won draws organised by the Society. Each has been notified by post.

RSGB Leicester Show Draw: M C Eddyvean, G7SQF, wins a Christmas hamper worth £100.

'Introduce a Friend' Promotion: T B Saggerson, G4WSE, wins a Netset scanner.

LIVE '94 Amateur Radio Village draw:

J R Groves, G7SNZ, wins a TH-22E 2m handheld donated by Trio-Kenwood Ltd.

A Rowe, G6AVP, wins a KPC3 packet controller donated by Martin Lynch.

J Irlam, G3JBT, wins an HF-150 short-wave receiver donated by Lowe Electronics.

M B Chapman, G4ZKE, wins an Alinco VHF/UHF hand held donated by Waters and Stanton.

S M Gambles, G4GI, wins an FT-416 2m hand held donated by Yaesu (UK) Ltd.

P J Holt, G8YQJ, wins an IC-281H 2m mobile donated by Icom (UK) Ltd.

Second prizes of one year's full Corporate membership or book tokens, donated by the RSGB went to: J Newman, G0FVC; H N Jakobsen, LA5QC; J Brown, G0PJU; P C Shepperd, G0CAN; K T Brown, G7EXO and M A Smith, G1IPB.

Third prizes of a subscription to *Practical Wireless* or *Short Wave Magazine*, donated by PW Publications, went to: J F J Porter, G4AGN; C Baker, G4USG; K P Blanshard, 2E1CRE; P F Clark, G4PGS; J Peerless, G3JPJ and J Binning, G3AJS.

Piece Dividend

DID YOU WORK GB30FYD at Fylingdales in September? If so, you qualify for a chance to buy a piece of one of the 'golf ball' radomes which have now been demolished. A Fylingdales 30th Anniversary commemorative certificate, which includes a small piece of one of the radomes, is available at £2.50 inc P&P. These have been very popular with the public and only a few are left but some have been put aside for anyone who worked GB30FYD, or sent in an SWL report. All proceeds go to charity. Send to: Sq Ldr E C Harrison, RAF Fylingdales, Pickering, North Yorkshire YO18 7NT.

Operation Market Garden

PETER HANSON, G0NVY, reports the successful operation of GB50OMG (see *News & Reports*, July and September, and *QSL*, July). The station was set up at Fulbeck Hall in Lincolshire from where the Battle of Arnhem was planned and co-ordinated 50 years earlier. There were two operating sessions, a fortnight in July and a weekend in September.

1,343 contacts were made, mainly on the 80m band, and these included some of the Dutch stations who were commemorating their liberation.

Win an IC-728

DID YOU KNOW that you could win an IC-728 just by buying the *RSGB 1995 Amateur Radio Diary*, filling in a simple questionnaire and sending it off to Lambda House? The diary, details of which can be found on this month'slabel carrier, contains a Free Draw Ticket.

The winner's details will be published in *RadCom* and the prize will be presented at the 1995 RSGB London Amateur Radio and Computer Show.

Countries List

FANS OF THE prefix listings which were produced by Geoff Watts will be pleased to know that Geoff's internationally known work is to be continued by the RSGB. John Forward, G3HTA, agreed to assume responsibility for maintaining and updating this invaluable reference work. The Society anticipates it being published early in 1995.

RA: Keeping the Spectrum Clean

THE RA reports that it is staying ahead in the battle to keep unlicensed broadcasters off the air. Staff executed 570 raids against over 150 pirate stations in the last financial year.

The Agency is responsible for taking enforcement action to keep the radio spectrum clean for licensed users to operate without interference to their services. Staff in the Agency's District Offices are responsible for dealing with unlicensed radio users and those who operate outside licence conditions.

During the last financial year, RA District staff took the following enforcement action: seized the equipment of unlicensed broadcasting stations on 570 occasions; acted against 151 different unlicensed stations; successfully prosecuted 71 individuals involved with unlicensed broadcasting, one of whom had to pay £5000 in fines and costs and another received a suspended six months' prison sentence; and successfully prosecuted a person for selling non-type approved radioactivated car alarms (£4000 in fines and costs).

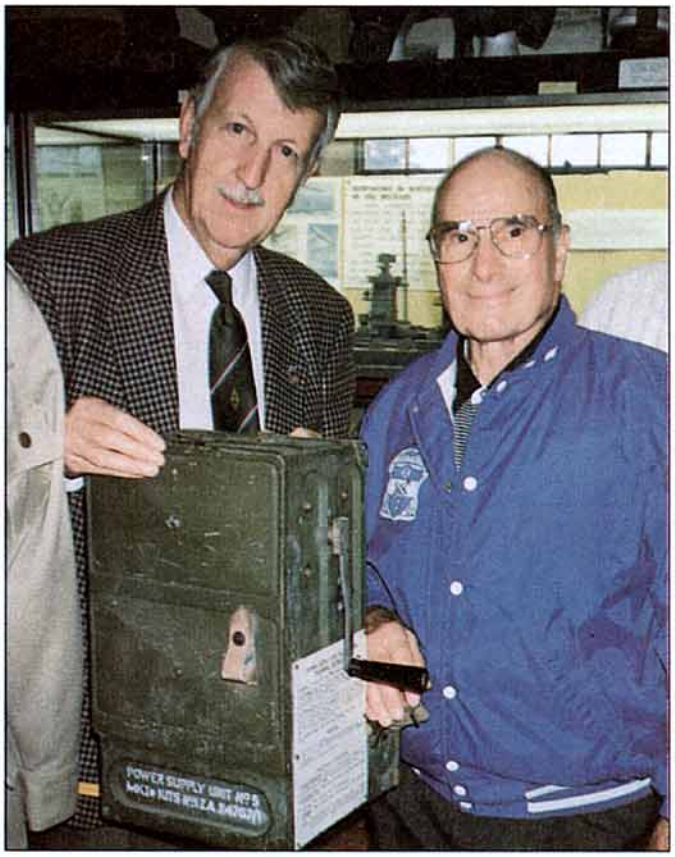
The RA will try to assist licensed radio users by providing advice on rectifying irregularities in operating methods. To this end, District staff gave to operators of private mobile radio systems: 1551 oral warnings, 637 notices to conform and 69 final written warnings.

When operators persist in operating outside licence conditions the Agency is left with no alternative but to prosecute. During the year: 15 operators were convicted, average fines and costs amounted to £324 and in five cases the operators were also ordered to forfeit their equipment.

The RA states that it remains committed to taking the necessary enforcement action to ensure legitimate radio users are able to achieve reliable communications.

Islands on the Page

FROM JANUARY'S *RadCom* there will be a two-monthly column dealing with the RSGB's Islands on the Air (IOTA) Awards programme. The columnist will be Neville Cheadle, G3NUG.



Deryk Wills, G3XKX (left), Chairman of the UK Chapter of the US 82nd Airborne Division, welcomed over 250 returning veterans this summer before joining them on their European anniversary tours. One was Russell Sunbury, N7PAU, from Seattle, a veteran of the 325th Glider Infantry Regiment. They are seen here visiting the Loughborough War Memorial Museum and discussing the merits of a 1944 hand-cranked power supply.

CQ Blind NRAE Students

NOTTINGHAMSHIRE SENIOR Novice Instructor G0LXX has available cassette tapes with the text of the RSGB *Novice Student's Notebook* and the RA's *BR68a/N* licence conditions booklet.

Just send two C60 or C90 tapes, plus £1.60 to cover post and packing, to Julian Mayfield, 9 Middlefell way, Clifton Estate, Nottingham NG11 9JN. If the cassettes are going direct to a blind student, send just 60p as postage is free for the blind. Enquiries to Julian on 0115 9211069.

More Novice Instructors

IS THERE anyone in **Hereford and Worcester** who has obtained years of enjoyment from amateur radio and would like to put something back in? Novice Instructors are needed to meet the demand from prospective pupils. Anyone interested is asked to contact the Senior RSGB Novice Instructor for the county: G4UXC, QTHR.

Operate in Qatar

THE RADIOCOMMUNICATIONS Agency has announced a reciprocal licensing agreement with Qatar based on the Qatar General Class and the UK Class A licences. Applications should be made to: Qatar Public Telecommunications Corporation, PO Box 217, Doha, Qatar.

Licence Issuer Announcement

THE RA WILL shortly be able to announce the result of the tender for the issuing of amateur radio, CB and ship radio licences (see their advertisement in May *RadCom*, p85). We are assured that the Agency will be writing to each licensee about this.

R & D Electronics

WE JUST CAN'T seem to get the details of R & D Electronics correct! In last month's correction, we made another mistake, this time in their fax number, so here goes again - their correct details are: phone 0843 866662; fax 0843 866663.

Lowe Electronics

TH79E - Small wonder!

The new Kenwood TH79E has been with us for a month or so now and what a winner it is proving to be. Just how do they fit so much into such a small space! Iím sure my first mobile radio had a bigger microphone!

Many of the features of the TH79E are hidden away, not even revealed in the manual but trust Lowe to take care of that for you. Everyone buying a TH79E from any branch of Lowe Electronics or by mail will get absolutely free of charge our wonderful booklet "The secret life of the TH79E", detailing all the modifications and hidden functions in this marvellous little transceiver.

We have the power

The Manson is back! We've increased our orders once again for these superb power supplies but you just keep on buying them! Sorry to keep so many of you waiting. If you don't yet know what all the fuss is about check this out! The EP925 is a variable voltage PSU that gives a continuous 25A current, peaking on 30A, Twin meters give you current and voltage readout and the thermostatically controlled fan keeps things cool, ideal for powering any of todayís HF transceivers. When you check out the price of a 'matching' power supply for your rig, you'll see just what great value it is at just £99.95.

If you donít need all that power then the EP815 may be the one for you. Case size and style is the same as the EP925 but without the metering. Output is 13.8V at up to 15A, just right if you use your mobile radio at home. Ideal too for running all your shack accessories, like your Packet or GTOR equipment, backlighting your Diamond SWR meters or even a stand alone transverter or VHF linear amplifier. Like its big brother it is superb value for money and you get change from seventy quid!

New!

Half catalogue, half price list - why not get your copy of our new CataList! Just send us four first class stamps and we'll send you one by return. Crammed full of interesting new products and some good old favourites as well.

BNOS VHF and UHF linears - for the serious Dxer

Whatís the difference between a power amplifier and a linear? Try a BNOS and compare it with some of the other products that call themselves ílinearî and you'll soon find out! If you are going to work that DX you need to be loud and clear and BNOS linears will give you both. Models available with or without pre-amps and all can be RF switched or hard switched depending on how you like to work. Full specs available on request.

CLP14410100	2m Linear with pre-amp; 10W drive; 100W output	***£255.00***
CLP14410180	2m Linear with pre-amp; 10W drive; 180W output	***£439.00***
CLP1441050	2m Linear with pre-amp; 10W drive; 50W output	***£169.95***
CLP1443100	2m Linear with pre-amp; 3W drive; 100W output	***£289.00***
CLP144350	2m Linear with pre-amp; 3W drive; 50W output	***£289.00***
CLP43210100	70cm Linear with pre-amp; 10W drive; 100W output	***£439.00***
CLP4321050	70cm Linear with pre-amp; 10W drive; 50W output	***£255.00***
CLP432150	70cm Linear with pre-amp; 1W drive; 50W output	***£289.00***
CLP43225100	70cm Linear with pre-amp; 25W drive; 100W output	***£375.00***
CLP5010100	6m Linear with pre-amp; 10W drive; 100W output	***£289.00***
CLP501050	6m Linear with pre-amp; 10W drive; 50W output	***£169.95***
CLP50350	6m Linear with pre-amp; 3W drive; 50W output	***£169.95***
CLP7010100	4m Linear with pre-amp; 10W drive; 100W output	***£289.00***
CLX14410100	2m Linear; 10W drive; 100W output	***£219.00***
CLX14425180	2m Linear; 25W drive; 180W output	***£345.00***
CLX1443100	2m Linear; 3W drive; 100W output	***£255.00***
CLX43210100	70cm Linear; 10W drive; 100W output	***£399.00***
CLX4321050	70cm Linear; 10W drive; 50W output	***£219.00***
CLX432150	70cm Linear; 1W drive; 50W output	***£255.00***
CLX43225100	70cm Linear; 25W drive; 100W output	***£345.00***

If you'd like all the secrets of the top Dxers, we've a great book written by the experts themselves. It's called the VHF UHF DX Book and contains chapters on propagation, antennas, transceivers, transverters, linears, pre-amps, accessories and most importantly, the techniques you should use to get the most out of VHF and UHF operating.
Its bang up to date.

Lowe Electronics

NEW FROM CHELCOM AERIALS

CHELCOM Aerials

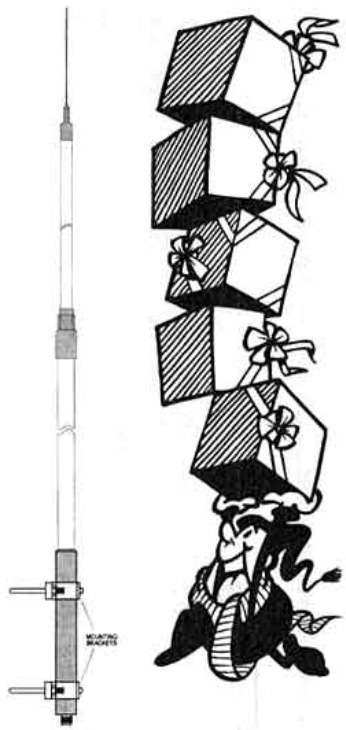
When you put your stocking up on Christmas Eve, make sure it's 27 feet long and you've told your partner about the new Chelcom Aerials CAHFV1.

At just £109.00, you won't find a better vertical! The CAHFV1 is a helical antenna and has been designed to be resonant on 80m and you can be operational in just minutes! There's just two fibreglass helical sections to screw together plus a stainless steel top section. No measuring to do, no coil winding and no cutting. It comes complete with a small stub mounting pole and brackets for a two inch mast. If you hammer a short length of pole into the ground and mount the antenna on that, you've got a great antenna system. Easy isn't it! Our test model loaded up straight away on 80m and surprisingly on 20m and 10m WITHOUT AN ATU! Using an outboard ATU, we were soon active on all the other bands as well, from top band to 10m! (By the way, did you know you can work G4LOW and G8LOW most Wednesday nights!)

You can also mount it above ground level but you will probably have to install a radial system of some type but that is easily worked out.

The construction is really good, something that purchasers of our Chelcom VHF and UHF colinears have really appreciated. It is made from the same high quality fibreglass with heavily chromed brass fittings to ensure a long life out in the elements and will easily handle a kilowatt.

Why not order one today and get active on HF now!



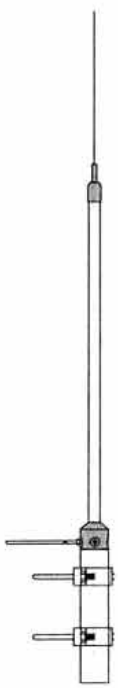
Check out Chelcom's dynamic duo.

SINGLE BAND COLINEARS FOR 2M AND 70CMS

CO-LINEAR CA432358

Specification:
430 - 440 MHz
3 x ⅝ colinear
Gain: 8.5dB
Impedance: 50 Ohms
SWR <1.4:1

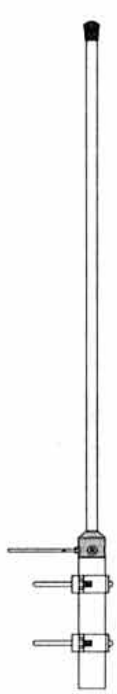
Construction:
Fibreglass, stainless steel, heavily chromed brass, with 'N' Type socket
complete with mounting tube, brackets and clamps for 2" dia masting.



COLINEAR CA144258

Specification:
144 - 146 MHz
⅝ over ⅝ colinear
Gain: 6.5dB
Impedance: 50 Ohms
SWR <1.4:1

Construction:
Fibreglass, stainless steel, heavily chromed brass, with 'N' Type socket
complete with mounting tube, brackets and clamps for 2" dia masting.
Made in the U.K. by....
....for Lowe Electronics



STOP PRESS NEWS!

NEW from Chelcom Aerials

The Chelcom family continues to grow with the addition of a new component system for making wire antennas. The Chelcom Aerial System makes available a range of baluns, dipole centres traps and insulators for making up a number of antenna designs including G5RVs, W3DZZs, Zepps, Windoms and Delta loops. In addtion to the individual components, we will also have a range of ready made antennas ready for installation.

At the time of writing (early October) we have very little detail regarding prices so we haven't included them in this advert but by the time you see this, we should have a complete information pack available which will include a booklet describing how the components all fit together with details of how to make up antennas from scratch.

Just send us four first-class stamps and we'll send you our complete antenna information pack which will also include other HF/VHF/UHF beams and verticals and our full range of rotators.

It's party time at Lowe's Bristol outpost!

December always means anniversary time at Bristol and this year, Tony and Dave are having their usual Christmas celebrations a bit early, Saturday 10th December to be precise. Make a note in your diary now to pop in and see them and enjoy a glass of wine or beer with them, their way of saying thank you. Light refreshments will also be available.

All our branches are also celebrating Christmas. During the week before, pop into your local branch and enjoy a glass of sherry and a mince pie with us - we'd love to see you!

HF225

Probably the most cost effective receiver on the market today, our HF225 gives you the best combination of facilities, matched with performance and price.

- Excellent sensitivity
- AM bandwidths: 10, 7 & 4KHz
- SSB bandwidth: 2.2kHz
- Audio CW filter: 200Hz
- 30 memory channels
- 8Hz tuning steps

All for just £479.00

Optional enhancements:

- B225 Nicad battery pack
- W225 Whip amplifier kit
- D225 Synchronous detecto
- KPAD1 Keypad controller
- C225 Leather carry case

HF150M

The world's most popular short-wave receiver just got a younger brother! The HF150 Marine is now available! A stylish white cabinet with tropicalised PCBs make the HF150M the ideal basis for broadcast, maritime mobile and WEFAX and NAVTEX reception in the harsh environment of the high seas. Complete with mains PSU and DC lead for 12V operation, the HF150M will complement the chart table or main cabin on any boat.

Available now, just £429.00

And some other gift ideas for those last minute shoppers...

BY1	Bencher Iambic paddle; black base	£64.95
BY2	Bencher Iambic paddle; chrome base	£79.95
BY3	Bencher Iambic paddle; gold base	£199.99
ST1	Bencher Single lever paddle; black base	£64.95
ST2	Bencher Single lever paddle; chrome base	£79.95
ST3	Bencher Single lever paddle; gold base	£199.99
RJ1	Bencher Hand key; black base	£59.95
RJ2	Bencher Hand key; chrome base	£64.95
YA1	Bencher Low pass filter; 1.8 - 30MHz; 1.5kW continuous power rating	£44.95
ZA1A	Bencher Balun	£24.95
4001	AKD 4m Transceiver	£199.00
6001	AKD 6m Transceiver	£199.00
HPFS	AKD High pass filter	£9.25
WA1	AKD Wavemeter	£29.95
WA2	AKD Wavemeter	£29.95
WA3	AKD Wavemeter; for HF TCVR; range 1.8 - 92MHz	£54.95
CX210A	Diamond 2-Way coaxial switch; SO239 connectors	£29.95
CX210N	Diamond 2-Way coaxial switch; N-type connectors	£53.25
DL30A	Diamond	£16.95
MX2000	Diamond Triplexer 6m/2m/70cm	£69.95
MX72DN	Diamond 2m/70cm duplexer	£39.00
BU50	Diamond Balun	£39.95
SY25D	Diamond 2m/70cm duplexer	£24.95
V2000	Diamond Triband vertical antenna; 50/144/432MHz 2.15/6.2 8.4dB 2.5m	£119.95
SX100	Diamond SWR meter 1.6 - 60MHz, 30W/300W/3kW, SO239	£119.95
SX1000	Diamond SWR meter 1.8 - 160MHz, 430 - 1300MHz, 5/20/00W, SO239 & N	£219.95
SX200	Diamond SWR meter 1.8 - 200MHz , 5/20/200W, SO239	£84.95
SX400	Diamond SWR meter 140 - 520MHz , 5/20/200W, SO239	£99.95
SX600	Diamond SWR meter 1.8 - 525MHz; 5/20/200W, SO239	£159.95
CS201	2-Way coaxial switch; SO239 sockets	£18.95
CX401	4-Way coaxial switch; SO239 sockets	£49.95
CX401N	4-Way coaxial switch; N sockets	£85.00

HP4A	Braid breaker filter	£9.95
NIR10	JPS Digital noise reduction unit	£399.00
NRF7	JPS Digital noise reduction unit	£299.00
NTR1	JPS Digital noise and tone remover	£199.00
PSUJPS	JPS 12V 1A power supply	£29.95
MFJ249	HF digital SWR analyser + 1.8-170MHz frequency counter	£229.95
MFJ259	SWR Analyser	£259.00
MFJ250X	Dummy load in a can (without oil) 1kW max.	£39.95
MFJ901B	1.8-30MHz "versa tuner" 200 Watts PEP	£71.95
MFJ941E	1.8-30MHz antenna tuner 300 Watts takes 2 antennas	£129.95
MFJ945D	1.8-30MHz mobile antenna tuner 300 Watts + meter	£109.95
MFJ948	1.8-30MHz antenna tuner 300 Watts	£149.95
MFJ949E	1.8-30MHz antenna tuner/dummy load 300 Watts	£169.95
MFJ931	Artificial ground	£99.95
PHF10	Pro-Am 10m mobile whip; ⅜" thread mount	£19.95
PHF15	Pro-Am 15m mobile whip; ⅜" thread mount	£19.95
PHF20	Pro-Am 20m mobile whip; ⅜" thread mount	£19.95
PHF40	40m mobile whip; ⅜" thread mount	£22.95
PHF75	80m mobile whip; ⅜" thread mount	£24.95
PHF160	160m mobile whip; ⅜" thread mount	£54.95
AB5	10; 15; 20; 40; 80m mobile antenna ⅜" mount	£79.95
101ADNP	Horizontal mirror mount ⅜" - SO239	£4.95
116NP	Gutter mount assembly ⅜" socket	£5.95
142ADP	Body/roof mount ½" hole; ⅜" - SO239	£4.95
81PTMKP	Plastic trunk mount and cable kit ⅜"	£9.95
MM3401	Maxi magmount; ⅜" socket to PL259	£39.95
PL58	PL259 to ⅜" thread socket adaptor	£3.95
SS100ADP	3 way mount; ⅜" socket to SO239	£5.95
TGSP	On glass scanner antenna and cable kit	£32.95
GM144	2m on glass antenna; 50W inc. 14' cable	£29.95
GM270	2m/70cms on glass antenna; 50W inc. 14' cable	
TGMKD	Kit for re-mounting TG series antennas	£9.95
PM144440BN	2m/70cms 3" magmount with 19" whip; BNC plug	£29.95

PRO-AM Mobile antennas and accessories

A Merry Christmas and prosperous New Year to all our customers old and new and those yet to do business with us. We look forward to serving you in 1995!

SPEED THRILLS

If you havenít yet upgraded to 9600 baud packet, nowís the time. Its been a long time coming but now you can get to 9600 of the shelf - complete radio and TNC packages with no mods to do and no extra boards to add in - just plug in and go - at high speed!

The radio end...

Check out Kenwood's twin FM transceivers - The TM251E puts you straight on to 2m or the TM451E for 70cms. Both run more than enough power to get you right into the network and feature dedicated data ports tailored to the needs of high speed packet.

The TNC end...

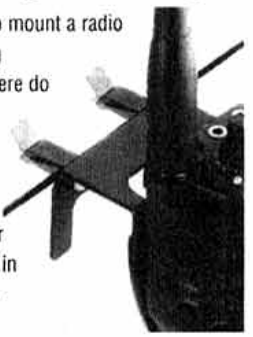
The new Kantronics KPC9612 is fast becoming the new standard in TNCs and when you see what it can do you'll know why! This is the only dual speed, dual port TNC on the market. It will let you connect two transceivers to it for working on two bands, or two frequencies on the same band if you prefer. One port is 1200 baud and the other can be configured to 4800, 9600 or 19k2 as standard! If you are already on Packet, imagine doing what you are doing already but eight times faster! With many new 9600 baud user ports fast becoming available on many BBS's this is the way forward! The new KPC9612 is available direct from Lowe Electronics, the Kantronics distributor - who better to buy from! If you want a complete package, we can supply you with everything from the power supply to the antenna and all the bits in between, including all the interconnecting leads. We canít supply the computer but we've got some great software we can offer! Ask now if you are considering upgrading, we're doing super deals on trade-ins and some great package deals on complete 9600 baud stations. Donít miss out!

Why not send us four first-class stamps and request our DataComms information pack and we will also give you a free copy of the Lowe Packet Radio ideal for beginners to get going or a useful reminder to those with more experience.

Lowe takes away the pain of mobile operating!

These days so many cars are just not condusive to operating mobile! Fewer and fewer places to mount a radio and when you do find someplace, someone breaks in and nicks it! Many people today are using handhelds in their vehicles which presents two problems - how do you operate it safely and where do you put it? Trust Lowe to solve the problem!

The QS200 is a superb little gizmo that everyone will want to buy for two reasons - it is so good and it is also so inexpensive! Just look at the picture. The QS200 holds the radio in a convenient place on the dash where you can still see the display and operate the major controls be it a handheld transceiver or a scanner. The QS200 mounts into the vents of your car dashboard with no drilling or cutting and your handheld just slots into it using its belt clip - fits in seconds and you can remove your handheld just as fast when you want to take it from the car - beats any quick release mount ! Get one now while stocks last!



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Tel 0272 315263

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Tel 0622 692773

YORKSHIRE
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Leeds,
Tel 0532 452657

SOUTH WEST
117, Beaumont Road
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Plymouth,
Tel 0752 257224

EAST ANGLIA
152, High Street,
Chesterton,
Cambridge,
Tel 0223 311230

THIS MONTH'S LEADING FEATURE

A Report by Tim Hughes, G3GVV and Malcolm Appleby, G3ZNU

THE 9TH REGION III Conference was held in Singapore from 5 - 9 September 1994, with the Singapore Amateur Radio Transmitting Society (SARTS) as the Host Society. At the opening ceremony, Mr K C Selvadary, 9V1UV, recalled that SARTS had just celebrated its 25th Anniversary, whilst the first record of a licensed radio amateur was in 1926 with the callsign SS2SE. From the International Telecommunications Union (ITU), speaking on behalf of the Secretary general, Mr G Davey referred to a forthcoming ITU plenipotentiary meeting. He added that the ITU recognised the contributions of amateur radio in assisting in HF propagation studies, in satellite communications, and field testing EMC in close proximity to other services. Next to address delegates was IARU President Dick Baldwin, W1RU, who pointed out that Region III had the smallest number of societies of the three regions. Nevertheless it had the highest number of operators citing the example of Japan, and the highest potential for growth; the People's Republic of China, Indonesia and Thailand were indicators of the latter. Next to speak, and then to declare the proceedings open, was the Republic of Singapore's Minister of State, Mr Goh Chee Wee, who stressed the significance of amateur radio and how young Singaporeans were becoming involved in the activity, with 70% of operators in Singapore being native Singaporeans.

The business of the Conference commenced with the nomination of 9V1UV as Conference Chairman, and the announcement by the Secretary, JM1UXU of other appointments which had been made at a meeting the previous evening: the Credentials Committee would be convened by G3GVV, the Finance committee by 4S7AJ, and the Editorial Committee by HS0/G4UAV. Two Working Groups would function: Working Group A would deal with Administration and Operating, chaired by Terry Carrell, ZL3QL, and Working Group B, the Technical Group, would be chaired by Kevin Olds, VK1OK.

Each Society presented a report on its activities. The RSGB reported that there were now bi-monthly articles on IARU in *RadCom*, that it continued to maintain good relations with its licensing authority the Radiocommunications Agency, that it organised courses for candidates for the Novice Licence and that amateur radio was being introduced at an increasing level in British schools. Monitoring System activities were increasing. The purpose and functioning of the Committee system was explained.

Working Group A

A WIDE RANGE of topics was discussed, including Region III relationship with other organisations, radio regulations and spectrum management in the CEPT, reciprocal licensing and the harmonised amateur radio certificate (HAREC), type approval of radio equipment, wind profiler radar, *Region III News*, the use of Morse code, and handicapped radio amateurs. An RSGB delegate was present and actively involved with all of these issues.

Region III Relationship With Other Organisations

The need for linking with other organisations was emphasised, following the proposal from Pakistan to use the 144MHz band for satellite communication. The authorities in that country appeared to be unaware that this was an amateur band.

It was agreed that liaison with the Asia-Pacific Telecommunity (APT), the Asian Broadcasting Union (ABU), and the Asia Pacific Cooperation Forum (APEC) was highly desirable. Although the last-named is more concerned with economic issues, it has become involved in standardisation and this could have an effect on amateur radio. A resolution put forward by RSGB that Region III should seek admission to these bodies and be represented when

Above photograph: The opening plenary. The Republic of Singapore's Minister of State opening the Conference; seated JM1UXU (Secretary IARU Region III), 9V1RH (Chairman IARU Region III), 9V1UH (President SARTS), Mr G Davey (ITU Regional Representative).

necessary at their meetings, was accepted.

Radio Regulations and Spectrum Management in the CEPT

It was noted that former USSR countries were now members of the CEPT, and that CEPT's staff were carrying out detailed spectrum investigations into the use of the spectrum from 29.7MHz upwards; recommendations were also being made as to how the frequencies should be used. The European Radiocommunications Office (ERO) and European Radiocommunications Committee (ERC) respect amateur radio activities. There are real threats to the amateur frequencies in the VHF, UHF and specially above 1GHz. These points were made forcibly in an RSGB Paper and in its presentation to the Conference.

Chen Ping, BZ1HAM.

Wind Profiler Radar

A detailed briefing was given by W4RI, and the work to date on frequency sharing was noted. Societies were urged to note, and report on, wind profiler radar development in their respective areas. The conference commended the work done by JARL and W4RI.

Commonly Acceptable Amateur Licences

Seven papers relating to this topic were introduced. It was noted that there are two alternative schemes: reciprocal operating privileges (the CITEL proposal, which is equivalent to an international driving licence), and reciprocal licences or common transferable licences (the CEPT proposal TR61-02). The latter is now available to amateurs in 40 countries in Europe, in Israel, in New Zealand, and in Peru. It was recommended that Societies pursue this with their licensing authorities, so that the latter recognise and extend existing informal arrangements between countries.

9V1RH talking to JR1ANP, with JA1AN (President JARL) on the right.

Morse Code Ability

The New Zealand Amateur Radio Transmitting Society had conducted a survey of its members concerning the desirability or otherwise of a Morse Code test to qualify for a licence to operate on frequencies below 30MHz; the results indicated general support for this policy. Reference was made, too, to a similar survey carried out by RSGB. A proposal supportive of this requirement which was made by RSGB, seconded by SARTS, received unanimous support; it will be discussed again at the next Conference.

ARDF

A report on the state of ARDF in the Region was given by BZ1HAM. The Rules for IARU Region III ARDF Championships and the appointment of IARU Region III International Class Referees were approved. The next Region III ARDF Championship will be held in Queensland.

Information Programme for Handicapped Amateurs (IPHA)

The work done for many years by PA3ADR was noted and commended to all societies. RSGB reported on the assistance which is given in the UK to handicapped persons, in their training, examination and operating.

Support of the Amateur Radio Service in Region III (STARS***)

The vital importance of acceptance of amateur radio by a country's administration was acknowledged; it was noted that there are still some countries where it is viewed with suspicion.

The need to have local input to administrations to strengthen amateur radio's influence at the ITU was highlighted, because each country, however large or small, has one vote at World Radio Conferences (WRC).

The Amateur Radio Forums promoted by IARU, JARL and APT were of great significance. For these reasons, the STARS*** programme, for the promotion and support of amateur radio in all the countries and societies in Region III, was approved unanimously.

Working Group B

THIS WAS THE first time at a Region III Conference that a separate working group met to discuss technical issues. In its discussions Working Group B covered such matters as beacons, bandplans, packet radio, satellites, EMC, and the IARU Monitoring System. 29 delegates attended the sessions at one stage or another, and RSGB was represented throughout.

Beacons

Region III gave its solid support to the expanding International Beacon Project (IBP) which is now proposing to extend the time

Mr Shozo Hara JA1AN, President JARL, (right) with Mr Keigo Komuro JA1KAB incoming Secretary of Region III.

share beacon network to all five HF bands (14, 18, 21, 24 and 28MHz). Several offers were made to both site and fund beacons at strategic points in the Region. As a result new beacons are likely to become operational

Front row: G3GVV, BV2A, G3ZNU, BZ1HAM. Second row, members of New Zealand delegation with ZL3QL in centre.

in Japan, New Zealand, Australia, Taiwan and Sri Lanka.

The Conference also decided to create a new position of Region III Beacon Coordinator, who will both actively promote the establishment of time share beacons as part of the IBP, and also act as a central coordinator for the locations and frequencies for non-time share beacons on the 28MHz, 50MHz and 144MHz bands. RSGB had offered its services to coordinate Region III beacons on 50MHz, but with the creation of the new Region III Coordinator position the offer was unnecessary. Instead it was agreed that there should be active coordination between IARU Regions

of beacon frequencies up to and including the 50MHz band, with information interchange between Regions for VHF/UHF beacons. The Conference recognised some benefit in establishing beacons on bands below 14MHz but realised there were a number of issues to be carefully considered before they be encouraged.

Bandplans

No major changes were made to any of the bandplans, but a proposal from RSGB that the moonbounce segment in the 144MHz band be aligned with Region I was agreed. National licensing administrations often overlook the fact that most amateur bands, even those above 1000MHz, need common allocations internationally so that worldwide satellite and moonbounce communications are possible. A paper from the RSGB raised the issue in the context of frequency planning in Europe (CEPT) and the Conference agreed that all Region III member societies should keep a close awareness of the frequency management activities of their administrations so as to ensure that common allocations be preserved. Societies were also asked to ensure that their administrations recognised the significance of the footnotes on the Amateur Satellite Service in the ITU Table of Allocations. The Conference also reaffirmed the widely-held position across all IARU Member Societies that bandplanning by regulation (ie imposed by the licensing authority) is not consistent with the Amateur Service and should be guarded against.

Packet Radio

IARU has adopted a set of guidelines for packet radio and bulletin board operators which were originally put together at the last Region III Conference. This year the Conference proposed a few changes, in particular emphasising the responsibility bulletin board operators have for the traffic passing through their stations, and encouraging the use of authentication mechanisms to validate the originators of messages.

Satellites

As have the other IARU Regions, Region III fully endorsed the Phase 3D satellite project which is in all respects a mammoth undertaking by amateurs worldwide, and encouraged all Member Societies to assist the effort by collecting funds. The Conference recognised the need to protect the satellite part of the amateur bands, and to avoid terrestrial communications in those segments. To this end all Member Societies were asked to publicise which segments were reserved for satellites from the 28MHz to the 24GHz band.

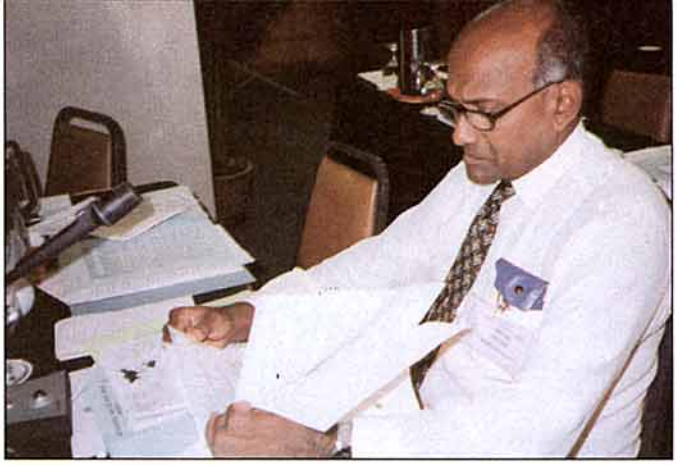
EMC

Region III has the same problems of EMC and standards as are emerging in other parts of the world, and agreed that a coordinated approach across the Region will benefit all amateurs. There is no equivalent standards body in Region III to our own regional ones (CISPR etc). Instead there are many national bodies independently setting standards for EMC and it was recognised that these need to be influenced so as not to place onerous standards on amateur equipment. To start this moving the Region III Secretariat will act as a coordinator, collecting information from all Member Societies. RSGB presented a paper on how to reduce EMC problems which was received with great interest, and we were also able to provide delegates with copies of a recent *RadCom* article on EMC.

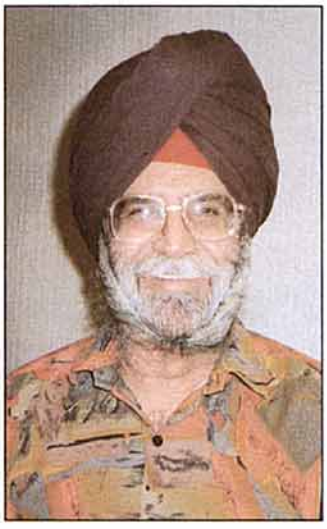
Some national licensing authorities have considered introducing type approval for amateur radio equipment, and Region III has affirmed its opposition to such moves which could restrict the hobby and increase costs to the amateur.

IARU Monitoring System

Region III has a small but active Monitoring Service coordinated by ZL1CVK, and the good work which has been done and the results achieved have spurred six or seven other Societies to commit to setting up a system. The RSGB's system was reported to the Conference and provides a model of how such systems are set up and operated. Region III has particular problems with intruders into the 28MHz band from fishing fleets and taxis, and the difficulties of identification are compounded by the wide area over which these intrusions occur, and language differences far greater than we experience in Region I. The Conference agreed that wide publicity should be given to those countries from which intrusion into the bands was persistent, but that we should also acknowledge those countries which have been successful in cleaning up their act (for instance Chinese intrusion on 7MHz, which has been considerably reduced following years of work by JARL).



9V1UV, the President of Singapore Amateur Radio Transmitting Society.



Sangat Singh, 9M2SS.

Conclusion

AT THE FINAL PLENARY farewells were said to Masayoshi Fujioka, JM1UXU, who had served as Secretary of Region III for twelve years, a task he had performed with efficiency and distinction. He will be succeeded by Keigo Komuro, JA1KAB. JARL indicated its willingness to support the secretariat, a gesture which gained the approbation of all delegates.

The outcome of the election for Directors will see the following in place: Fred Johnson, ZL2AMJ, Park Young-Soon, HL1IFM, David Rankin, 9V1RH, Yoshiji Sekido, JJ1OEY, and Sangat Singh, 9M2SS; ZL2AMJ was chosen as Chairman by the Directors, 9V1RH having decided that he wished to stand down after the next Conference. The latter received warm thanks for the work he had done over many years.

The venue of the next Region III Conference in 1997 was chosen as Beijing, with CRSA the host. The following Conference would be in Queensland, hosted by the Wireless Institute of Australia.

This was a highly successful conference, with matters of substance being discussed in a realistic and constructive manner. It was attended by more than 70 representatives from 18 countries. Present, too, were members of IARU Headquarters, the International Secretariat, Region 1 (including the Secretary, Dr John Allaway, G3FKM, at no cost to RSGB), and Region II. The fact that it ran so smoothly was a tribute to the organisation of SARTS; with a current membership strength of 85, an immense amount of preparation had taken place prior to the event and continued throughout. Presentations were made to the President, 9V1UV, including a gift from RSGB.

Tim Hughes, G3GVV and Malcolm Appleby, G3ZNU (Chairman and Vice-Chairman of the IARU Committee) were the RSGB representatives.

HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham B17 8QB

MORE COMMENTS have come in on the idea of some kind of 'centre of activity' on 21 and 28MHz during the period of low sunspot numbers. One came from John Purcell, 2E0AHU, who I mention specifically because he is the very first Novice operator to write to me and obviously is a budding DXer, having worked 27 countries in two months with his three watts (or less) into a dipole on 28MHz! Steve, G0AEV, suggests having a regular time for people to have a 'try 10 metres night' maybe on the 10th of each month between 1500 and 2100UTC and using 28.500MHz as the centre of activity.

John Bazely, G3HCT, wishes it to be known that he is *not* QSL manager for the present A22CT. The call has been reissued and only requests for QSLs for contacts made during October 1982 should be sent to John.

IOTA

A NEW FEE structure for certificate applications and updates will become effective on 1 January 1995. The main change is the adoption of an 'administration fee' based on the number of cards submitted for checking as the main element of the charge. The new fees will be as follows: IOTA-100 Certificate - no charge (included in the administration fee); Highest level certificate (IOTA-200 to IOTA-700) appropriate to the applicant's score - no charge but issued only on request; all other certificates - UK £4.00, US $6.00, or 10 IRCs. Updates: Those already taking part in the programme and who hold an IOTA-100 Certificate may update their score for inclusion in the Honor Roll or Annual Listing. If less than 60 cards are sent the fee is UK £3.00, US $5.00, or eight IRCs. Where there are more than 60 the charges below apply. No certificate will be issued. Administration fee per number of QSLs submitted: **Up to 120** = UK £6, US $10, or 16 IRCs. **121-170** = £9, US $15, or 24 IRCs. **171-220** = £12, US $20, or 32 IRCs. **221-320** = £15, US $25, or 40 IRCs. **321-420** = £18, US $30, or 48 IRCs. **421-520** = £21, US $35, or 56 IRCs. **521-620** £24, US $40, or 64 IRCs. **621-720** = £27, US $45, or 72 IRCs. Total charge is the administration fee plus the certificate fee where appropriate. From 1 January 1995 it will no longer be necessary to purchase missing lower level certificates.

The 1995 edition of the *IOTA Directory* is now available and contains all the information which was due to be released at the 1994 HF and IOTA Convention. The IOTA 30th Anniversary booklet *IOTA-30 Years On* is also still available. A copy of both books costs £11, US $18, or 27 IRCs (within Europe) or £13, US $22, or 33 IRCs outside Europe. Individually they cost £6, US $10, or 15 IRCs (Europe) or £7, US $12, or 18 IRCs (elsewhere). They are available from Roger Balister, G3KMA, La Quinta, Mimbridge, Chobham, Woking, Surrey GU24 8AR. (*Please do not send overseas cheques*).

An important statement was made at the IOTA 30th Birthday Party that: "The IOTA Committee of the Radio Society of Great Britain and Yaesu UK Ltd announce that they have entered into a sponsorship agreement by which Yaesu becomes the principal sponsor of the RSGB IOTA Programme. The agreement is a world-wide agreement and runs for three years from 1 October 1994. Under this agreement Yaesu will inject funds into the IOTA Programme which will be used by the IOTA Committee to finance its costs in running the programme. Yaesu will secure advertising without charge in the IOTA Directory and in the IOTA Anniversary Booklet. Both parties agree to make their best efforts to publicise the agreement. Yaesu will be making available on loan a portable station for the use of IOTA DXpeditions together with QSL cards."

DX NEWS

FIRST OF ALL special congratulations to ZB2EO who believes that he and VK6HD may have made the first ever ZB2/VK QSO on 1.8MHz on 2 January 1994 at 2112UTC, and likewise maybe the first ZB2/ZL QSO on the same band at 0705UTC on 2 November 1993 when he worked ZL1HY.

On 19 September a remarkable operation took place in Yangon, the capital of **Myanmar**. A demonstration of amateur radio to government officials was made by G3NOM and two Japanese friends and seven countries were worked on SSB and SSTV. The callsign used was XY1HT and there is no intention to apply for DXCC status for the project. Ralf, DF2FDK, will be in **Thailand** and signing HS0/DL2FDK between 9 December and 9 January. He will be using SSB, Pactor, and RTTY and has an FT747 and TH3JR beam antenna.

RSGB DX News Sheet quotes from a letter received by G3IOR which came with a QSL from 7O1AA. In it Ahmed says: "Unfortunately this operation (7O1AA) will not occur any more after the occupation of the south by the north. I have lost my rig and laptop computer and also my logbook which was in the club station at the time the north troops occupied Aden and destroyed it. Everything was stolen from the shack and they set fire to it. The address in Aden is not active any more and I have no intention to go back there in the near future."

Dave Plater has written to say that he has now been issued with his licence in the **Sultanate of Oman** where he expects to be until about August 1995. He is running a TS140S into a vertical antenna and activity is mostly on 7 and 14MHz with CW, SSB, and digital modes. A45XJ's operating hours will usually be between 1100 and 1400 and 2000 to 2300. UK and Novice contacts will be specially sought. He will operate from A47RS occasionally.

The *Long Island DX Bulletin* says that K3UOC is in **Saudi Arabia** and on the air from the Royal Palace as 7Z5OO with an ICOM IC-736 and R7 antenna. He is most active from 0900 - 1500 and prefers CW.

According to the *Long Island DX Bulletin* VR6PAC on **Pitcairn Is** appears on 14.255MHz on Wednesdays at 0100. The *RSGB DX News Sheet* reprinted advice which appeared in the *TopBand Newsletter* - if you would like to work **New Zealand** on top-band and want to know when to look then listen for a ZL beacon on 1819.30kHz which is located in Napier and sends digital bursts on LSB every few seconds.

ST2AA is said to be found near 21.150MHz between 1400 and 1500. If 21MHz is not open he goes to 14.348MHz. *DXPRESS* says that CT1CZT was due to start a two year spell in **Sao Tome** during September and that he is trying to get a licence. S92SS is active on Fridays and Saturdays on 1.835MHz at around his sun-

BAND REPORTS

This time I have to thank G2HKU, G3GVV, G4CMZ, GJ4GG, GW4KGR, G4OBK, G0AEV, and G0MHC for their input. The period covered is from mid-September to mid-October and callsigns in italics were of stations transmitting on CW:

7MHz
0600 *FG5ED, TA2DS, VK3MR, ZL2IE.*
0700 *YJ0AAA.*
10MHz
0600 *TA/DJ6SI, VK, YJ0AAY, 5T5JC, 5V7DB.*
1000 *5T5JC.*
1700 *ET3BN, JT7FAA, VQ9KC, 3DA0BX, 9M8FC.*
1900 *JX7DFA, T5AR, 9X5HG.*
2000 *S92SS, 3B8/NK6F, 9Q5AGD.*

14MHz
0700 C2/DL6NA, JA, KH0AC, P29SC, YI0BIF, *5V7DB,* 5W1UC.
0800 BV2FI, KH8BB, SV2ASP/A, VR2KF, 3X0DEX.
1000 H44BC, TJ1PD, VK9NS, ZL3AC, 9K2ZM.
1500 *C53HG, VQ9QM,* 9X5/VE3MJQ.
1600 *HS1GOS, HS1OVK, 9V1YC.*
1700 BV7GA, HS1NGR/8, J28RP, SU1SK, 3DA/SP2JYK, 4S7/CN8GM.
1800 ET3BT.
2100 *V26X,* ZD7HAM, *G3MRC/9Q5.*

18MHz
0900 A35MW, *JD1BIE/JD1,* T30NJ.
1000 VS6CT, *5V7DB.*
1100 V63JC, V73C.
1300 C91AI, *FR5HG/E, ZD5OO, 9X/HB9AUZ.*
1600 TU2ER, *T5AR,* VQ9HJ, *YI9CW, 3B8CF, 9M8FC, 9V1OK.*
1700 *A71AN, PJ8X, TL8NG, TR8XX, TU4EV, 9M2AX.*
1800 A22CT, *C53HG, ET3BN, V2/G4DIY, VQ9KC,* 5N0GC, 5R8KH.

21MHz
0800 HZ1AB, 9U/F5FHI.
1800 VP8BKT, 9Y4PM.

1994 WARC BANDS TABLE

	10MHz	18MHz	24MHz	Total
G4OBK	136	204	127	467
EA5GQI	-	137	77	214
G0MHC	54	78	41	173 (CW)
GJ4GG	41	69	42	152
EA5DQE	-	92	49	141
G2AFV	57	56	12	125
G3ING	62	46	15	123
G4CMZ	53	61	9	123
G3KKJ	17	53	39	109
G0TMZ	25	32	11	68
G3IAR	33	16	2	51
G4FVK	18	20	11	49

28MHZ COUNTRIES TABLE

G0AEV	42
G4OBK	40
G0DNV	31
G0MCT	12
G0NQC	9

set time. PA3CXC/ST0 expected to leave Southern Sudan for **Angola** at the end of September. TJ1JR - in **Cameroun** - keeps a sked with his QSL manager N7VEW and stands by for other callers when he has finished. The sked is at 2230 on 14.165MHz on Wednesdays.

DL3KDV will be in the Caribbean area about this time and his plan was to be in **St.Vincent** from 18 November until 1 December, and **Dominica** from 2 to 5 December. According to the *RSGB DX News Sheet* novice operators in **Colombia** are now allowed to air their HJ callsigns on SSB on 1.8, 3.5, 7, 21, and 28MHz. G8FXT is in the **Falkland Is** until 20 February and will be on all bands on SSB and digital modes. His callsign is VP8CQJ. KB9EKO and K9JJR will be in **Barbados** from 4 to 12 December as 8P9CT and 8P9DC.

DXCC News Releases issued on 3 and 4 October announced that the number of unprocessed applications at the end of September was 925 (70,916 QSLs). The DXCC desk had received 1,233 applications during the month - this was a 75.5% increase over the number dealt with in August.

The Awards Committee has voted 5 to 2 against a DXAC recommendation that would set a minimum size for DXCC countries. Those voting against shared the feeling that a 'minimum size' rule was not needed. Standard operating procedure allows the DXAC to resubmit a recommendation (with or without changes) on appeal, and Chairman Bob Beatty, W4VQ, has announced his intention to do that. He also declared a moratorium on new DXCC country petitions that might be affected by a minimum size rule. This will be in effect until such time that deliberations on this issue are complete.

IOTA FREQUENCIES

JUST TOO LATE for inclusion in last month's column I received a copy of a letter from G3KMA to G3RJV. In it Roger apologised for what had happened which came as a result of requests from North America for an IOTA frequency above 7.025MHz. The IOTA Committee has considered the problem and has issued new guidance which says: "No specific frequency is nominated for 7MHz CW but it is recommended that operations should include a frequency above 7.025MHz when the band is open to N America." Roger also points out that nominated frequencies are not reserved exclusively for the making of island contacts but are shared with others on a normal non-interference basis.

PROPAGATION

THIS MONTH SMITHY reports: "By the third week in October there were signs that the Doldrums referred to last month might be about to end. For the past six months the 27-day average solar flux had hovered between 76 and 82 sfu, showing neither an upward or downward trend, but was now showing signs of a possible recovery, having climbed steeply as a result of a re-organisation of activity on the Sun. Past patterns suggest that the upward trend might continue for at least a few weeks. Certainly the combination of daily values in the 90s and very low geomagnetic activity had improved HF band conditions all round and brought some good F2 propagation back to 28MHz."

CONTESTS

ARRL 160M DX CONTEST

2200 2 December - 1600 4 December

CW only, work W/VE only. Single-operator (1) QRP (less than 5W output), (2) Low power (less than 150W output), (3) more than 150W output, and multioperator classes.

W/VE stations will give RST and ARRL/RAC section. Each QSO counts five points. Multipliers are ARRL/RAC sections worked plus VE8/VY1 (maximum

QTH CORNER

A45XJ	via G4MZY, D J Plater, c/o FCO (Masirah), King Charles St, London SW1A 2AH.
HS1GOS	via HS1FMD, J Suttipornjaroen, 213 Suksawat 22 Rd, Bangpakok, Rahthburana, Bangkok 10140, Thailand.
HS1OVH	Box 195, Bangkok 10400, Thailand.
T30BH	(Direct only) Ron Wright, ZL1AMO, 28 Chorley Av, Massey, Henderson, Auckland 1208, New Zealand.
T5AR	SM0DJZ, Jan Hallenberg, Siriusg 106, S-19555 Mersta, Sweden.
ZB2EO	J.J.Bautista, 47 Valiant House, Varly Begg Estate, Gibraltar.
ZG2EO	via ZB2EO.
7Z5OO	via Harvard Wireless Club W1AF, 6 Linden St, Cambridge, MA 02138, USA.

PHOTO: IAN TRUSSON, G3RVM

The IOTA 30th Birthday Party in October. A full report will appear in January's edition of *RadCom*.

77). Post entries within 30 days to ARRL, 225 Main Street, Newington, CT 06111, USA.

ARRL 10M CONTEST

0000 10 December - 2400 11 December

Same power levels as above, Mixed mode, Phone only, or CW only. Exchange RS/T - Ws/VEs will send state or province, others RS/T and serial QSO number (from 001). Each Phone QSO counts two points, each CW four, and QSOs with US Novice or Technician stations count eight. Multipliers are the fifty US states (plus DC), US states and Canadian provinces, and DXCC countries. Submit logs within 30 days. I can supply photocopies of the rules of either of these ARRL contests.

RAC WINTER CONTEST

0000 - 2359 31 December

1.8 to 144MHz either CW or SSB. Stations may be worked once on each band and mode. QSOs with Canada count 10 points, and with RAC official stations (VA2RAC, VA3RAC, VA7RAC, VE1RAC, VE4RAC, VE5RAC, VE6RAC, VE8RAC, VE9RAC, VO1RAC, VO2RAC, VY1RAC, and VY2RAC) 20 points. Stations outside Canada count two points. Send RS/T and serial number, Canadians send province or territory. Multipliers are Canadian Provinces and territories (12 in all) and count once on each band and mode.

Entries must contain a summary sheet and dupe sheet and must be sent to: RAC, PO Box 356, Kingston, Ontario, K7L 4W2, Canada, by 31 January 1995. I have copies of rules (SASE please).

HAPPY NEW YEAR CONTEST

0900 to 1200 1 January

CW only, 3.510-3.560, 7.010 - 7.040, and 14.010 - 14.060MHz. Listeners may take part. Three categories - (1) 250W, (2) 50W and (3) 5W *output*. Exchange RST and serial QSO number (from 001). AGCW members will give their club number.

Each station may be worked on each band and multipliers are the number of AGCW members worked. Post before 31 January to Fritz Bach jun, DK1OU, Eichendorffstrasse 15, D-59590 Geseke, Germany. Photocopies of rules available (SASE please).

NINE BAND TABLE NO 12

Callsign	1.8	3.5	7	10	14	18	21	24	28	Total	
G3KMA	182	277	320	269	326	302	326	290	320	2612	
G4BWP	153	275	309	260	325	299	321	266	310	2518	
G4GIR	133	262	303	233	326	280	322	248	310	2417	
G3XTT	187	248	295	225	323	275	317	246	294	2410	
G3GIQ	77	223	285	154	326	273	326	234	314	2212	
G4OBK	133	181	233	187	303	257	279	206	251	2030	
G3TXF	96	198	257	173	307	194	306	144	273	1948	
GM3PPE	68	172	214	218	278	237	255	183	221	1846	
G3WGV	84	152	211	218	254	242	255	196	228	1840	CW
G3SXW	81	181	224	191	292	193	281	141	238	1822	CW
G3IGW	125	182	302	192	273	222	229	44	207	1776	
G3NOF	5	114	113	-	325	236	325	221	299	1638	
G4ODV	88	184	307	167	254	123	244	69	200	1636	
G3VJP	17	135	212	80	311	114	289	43	238	1439	
GW3JXN	60	145	207	154	256	218	235	52	125	1574	
G4NXG/M	6	42	96	-	237	128	256	137	238	1140	
G4CMZ	14	42	102	80	142	52	125	7	101	664	
Average	89	177	235	165	286	214	276	166	247	1854	

NEXT DEADLINE: Entries to reach G3GIQ no later than 8 January 1995.
Please note entry level is 600 total. No need to work all bands.

Results of the **1993 *CQ* WW DX Contests** have now appeared in *CQ* magazine. **G0TDX** came third in the Top Ten listing of the DX QRP CW section with 73,476 points and **G0NYD** was 12th in the corresponding Phone listing.

In the **CW Section** UK scores were as follows:

(All-band) **G4BUO** 3,651,156, **GJ/K2WR** 1,097,580, **GM3YTS** 1,003,448, G3TMA 775,202, G6IRA (?) 386,553, G3KKQ 125,316, GM4SID 191,000, G4PTE 43,788. (All-band low-power) **G3SWH** 916,158, G3SSO 676,506, G4ZFE 481,572, **GW3JI** 431,760, G3NKS 281,880, **GM0/NX1T** 267,332, G3RSD 108,605, G4ZME 89,628, GW3JSV 85,738. (21MHz) **GW8GT** 601,160, **G3KDB** 481,712, G3UFY 181,930. (14MHz) **GM3WOJ** 542,336, **G4CNY** 505,180.(14MHz low-power) **GM3CFS** 77,160, (7MHz) **G0IVZ** 531,522, G3WRR 10,070 (7MHz low power) **G5MY** 60,809, **GM4FDM** 53,908. (3.5MHz) **G3BPM** 27,048. (1.8MHz) **GW3YDX** 154,376, **GI0KOW** 77,162, **GM3YOR** 49,070, GM0RHP 21,114. GW3GWX 3,440.

In the all-band QRP section **G4BWP** scored 685,500 and took third position in the world listing. **GM4HQF** scored 59,502, GM0GNT 21,165, On 28MHz G0FDX 2,844. On 21MHz **G3DYY** scored 72,485, on 14MHz **G3LHJ** 29,460, and G3DOP 5,254. In the single operator high power listings **GW3YDX** was world second on 1.8MHz with **GI0KOW** sixth. In the single-operator assisted category (all bands) **G3XTT** scored 1,502,501 points, **G3TXF** 1,301,300, G5LP 339,075, and G4OBK 8,800. **G4PDQ** made 81,885 on 21MHz and **G3WVG** 126,845 on 3.5MHz. In the multi-operator single transmitter category **GB5DX** scored 5,497,007, **G3LNS** 5,308,580, G3PJT 1,412,544, GB5WW 1,266,651, GX0FUN 1,008,780, G0FOS 543,840, GS4TMS 461,404, and G4BLX 166,390.

THANKS

THANK YOU FOR the support I have received from members during 1994 and also to the authors of *DXPRESS* (PA3FQA), the *Lynx DX Bulletin* (EA2KL), the *EA DX Boletin* (EA1QF), the *Long Island DX Bulletin* (VP2ML) and the *RSGB DX News Sheet* (G4DYO). Please send everything for **February** issue to reach me no later than **17 December.**

And finally - seasons greetings to all!

VHF/UHF NEWS

NORMAN FITCH G3FPK
40 Eskdale Gardens, Purley, Surrey CR8 1EZ

THE MAIN TOPIC this month is the period of excellent tropospheric propagation enjoyed in mid-October. This brought a lot of reports from readers. The VHF Committee of the RSGB has published proposals for re-planning the 144 - 145MHz section of the 2m band.

PUBLICATIONS

THE OCTOBER issue of *Six News*, the journal of the UK Six Metre Group (UKSMG), includes the definitive, 36-page account of the historic operation from Jordan by the JY7SIX team in May/June 1994. It is well illustrated with photographs. For details of the UKSMG, contact secretary Chris Gare, G3WOS, QTHR (address in *RSGB Call Book*).

The August/September issue of *The VHF-UHF DXer* features Sam Jewell's, G4DDK, 'Tech Slot' covering the use of coaxial transfer relays. Products by Sivers Lab and Radiall are illustrated. There is an article by Al Ward, WB5LUA, on a variable bias supply for grounded grid power triodes plus the usual band reports. The editor and publisher is Dave Hardy, G8ROU (QTHR). His Internet address is g8rou@g4klx.demon.co.uk and his packet radio route is G8ROU@GB7MAM.#23.GBR.EU.

The Autumn issue, 3/1994, of *VHF Communications* includes a contribution by Richard Formato, K1POO, on 'Improving impedance bandwidth of VHF/UHF Yagis by deceasing the driven element L/D ratio.' This is well illustrated with graphs and diagrams. Jochen Jirmann, DB1NV, has summarized his radio astronomy experiments in the 70cm band. He describes a simple Dicke receiver used with a single 19-ele Yagi to detect cosmic radio emissions. For subscription details contact KM Publications, 5 Ware Orchard, Barby, Rugby, CV23 8UF.

REPEATERS

THE CLYDE COAST Repeater Group has a new committee comprising chairman Simon Lewis, GM4PLM, treasurer Andy Hood, GM7GDE, Rod Spink, GM7FGJ and Duncan Macpherson, GM7OBM. The group runs UHF relay GB3PG (RB9) in Greenock and has plans for a second repeater in Ayrshire to cover the lower area of the Clyde. Contact any committee member for details of the group.

Mike Wright, EI2DJ, sent information about EI2RTE/R, the Dublin UHF voice repeater on RB9. Located near junction 1 on the M1 airport motorway, it has been operational (QRV) since September 1991. There are plans for a 1297MHz repeater with proposed DTMF linking to EI2RTE/R. Contact EI2DJ at 5 Woodview Park, The Donahies, Dublin 13, Irish Republic for more details.

GB3KR, the Kidderminster UHF repeater, is QRV again on RB3 with reduced coverage due to temporary antenna height problems. Reports to Mr RJ Duddin, G8NTU - QTHR. After a long absence, the Jersey VHF re-

PHOTO: GJ4ICD

(From L) Mohammad, JY4MB, HRH Prince Raad, JY2RZ, and Geoff, GJ4ICD presenting the 50MHz beacon JY6ZZ on the recent expedition to Jordan. The beacon was built and donated by Lawrence, GJ3RAX, and Geoff, GJ4ICD.

LOCATOR SQUARES TABLE
Starting date: 1-1-1979

Callsign	50MHz	70MHz	144MHz	43MHz	1.3GHz	Total
G3IMV	460	15	521	125	52	1173
G0CUZ	199	-	394	80	-	673
G4RGK	183	-	332	204	68	787
G4YTL	-	43	290	38	-	371
GW8JLY	-	-	284	36	-	320
GJ4ICD	628	1	264	121	75	1089
GW4LXO	499	37	261	109	48	954
G0EVT	251	12	261	65	1	590
G4DEZ	235	-	255	74	63	627
G4IGO	565	-	250	-	-	815
G6HKM	481	-	248	120	64	913
G3FPK	-	-	246	-	-	246
GW4FRX	-	-	239	-	-	239
G0GMB	106	-	225	108	-	439
G4TIF	352	28	213	112	-	705
G0FIG	200	-	211	69	23	503
G8LHT	225	20	210	95	20	570
G1SWH	285	37	199	64	9	594
GW0PZT	-	-	188	-	-	188
G7LIJ	24	-	171	-	-	195
G6RAF	129	19	168	115	-	431
G1AWF	59	-	167	3	-	229
G4MUT	200	26	159	97	34	516
GW6VZW	399	-	143	6	-	548
G8TOK	167	25	131	51	21	395
G8XTJ	175	-	129	-	-	304
G1UGH	239	-	124	-	-	363
G4OUT	-	22	103	-	-	125
G3FIJ	61	26	85	33	6	211
GU4HUY	-	-	84	-	-	84
G0HVQ	328	-	71	-	-	399
GI1CET	97	-	67	6	-	170
G3UOL	11	-	66	-	-	77
G6ODT	-	3	62	73	-	138
G7CLY	98	-	60	2	-	160
G0HIK	1	1	58	13	-	73
GJ7LJJ	102	-	54	12	-	168
G0JHC	542	-	48	-	-	590
G0SOO	115	-	41	-	-	156
GW7SMV	-	-	40	-	-	40
GM0GLV	102	-	35	-	-	137
G3NKS	2	43	2	2	-	49
G4OBK	83	-	1	-	-	84

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Band of the Month is 144MHz. Next deadline is 29 December.

peater GB3GJ on R2 is QRV from a new site. Details from and reports to its keeper Mr P Crespel, GJ0NSG, at PO Box 704, Jersey, JE4 8ZZ.

144MHZ BANDPLAN

ON BEHALF of IARU Region 1, the RSGB VHF Committee has proposed the following bandplan revisions to the 144 - 145MHz segment of the 2m band: 144.000 - 144.035 CW/SSB EME 144.035 - 144.125 CW 144.125 - 144.380 CW/SSB 144.380 - 144.400 All narrowband modes 144.400 - 144.510 Beacons 144.510 - 144.710 Data communications 144.710 - 145.000 All modes. For a full report on these proposals, please refer to page 6. Your constructive comments on them would be welcome and all will be considered by the VHF Committee.

In the current bandplan, 144.150 - 144.500MHz is designated for SSB and CW only. Several contributors have complained about FM operation in this section; eg during the October lift a club net, using FM in east London on 144.480MHz, was causing QRM to a station 100km away in Suffolk who was searching for weak DX.

This region of the band is used by SSB meteor scatter operators, invariably by prearrangement. Such 'skeds' can be ruined by FM operation. The Worked All Britain (WAB) enthusiasts often attempt to work weak mobiles at long distance on SSB. It is no excuse to say, for example, that: "Our club has been using this 'channel' for 20 years," or to suggest that, as they are not RSGB members, they don't recognize the band plan. Surely it's in everbody's interest to respect any bandplan?

CONTESTS

A REMINDER that the last 432MHz Cumulatives sessions are on 28 November and 13 December, 2030 - 2300UTC. The final session of the 1.3/2.3GHz Cumulatives is on 5 December, 2030 - 2300UTC - rules for both these on page 82, July *RadCom*. The 144MHz AFS/Fixed/SWL event is on 4 December, 0900 - 1700UTC. The Christmas Fun Contest is for fixed stations on 70, 144 and 430MHz on 26, 27, 28 and 29 December, 1400-1600UTC - rules for these last two events on page 78, November *RadCom*.

METEOR SCATTER

ACCORDING TO OH5IY's software, the Geminids meteor shower should peak around 0400UTC on 14 December. The Zenithal Hourly Rate (ZHR) varies little from year to year at about 110. UTC times when the reflection efficiency exceeds 50% are: NE/SW 2100-0200 and 0500-0930; E/W 0030 - 0400; NW/SE 1900 - 2300 and 0230 - 0730; N/S 1900 - 0100 and 0330 - 0900. The radiant is above a mid-UK horizon from 1630, through midnight, to 1230. The Ursids shower's radiant never sets and this year's peak is predicted for 1740 on 22 December. Best times are NE/SW 0900 - 2400; E/W always better than 75%; NW/SE 1700 - 0830; N/S poor, never better than 40%.

MOONBOUNCE

SORRY THAT the Activity paragraph in the November issue was edited into the MS section. The VE3ONT 50MHz operation, proposed for the first leg of the ARRL EME Contest on 29/30 October, had to be cancelled as the Algonquin Park dish was wanted for professional work.

Stefan Heck, LA0BY, reported his 144MHz EME activity from JW0BY (JQ88AD) in Svalbard from 16 October. The site is 15km from the main settlement at Longyearbyen, 430m ASL. It is snow-covered for ten months each year, the ground is permanently frozen and the temperature can drop to -35°C. The useful azimuth range is 50 - 210°.

In the first three days, contacts, mostly random, were completed with 22 stations. 'Firsts' from JW were with PE1AGJ, G4SWX, ON4ANT, VE7BQH and JA4BLC. The equipment comprises a TS430S HF transceiver with a 270Hz filter, an LT2S transverter, homebrew PA with two 4CX250Bs running 1kW and 0.4dB MGF1302 preamp. The four 17-ele F9FT Yagis are mounted in a solid H-frame atop a 12m steel tower with full az/el control.

Stefan should be QRV on 144.025MHz ±QRM in the contest on 29/30 November. December activity is planned on the 9th 16 - 19UTC; 10th 15 - 19UTC and 11th 12 - 20UT. Possible changes will be announced on the EME net on 14.345MHz (VE7BQH or K1MNS). Sked requests may be forwarded by E-mail to stefan@eiscat.no.

John Regnault, G4SWX (JO02), completed with five more initials on 144MHz in the month from 18 September. They were SV1BTR (KM17VX) on 18/9; DK3BU on 21/9; ON4GG on 1/10; DL9MHG and F9SQ on 2/10. But the prize was JW0BY at 1830 on 17/10 for no. 255. John reckons: "The weekend of 1/2 October was just like old times when the Moon was up during daylight with lots of random activity."

Bob Henshaw, G4GCM (IO90), is slowly building a new antenna array for 70cm and has completed one 31-ele DJ9BV Yagi. He plans to launch four next summer and is currently designing the feed system. Dave Redman, G4IDR (YSW), is working on a 6m dish for 23 and 70cm. At present he runs 400W to a 30-ele Yagi on 70cm and a 12-ele on 2m. In the 1970s, he may have been the first UK station to complete with K1WHS on 2m using a single Yagi.

Stuart Jones, GW3XYW (IO71), is QRV on 70cm and now uses a DSP-9 digital signal processing filter concluding it "...is definitely the best yet and has something to offer EME operators." In the 1/2 October sked weekend he completed with OE5JFL, F5HRY, ON4KNG, DL9KR, K5JL, PA0CSG, NC1I, K0RZ, IK6EIW, ZS6AXT, DL8OBU, KB8ZW and G3HUL.

The December sked weekend is 17/18, a night apogee one with the Moon's declination at +20°. The signal degradation is -1.8dB and the Sun offset -180° the 144/432MHz sky temperatures are 575/43°K.

50MHZ

NEWS

Ted Collins, G4UPS (DVN), reports that UX0FF's (KN45NI) QRA is PO Box 3, 272630 Izmail, Ukraine. Bill Stirling, GM4DGT, operated as 9H3TV in October and Ted worked him on the 22nd in his only opening to the UK. Bill's new QRA is 58 Tippet Knowes Park, Winchburgh, West Lothian, EH52 6UP. Bill Meinerts-Hahn, G3UOL (WMD), needs a QSL from HB9MM and wonders if anyone can help. He thinks computer logging may be the root of the problem; who has the disk!

Iain Phillips, G0RDI (BUX), secretary of the West London ARS, posted a nine page report about 6m repeaters on the VHF Reflector. It is a resume of the history and progress of the group's proposal for a repeater at

Amersham (BUX). It is a very detailed paper and well worth reading, whatever your views are on the subject. Iain monitors 51.830MHz, the proposed output frequency of GB3AL, and is keen to discuss the topic, promoting activity at the same time.

Jack Hum, G5UM (LEC), puts the case for more FM nets in the upper half of the band. He believes several are already in operation, so suggests their sponsors provide information on day of the week, time, frequency, etc, for wider dissemination. He adds that the East Midlands net has been going for five years on 51.41MHz, members using vertical polarization.

ACTIVITY

E-layer propagation has been infrequent, but G4UPS reports a good opening on 30 September to OE, OK, OM, S5, SP, YU and 9A. The period 13 - 17 October, dominated by high pressure, resulted in very strong tropo signals during Ted's morning skeds with G3CCH (LCN). Ela Martyr, G6HKM (ESX), found the band very lively on the 25th and worked GM0GLV (IO75), GD0TEP (IO74), DL9USA (JO71), SP6RLA (JO81), F5LJA (JO10) and four Italians.

In the WAB Contest on 2 October, John Fitzgerald, G8XTJ (BUX), made 11 contacts including I7WAN, IK0FTA, YU1QC, YU7AS and YU7FU. Eric McWhinnie, GM0GLV (SCD), runs 100W to a 5-ele Yagi and wants to try MS. He has been QRV since mid-May and already has over 100 squares in the log. Martyn Jones, G4TIF (WKS), only has a fixed dipole at present but his "prize QSO" was with JY7SIX on 17 June.

70MHZ

THE CONTEST on 25 September brought three new GM regions for Roger Betts, G0TRB (SFD), and over 20 counties for the day. Ian Cornes's, G4OUT (SFD) log shows six new 1994 counties in this event. John Baker, GW3MHW (PWS), made 21 contacts in this contest. Stations worked included GI4KSO (DWN), G4PIQ (ESX), G4SSD (DVN), GM4ZAP/P, GM4CWH/P, GM3CKR/P and GM4DSP/P. G0UPU (GLR), is a new callsign on the band and John recently worked G4BBU/P.

144MHZ

THE MAIN topic is the period of excellent tropo which started on 12 October, but there were some lifts before that. G4SWX worked Scandinavians in JO65 and JO66 on 23 September and the German AGCW event next evening brought DLs in JN68 and JO60. On the 29th he contacted OK, DL, OE5, HB9, SPs in JO81 and 82 and at 2200 HA/DL1MAJ (JN87) who was running 100W and a 17-ele Yagi. There was some good DX on the 30th to OK, while the Scandinavian activity night on 4 October yielded a few OZs.

G6HKM contacted LA1EKO (JO16) on 23 September and Ela worked DLs in JO50, 52, 60 and 61, and OK1VMS/P (JO70) on the 29th. Jamie Ashford, GW7SMV (GWT), runs 80W to a 13-ele Yagi 30ft AGL. The period 29/30 September brought QSOs with DLs in JO31 and 62 and Fs in JN18 and 38. On 7 October he worked EA1TA (IN53) and Fs in IN88.

With high pressure dominating the British Isles in the second week of October, all seemed set for a welcome period of good tropo propagation. We weren't disappointed. Things began to hum on the 12th with many DLs in JO31 worked. By the end of the evening, the skip had lengthened to Berlin and Poland. In the morning of the 13th lots of OKs and SPs were contacted, while the evening brought DLs galore, OZs and SMs and later SPs.

Star turn on the 14th was RK2FWA (KO04) who was a really loud signal creating a screaming horde of callers. SMs were prevalent and later on stations in JO31 and 41 were loud. On the 15th the actvity was mainly to DL, OK and SP. The DX had all gone by the 16th. The most encouraging feature was the tremendous level of activity, far greater than in any contest for years.

At G3FPK, scores of Gs were QRV whose calls hadn't been heard before. The SSB section was crammed full of stations from 144.15 to well above 144.40MHz. Even so, some seemed blissfully ignorant of the DX being worked. John Nelson, GW4FRX (PWS), commented: "Usual rotten operating and wide signals prevailing, alas. Why do G7 stations have to have local chats on 144.31MHz when half Europe is trying to work SP DX all round the frequency?" In such lift conditions, it makes sense to QSY above 144.400MHz for local chats.

To sum up, David Whitaker, BRS25429 (YSN), logged 26 different SPs in two days, furthest east being SP5IDX (KO02LG); he heard 68 squares. G3UOL's best DX on 2.5W SSB was SM7CMV (JO75). G6HKM filled up two log pages in the 15/16 period, working 17 squares in JO field, plus KO02. Alan Rowley, G8MYK (WMD), worked 35 of the squares in JO field with 100W and a 17-ele Yagi. GW4FRX's tally of SPs was 39, two in new squares. Thanks also to G0SOO, G0TRB, Paul Barrey, G7RSG (SXE), G8XTJ and GW7SMV for reports on this event.

432MHZ

PROPAGATION ON UHF in the October lift was superb. At G3FPK TV channels 26 and 33 were unwatchable for hours. GW4FRX had never before experienced such severe QRM on all four local TV channels. Derek, G8TOK (KNT), had signals from Swedish TV on channels 25, 43, 45, 46, 48, 49, 55 and 60; there were so many signals on some channels that none could be deciphered.

SWL David Whitaker's best DX were OK1DCH (JO80), SP5QGT (JO92), SP7CNI (JO91) and SM6HYG (JO58) all heard via his 2m antenna. For Chris Skelcher, G3YHF (WMD), it restored his faith in the band hearing so many moderate power stations working good DX. Using 10W to a 19-ele Yagi he worked six countries in 21 squares, best DX being DL3BWW (JO72) on the 12th and OK2s BLE and BFH (JN99) next morning. G6HKM completed with HB9MIN/P (JN37), F6CBH (JN19) and DL7UDA (JO62) on the 12th; GD, GIs, OZ, SM6 and DL6NVC/P (JO73) on the 13th and with DL2NUD (JO63) on the 14th.

Karl Lamford, G6ODT (NHM), running 32W and two 21-ele Yagis, made 49 contacts outside the UK in the 12-16 October period comprising 30 DLs, 12 PAs, two Fs and SPs and one each ON, OZ and SM in 22 squares. Best DX were SP2DDV (JO93) and SP1JX (JO84).

1.3GHZ

JOHN CLARKE, G0JDL (SFK), is 2km inland from the most easterly point of the UK, so well sited for marine ducting across the North Sea. His best DX in the October lift were SM6FHZ and SM6EAN (JO57), OZ6OL (JO65) and SP3RBF (JO71). He runs 15W from an LMW transverter and Mitsubishi PA slab to a single 23-ele Yagi 10m AGL. His friend Terry Quantrill, 2E1BMU (JO02UK), worked some good DX with 3W.

G4GCM (HPH) found conditions good to PA and DL on the evening of the 12th. He was QRV all evening on the 13th and the propagation then favoured the northeast, best DX being SM6GXV (JO58); OZ5BZ (JO45) and OZ6OL were also contacted. Bob runs 300W from a TH328 PA and uses an array of eight 23-ele antennas.

Paul Gill, G4IEV (OFE), runs 400W to a 55-ele Yagi 6m AGL. His QTH is 200m ASL. Best DX over 1,000km on the 13th were SK7QJ (JO76), SM6EAN, DL6NVC/P, SM7UHF and SM7ECM (JO65). He lists many DLs and OZs over 700km. G6HKM contacted G, GD, HB9AMH/P (JN37) and F6CBH, who was running 0.4W, on the 12th. Next day brought G, GD, GI, GJ, DLs in JO32, 41, 43 and 73 and SM6s in JO57 and 58 and OZ QSOs.

Using 40W and two 23-ele Yagis, G8TOK lists ten choice DX stations worked on SSB in DL, OZ and SM in the 11 - 14 October period. Derek completed with SM6GXV on FM, too. Geoff Brown, GJ4ICD added five new squares in the lift - DL3YEL/P (JO41), SK7QJ, SM6ESG (JO67), SM6EAN and SM7UHF.

DEADLINES

QUITE AN exciting month and it was great to hear such activity. The deadline for **February** is **29 December** and for **March 26 January**, when I'll need your end-of-year table scores.

The E-mail route is 70630,603 if you're on CompuServe, 70630.603@ compuserve.com via the Internet. The BT Gold mailbox is 87:CQQ083 and the telephone answering and fax machine is on 0181 763 9457.

A very happy Christmas to all readers and contributors.

IARU

JOHN ALLAWAY, G3FKM
and
TIM HUGHES, G3GVV

Noel Eaton, VE3CJ, speaking at the IARU Region 1 Conference at Miskolc-Tapolca in northern Hungary in 1978.

The Region 3 Conference took place in Singapore early in September and more information about this appears on page 13. As is customary the Conference was followed immediately by a meeting of the IARU Administrative Council - AC - (which consisted of IARU President W1RU, Vice President VK3KI, Secretary W4RA, and regional representatives PA0LOU, G3FKM, HK3DEU, YV5BPG, 9V1RH, and VK3ADW).

DISCUSSIONS

THE MATTERS discussed included a report produced by an ad-hoc committee on the 7MHz band, the IARU policy of seeking a worldwide 300kHz wide allocation was reaffirmed, and W1RU was asked to name a 7MHz Strategy Group.

A subject of prime interest to so many - a resolution concerning the requirement for a Morse code test by those wishing to operate below 30MHz was adopted. The Press Release which followed the meeting says: "Consistent with the views of the member societies as expressed through the regional organisations, the IARU will neither propose or support a change in the requirement at this time".

A voluntary group of experts has been working for some time on re-writing and simplifying the ITU Radio Regulations. Region 1 Vice-Chairman, SP5FM, has spent a great deal of time monitoring the meetings of this group and he has also been asked to propose a policy on the sharing of frequencies between the amateur service with those used for Industrial Scientific and Medical (ISM) purposes.

Input from the IARU Satellite Ad-Hoc Committee was considered and a new position of IARU Satellite Adviser was created with the task of keeping the AC advised on satellite matters. Hans van de Groenendaal, ZS5AKV, a member of the Region 1 Executive Committee, was appointed. Hans has had wide experience in the realm of satellites. He has also recently been awarded with an Honorary Master's Degree in Engineering by the Senate of the University of Stellenbosch in recognition of his work and support for the amateur satellite and amateur radio service. This is a great honour for Hans and for amateur radio.

It was felt that there was also a need to create the position of IARU Satellite Frequency Coordinator - who is needed to coordinate frequencies. This person is to be nominated by the amateur satellite community.

A report written by John Troster, W6ISQ, IARU International Beacon Coordinator contained news of the updating and future development of the worldwide time-sharing beacon system. The system seems to be developing well and some consultation is to take place on the value of the older continuous duty beacons.

The membership rights of two societies - one in Myanmar and the other in Brunei Darassulam - who appeared to be not functioning any longer - were suspended until they show why they should be reinstated. As far as Myanmar is concerned it is clear that the former BARTS ceased to exist very many years ago but the IARU Constitution makes it virtually impossible to recognise the fact because at present it requires a two-thirds vote of Member Societies voting in favour of terminating membership and this majority has never been achieved!

A resolution was adopted designating the third Saturday in September as World Amateur Radio Day with the intention of focusing public attention on the value of amateur radio. The theme for 1995 will be '100 Years of Radio' and plans put forward by ARRL to mark the Centenary of Radiocommunications next year approved.

APPOINTMENTS

WE ARE VERY pleased to be able to tell you that Canadian amateur Robert W Jones, VE3CTM, has been elected to replace Richard Kirby, W0LCT, as Director of the ITU Radiocommunication Bureau in Geneva. This means that the long tradition of having radio amateurs in that position and its predecessor, the CCIR Director, continues. Dr Pekka Tarjanne - a good friend of amateur radio - has been re-elected as Secretary-General unopposed and Mr Henry Chasia from Kenya was elected as Deputy Secretary-General.

Two more societies have been elected to IARU membership - the Iraqi Amateur Radio Club and the Union of Radioamateurs of Russia. This brings the total of member societies within Region 1 to 74. Voting is still taking place on the admission of the Latvian ASR and the Belarus Federation of Radioamateurs and Radiosportsmen.

Just before going to press an application for membership arrived from the Turkmenistan Radio Amateur League - it is so good to see that many of the countries of the old Soviet Union are asking to join. News was also received of the formation of a new African society - the Association des Radioamateurs du Burkina Faso - and this is particularly welcome in an area not yet well represented with amateur radio and is very largely the result of good work by Vincent Magrou, F5JFT, a member of the IARU Region 1 Executive Committee.

ARDF CHAMPIONSHIPS

THE 7TH ARDF WORLD Championships took place in Sweden from 12 to 17 September. They were the biggest and most impressive ever and 26 national teams from Regions 1 and 3 entered.

All but two of these were representing their national IARU member societies. It was good to see RSGB participating in an activity which we consider is an excellent way to introduce young people to amateur radio. Maybe we should remember that China came back into the fold as a result of its introduction via ARDF!

TELEGRAPHY

ANOTHER ACTIVITY of interest is high speed telegraphy. There was a meeting of the Region 1 HST Working Group in mid-October. Seven societies attended - ARI, BFRA, DARC, OVSV, RSM, FRR, and MRASZ. They decided that some modification of the rules should be made and that preparations would go ahead to organise European and World Championships to take place in Hungary next year.

Contest Exchange

ANDY COOK, G4PIQ
Fishers Farm, Colchester Road, Tendring, Essex, CO16 9AA.
G4PIQ @ GB7MXM.#36.GBR.EU

The address I gave for David Johnson, G4DHF, in the October column was wrong - if you want to write to David to say how you would like to see the VHF contest rules evolve, then you need to send your notes to 65 West Street, Bourne, Lincs. The address I gave you was the one for his local fish & chip shop! This is all very well, but collecting the post is doing nothing for David's cholesterol level!

With December upon us once again, so too are the Affiliated Society (AFS) series of contests. This is a set of four short events covering 80m CW, 80m SSB, 2m and 70cm taking place between the start of December and the start of February. They are slightly different from normal contests in that, not only are individual stations' scores listed in the usual way, but these scores for a group of club members count towards an overall result for the club. This makes the AFS contests very popular within societies - it really doesn't matter if your own score isn't all that big because the overall club scores are often separated by a few points, and your relatively small contribution could well move the club up several positions in the overall table. Another nice feature about the 80m events in particular is that you don't need to have a big station to do well. The vast majority of people's QSOs come from inter-UK contacts, and low dipoles are well suited to these contacts - no need for four-square phased vertical arrays here!

More or less the whole of the December 1993 *Contest Exchange* was dedicated to the AFS contests, so if you want some more background, take a look at that pile of *RadComs* which is gathering dust in the corner! There is one important change which you need to be aware of, and that is the start time for the 80m events has been moved one hour later, so that they now run from 1400 - 1800 UTC. This has been carried out in response to requests from people who are situated away from the centre of the UK, particularly in Scotland and the West Country, for whom propagation at 1300 was just too short a skip to enable them to compete effectively.

Also in the December '93 column I said that I would run an overall table for those clubs who make it on for three or more of the AFS events. I know that this encouraged some groups onto bands for which they would not normally have submitted an entry and, with all the results available, I have run the spreadsheet, and reproduced the results in Table 1. I have to say that I am a little embarrassed by the result - this was not the intention at all - but my own club set up a big lead on the VHF bands which others found difficult to dislodge.

Certificates go to Martlesham & Lichfield, but also congratulations to Sutton & Cheam who staged a valiant effort,particularly on 70cm, attempting to oust Lichfield from second place. Take a look at the middle part of the table - several clubs are really quite close together, and this is typical of the AFS contests in general - so remember - get on for these contests - 'Your Club Needs You!' I will run the AFS Championship again - why not try and raise an entry for some extra bands again this year.

The Basingstoke ARC 70cm rotator was rather sluggish on Sunday morning.... Ben is 12 years old and should have his Novice licence by now.

WORLD RADIO CHAMPIONSHIP

I HAD HOPED to be able to provide a little more information on the selection arrangements for this international event which I introduced last month. However, the discussion on the Internet contest forum has gone a little quiet of late, and I have no more firm details. There is still debate over whether entrants will be selected according to a rather complex rating system based on their performance (primarily as single operator entries) in a number of previous international contests. While some people think that a rating system is a marvellous scheme, it is every bit as difficult to devise an equitable rating system as it is to produce an entirely fair contest. I saw a document forming the base of this proposed rating system and it ran to about 15 pages of single spaced A4 typing! Dave Lawley, G4BUO, was one of the UK representatives at the last WRTC in 1990 - he is not currently planning to attend this year, but is trying to pull together a UK team for the event - but has no volunteers at present. If you are interested in what should be both an exciting competition and a great social event, and you feel that you have the operating skills needed, please contact Dave who will be able to fill you in on the current situation. I look forward to being able to report on the UK team thrashing the rest of the world next year!

I said last month that the 1990 WRTC was the first time that this sort of competition had been run in the West. However, I understand that for some time there have been/used to be some contests operated on a more or less truly level playing field in the former Soviet Union. Over there, certainly in some of the events, the station equalisation was taken to much greater levels than in the US event. In the event held in America, all stations used a common 100W transceiver from existing fixed station sites and antenna systems which were located within a certain small geographical area. The former USSR version involved all the stations all being located in tents arranged in a (large) circle and stations used the same type of antenna. Some interference is bound to occur due to the proximity of the stations, but the circular arrangement helps to at least make it equitable QRM! I gather that the transceivers used were not particularly standard, other than in power output, but all had to undergo inspection to make sure that they did not have any spurious problems which would cause undue pain to the other guys! These were popular events, with people prepared literally to drive for weeks to travel from one side of that vast country to the other in order to participate. Thankfully, Washington is hours rather than weeks of travelling time away!

That's it from me for this month - as usual before *CQWW* I'm finding the nights are becoming very short - far too much work to fit into a small time, but then I should start earlier shouldn't I! I could really use some more photos of contest situations for this column - people operating, antenna systems, stations, teams, disasters (these can be really good!) can all make the column a bit more interesting. If you have any material, perhaps you could send it to me - I don't need negatives or anything difficult like that - plain ordinary prints are just fine.

It can get seriously windy at the top of high mountains and normally straight antennas can quickly start doing a good impression of a banana. When the Flowerpot Men Contest Group went on an expedition to the South of France, this was Jim King, G0JIM's, answer to this problem. He used a top-hat pole and three lengths of waterproof rope to provide extra strength in both planes to a 17-element tonna.

Pos	Group	2m	70cm	80m CW	80m SSB	Total
1	Martlesham DX & CG	13921	1544	2642	3278	2548
2	Lichfield ARS	1301		13853	9180	2093
3	Sutton & Cheam RS	3401	997	6983	4958	1934
4	RAF N.Luffenham ARC	3513	728	3838	4329	1472
5	South Manchester RC	2153	887	4395	3757	1456
6	Crawley ARC	3635		9277	4547	1426
7	Harwell ARS	2260	901	4079	3387	1409
8	Scunthorpe ARC	1628		7624	3856	1087
9	Leicester RS	868		5900	4867	1018
10	Aylesbury Vale RS	2765		3030	3925	845
11	Clifton ARS	1088		3717	4336	819
12	Telford & DARS	1306	353	4166	1287	763

Table 1: Clubs participating in three or more AFS events this year.

HF F-LAYER PROPAGATION PREDICTIONS FOR DECEMBER 1994

The time is represented vertically at two-hour intervals UTC for each band, ie 00=0000, 02=0200, etc. The probability of signals being heard is given on a 0 (indicated by a dot) to 9 scale; the higher the number the greater the probability with 1 meaning 10 to 19 per cent of days, and so on. Additionally F-layer openings at 50MHz and 1.8MHz are indicated by a plus (+) sign in the 28 and 3.5MHz columns, with these latter bands having a probability of 9.

Time / / GMT	28MHz 000001111122 024680246802	24MHz 000001111122 024680246802	21MHz 000001111122 024680246802	18MHz 000001111122 024680246802	14MHz 000001111122 024680246802	10MHz 000001111122 024680246802	7MHz 000001111122 024680246802	3.5MHz 000001111122 024680246802
** EUROPE								
MOSCOW	1...22.....	....1441....	....4774....	....6987....	....88884...	32.576678212	9856443577 78	++532..24+++
MALTA	....111....	....1332....	....47661...	....78883...	...188888...	463675678543	9987433478 98	+++4....4+++
GIBRALTAR	....	....121....	....4541...	....27774...	....78888...	232186668631	8987643458 98	++++3...2+++
ICELAND	....	.....11....	....133....	....3662...	.....7886...	....577784..	663.755578 64	++++42224+++
** ASIA								
OSAKA	....	....	....	....2.....	....61.....	....63123..1	1..142125453	.........24+.
HONGKONG	....	....21.....	....43.....	....661....	...16651....	1..134442...	2...111255 64	.........25+4
BANGKOK	....23.....	....361....	....684....	....6861....	...147642...	2...144561 11	3....112567 7	.........25+5
SINGAPORE	....242....	....4651...	....6874...	....16886...	...146672...	2...144561 13	2....112567 6	.........25+3
NEW DELHI	....221....	....442....	....675....	....16771...	...34664....	421113453114	731..112567 8	5.........25++
TEHERAN	....332....	....5651...	....17774...	....27787...	...555673...	642322356234	9831..125788	+5........25++
COLOMBO	....343....	....5652...	....6775...	....15787...	...224674...	22...135 7234	52....125 788	3.........24++
BAHRAIN	....322....	....5441...	....17674...	....36676...	1..534673...	743211356445	973...125 788	+5........24++
CYPRUS	....4542...	....6765...	....18888 1...	....38888 4...	22.676788111	885643468767	9973112368 98	++4.....3+++
ADEN	....3322...	....5544...	....16677...	....35578 2...	2..422477 1..	8122..157666	962....24 788	+4.....24++
** OCEANIA								
SUVA/S	....	....	.....1....	.....131....	.....4651...	....244551..	....421252..	.........2...
SUVA/L	....1.....	....32.....	....6431...	....8653121.	1111866655 21	..136434652.	...2311142..	.........24++
WELLINGTON/S	....	....	....12....	.....341....	....2664....	....64453...	....421251..	.........2...
WELLINGTON/L	....	....	....21....	....421..2..	112.753235 21	..126434642.	...1311131..	....
SYDNEY/S	....121....	....243....	....5762...	....7884....	....17767 1...	....144455...	....2112541.	.........23..
SYDNEY/L	....	....	.....31....	....1521.1..	....4654252.	....543457 31	....2111341.	.........2...
PERTH	....343....	....5652...	....7875...	....16887...	...246674...	1...143577222	1125762	.........254.
HONOLULU	....	....	....	....	.........11..	....112253..	.12.321242..	..25....2...
** AFRICA								
SEYCHELLES	....1222...	....2454...	...14577...	...2457 82...	2..222577 11.	7.1...257666	831....24 788	+.........24++
MAURITIUS	....3322...	....4554...	...16677 1...	...2557 83...	21.222477 111	751...147676	73.....24 789	4.........24++
NAIROBI	....3333...	....5555...	....66672...	....2556 85...	3..422368 221	8422....37787	873....14 788	+4.........4++
HARARE	....1233...	....2456 1...	....4567 4...	...1555 77...	43.322258 432	9832...26888	972.....3789	+4.........4++
CAPETOWN	....2441...	....1366 3...	....3567 6...	....4556 71...	42.232246544	9742....13689	873.....1478	+4.........5+
LAGOS	....2544 2...	....4666 4...	....7767 7...	.1..7556 821.	45.152236654	894 52....3799	8883.....1588	5+5.......2++
ASCENSION Is	.....4333...	....1655 5...	....4766 7...	.1..6655 621.	453.632245 54	998441..1489	88851.....269	+++2.......3+
DAKAR	....4543...	....1666 5...	....3876 71..	....6755 72..	344.752256 43	889352..2589	88972.....279	55+4.......4+
LAS PALMAS	.....3432...	.....6664...	....3888 7...	....6888 82..	233.876676 32	888574 45788	9898521125 89	++++2....2++
** S. AMERICA								
Sth SHETLAND	.....112...	....12234...	....3556 6...	....5766 62..	243.765433 22	466253211123	234321.....1	....
FALKLAND Is	.....133...	.....2254...	....1556 6...	....4765 52..	234.764222 22	68836 31...24	467531.....1	.442......
R DE JANEIRO	....1..1...	....3112...	....6434 1...	....1754 42..	234.563223 32	889363...136	88973.....15	+++5.......2
BUENOS AIRES	.....2....	....2113...	....1543 51..	....3754 52..	124.664222 21	6893641....24	6897 41.....2	3++5.......
LIMA	.....332...	.....554...	......7751..	......8652..	..1...63221.	447113 31...12	5887311.....1	2++5.......
BOGOTA	.....232...	.....453...	......7751..	......8652..	....126322 1.	336154 31...12	7886411.....2	4+55.......
** N. AMERICA								
BARBADOS	.....332...	.....554...	....1765 1..	....4755 2..	..1..662232.	546144 3..134	8877 41.....15	++55.......2
JAMAICA	.....31....	.....253...	......4751..	......6752..	....116522 1.	224.433 2..22	7775421.....3	4+55.......
BERMUDA	.....31....	.....253...	....5761..	......7763..	....365441.	214.343212 43	8785421.....26	+++5.......3
NEW YORK	.....21....	.....43....	....2751..	....4872..	....166551.	212.234433 32	7783 4211...25	+++5.......2
MEXICO	.....21....	.....42....	.....75....	.....861..	.....2742..	112.333 41....	4783 4211....1	.++5.......
MONTREAL	.....11....	.....32....	....2651..	....4872..	....167651.	112.134 43341	7773 4212 1125	+++5.......3
DENVER	....	.....1....	.....4....	.....261..	.....564..	111.2.154 22.	4771 4112 1..1	2++5.......
LOS ANGELES	....	....	.....3....	.....51..	.....163..	.11.12.44 21.	2661 4212 1....	.4+5.......
VANCOUVER	....	....	....	....	.....43..	11..11.264 2.	365.321232 11	.4+5.......
FAIRBANKS	....	....	....	....	....	11..121244 1.	353.321255 32	.344....22..

The provisional mean sunspot number for October 1994 issued by the Sunspot Data Centre, Brussels was 43.8. The maximum daily sunspot number was 60 on 14 October and the minimum was 6 on 1, 2, and 3 October. The predicted smoothed sunspot numbers for November, December and January, are respectively: (classical method) 24, 23, 22 (±5); (SIDC adjusted values) 17, 15, 14 (±3).

QSL

JOHN HALL, G3KVA
Corfe Lodge, Ipswich Road, Long Stratton, Norfolk NR15 2TA.

PLEASE NOTE that Mr J Payne, G7NCJ, is no longer the QSL Sub-Manager for the G4SAA-SZZ series. The new Sub-Manager is Mr D Lavis, G0DMT, 48 Gilda Crescent, Polegate, East Sussex BN26 6AW. Mr Lavis is already Sub-Manager for the G4UAA-UZZ series of callsigns.

One of our Sub-Managers has contacted us to say that people are not writing the call sign correctly for some special event stations. As an example he says that if you write GB5OA on a card it is taken as an O series special event card and sent, incorrectly, by our sorting ladies to the special event Sub-Manager for the GBxNAA - ZZZ series who, understandably, becomes somewhat emotional when he gets a whole lot of beautifully sorted and packaged cards from us all for the wrong series! The O should, of course, have been written Ø (zero). Then the confusion would not arise, and the card would go to the GBxAAA - MZZ series special even Sub-Manager, who is a totally different person and the Valium consumption would decrease significantly!

QSL BUREAU INFORMATION

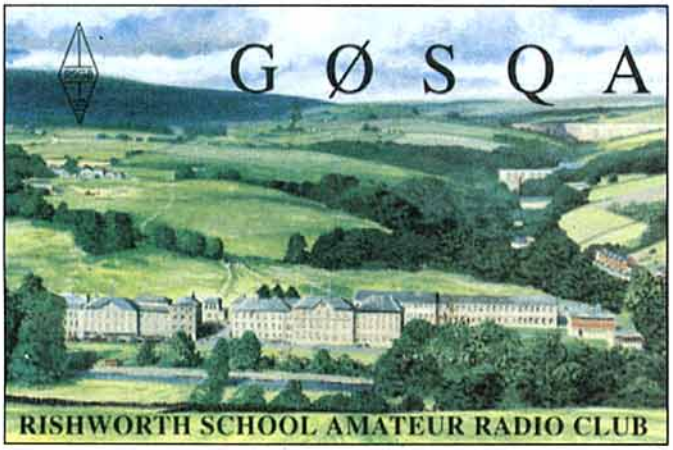
LESLEY LEWIS, S92YL, writes to let me know that there is no QSL Bureau on Sao Tome. Lesley says to send your cards direct to PO Box 522 Sao Tome, West Africa and *please* enclose an SAE and return postage.

We recently sent a large envelope of QSL cards to Iraq addressed to the official QSL Bureau there at PO Box 55072 Baghdad 12001. But they came back from the Post Office with a label stating 'Return to Sender. No transfer link available because of Middle East situation'. We will keep trying but it does look as though things are getting a little restive out there again and there may be delays.

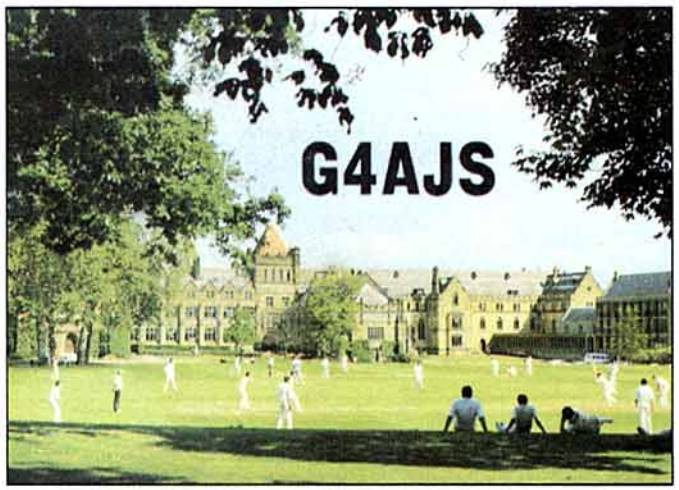
We also sent a packet of cards to Gabon and back they came marked 'Return to Sender. No surface service'. We will try them again because that's the first time this problem has occurred in this area.

Mr Bondarenko of the Krenkel Radio Club of Moscow has taken exception to the comments made to me by Alex, RK3DT, and reported in the September column. Mr Bondarenko says that the problems concerning P O Box 88 have been greatly exaggerated and that, contrary to rumour, the well known address continues to function normally despite economic restrictions. He says it is much cheaper for a Russian amateur to sent QSL cards via P O Box 88 than by mail and that Box 88 continues to handle incoming cards for *all* Russian amateurs whether they are members or not. He assures me there is no backlog of cards awaiting distribution. I am happy to put the record straight.

Card used by the President of the Bangladesh ARC.



This QSL card of her school was sent in by Emma Constantine, 2E1BVJ.



Tim Hughes, G3GVV, sent in this card used by Tonbridge School Radio Society.

CARDS

TIM HUGHES, G3GVV, sent me a number of QSLs. One is a most attractive card for G4AJS, the affiliated club located at Tonbridge School. In addition Tim sent me QSL cards obtained at the recent IARU Region III Conference. These include, S21A - the card for the President of the Bangladesh ARL, and HS0/G4UAV - the card for Tony Waltham who was attending the conference.

Emma Constantine, 2E1BVJ, sent me a sample of the beautifully produced QSL card used by her school amateur radio club, G0SQA. The back of the card states that Rishworth School was founded in 1724 to educate eight pupils! It now has over 600 young people between the ages of 4 and 18 who come from all over the world. The club has 20 members and 14 of them are Novices with a further six taking the December exam - I wish them every success. There's hope for the future of amateur radio yet!

ENVELOPES

THE GIRLS TELL me that many of the envelopes arriving at the HQ Bureau are too flimsy for the job. Consequently, they are being damaged by the Post Office and, in some cases, arriving minus the cards. Unless you want your cards to go astray in that way it is worthwhile investing in some stout manilla envelopes that are much more resilient to the sorting machinery which is specially designed to sort out the men from the boys - envelope-wise!

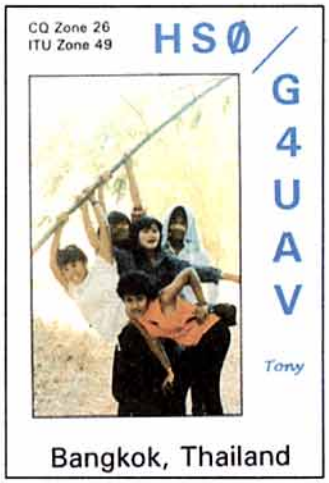
Jan Harte, G4VBI, says she had difficulty in obtaining envelopes with gummed flaps and was forced to buy self-seal. She blocked off the self-seal gunge with a strip of 'Perlafoil' and had no moans from her Sub Manager about her modification. W H Smith assured her that they still stock gummed flap envelopes in a variety of sizes.

CALLBOOKS

PETER CHADWICK, G3RZP, writes about the *International Call Book* and the machinery for getting entries put into it. Apparently, the RSGB have a non assignable copyright licence from the RA in respect of the tape sent to the Society by SSL Ltd, so the International Call Book proprietors cannot legally copy the *RSGB Call Book*. To do so they would need to pay £150 to obtain the tape from SSL Ltd and then spend time deciphering it! Peter says if you really want your up to date details in the *International Call Book*, send them yourself! QED.

GOOD WISHES

I WISH THE girls in the Bureau and all long suffering QSL Sub-Managers a very Happy Christmas, a peaceful New Year and may all the cards they so diligently sort be collected by those to whom they are addressed.



Tony Walthem's, G4UAV, card.

NOVICE NEWS

MRS ESDE TYLER, G0AEC
43 Nest Est, Mytholmroyd, Hebden Bridge, W Yorks, HX7 5BH

THE REPORT on the September NRAE results shows that the pass rate was a little lower than usual - although there were a few papers not received by City & Guilds in time for inclusion in the figures. 130 of the 169 papers marked at that time were passes - which works out at 76.9%.

The general comments on the paper state that candidates were not as well prepared this time when compared to previous exams, but those who were successful gained good marks. Some of the more detailed comments advise instructors where more emphasis is needed in the training course and, whilst these comments are aimed at specific questions, the comments given enable an intelligent guess to be made.

Briefly, 29% thought the RF amplifier was the stage following the mixer in a block diagram; 37% chose a wirewound, instead of a carbon resistor as the main component of a dummy load; less than half chose the right answer when asked which stage removed the carrier in an SSB transmitter and only 15% knew how to end a Morse contact correctly.

The report makes interesting reading and, after discussions between instructors and students, better preparations can be made for your next class.

A copy of the report can be obtained by sending a SASE with your request to the Amateur Radio Department at RSGB HQ. Perhaps Senior Instructors could see that all active Instructors in their area obtain a copy as the points raised seem to be fairly general with the high percentage of similar wrong answers. The training scheme is highly successful - but can become even more so - think of the feeling of gratification when even more of your students are successful in their exam!

KIDLINK '94

I was involved with Kidlink on the last day of the three operating days and spoke to two youngsters at Rishworth School (GX0SQA) where Anthony, G7OKW, was in charge. He was 'holding the fort' during lunchtime as food is naturally more important than conversation to the young, so the station was underpopulated!

Peter, G3LCG, was busy at Scarborough College and I spoke to six of the youngsters - who knew exactly what they wanted to be in adult life and also what improvements they would like to see in the meantime. One of these, Chris, was waiting for the NRAE results, and I have since heard that he has passed - congratulations Chris. Aged eleven and twelve, the youngsters spoke clearly and confidently - Peter had coached them well. In total 39 students spoke to amateurs and Peter thanks these for their patience. Perhaps Scarborough College will find more NRAE recruits from among them.

My apologies if I failed to find you on the air - it may be that you were so busy on the other bands that our paths didn't cross. If you did join in Kidlink, then can you let Peter, G0GTE (QTHR), or me know.

GB0AP

THE INTERACTIVE DAY at the University of Bradford was a huge success and will be repeated. The organiser, Dianne Excell, had put in an enormous amount of work and the positive results are still coming through. The University sees it as a means to show prospective students that Science is fun! Sixty or so pupils from local schools attended, and had a most enjoyable and informative time.

Dr Peter Excell told the youngsters about Sir Edward Appleton's life and achievements, and also about the present project. Then Rev George Dobbs, G3RJV, pointed out that the way into amateur radio could be economical - and fun. While he was talking, seven-year-old Charlotte Excell was building a radio receiver

PHOTO: DAVID, GM3YMX

Newly licensed John Ferguson, 2M1DGU, says thank you to his instructor Peter Dick, GM4DTH.

Matthew Kiteley, 2E1CVC, operating the Special Event Station, GB2BS at the recent Scout and Guide Band Contest.

helped by Jo Anne, G0OWH. It was finished and working in less than an hour.

The youngsters were split into six manageable groups which moved round the workshops. Dianne's organisation was such that as one group finished in an area, another moved in so there was no waiting nor time wasted. By the end of the day, the groups had heard about propagation and radio astronomy, seen their picture transmitted by slow scan television, investigated RADAR, 'played' with the exhibits on reflection, had the chance to build a simple radio from a kit and seen an amateur radio station in full working order.

Rishworth School activated GB0AP under the guidance of Richard, G3UGF, and made about 55 contacts into seven countries. The Novices called on 70cm and found Bob, 2E1BGV, ready to speak to them! The BBC TV programme 'Why don't you?' was running continuously with extra video coverage showing the making of the programme.

Information on the Novice Licence was available from me and, as all the youngsters were enthusiastic about what they had seen and heard, they wanted to know more. Their teachers were keen to take as much literature on amateur radio as they could, for their own interest and to pass around the school staff-room.

Some of the academic staff at the University were so impressed that they have asked for more activity days such as this. The University intends to use such days to demonstrate that learning science can be fun - a lecturer who was not involved this time has volunteered to make crystal sets next time and other electronics activities are already being planned.

Another similar day is planned for younger students - possibly around next April. As I get information, I will let you know - and will be looking for local volunteers!

BUSY NOVICE

WHILE IT IS NOT unusual for Novices to help at special event stations, it is rarer that as many as six help to run a station. This was the case when GB2BS was activated during the musical contest for the Scout and Guide bands.

Amateur radio was demonstrated to 2,000 Scouts, Leaders and other visitors from every corner of the UK when they attended the contest. The operators included from the Scouts: Nick 2E1CRZ; Martin 2E1CSU; Ian 2E1CSW; David 2E1CVB and Matthew 2E1CVC and venture Scout Philip 2E1AQG. The young people are from the Stourport and District Scout Amateur Radio Group and the Hasbury Scout Group, Halesowen.

SCROOGES CORNER

MARK, G0KHB, is a QRP enthusiast and his equipment is all home-brew, with a crystal controlled transmitter. It began life with a 3.579MHz 'TV' crystal, one of the cheapest 80m crystals you can get, to which a 3.686MHz microprocessor crystal was added. He then saved up and added the QRP frequency, 3.560MHz. This was much more expensive than the other two. As 3.579MHz is within the Novice allocation and there is a cheap crystal available, this leaves a lot of change from an arm, never mind a leg.

HAVE YOURSELF A RADIO HAMSTORES CHRISTMAS

While stocks last, why not take advantage of these great end of year bargains from ICOM. Now is the ideal time to buy stocking fillers, such as the **IC-P4E** UHF FM handheld transceiver, the P4E operates on 70 cms/440MHz to give error-free operation (especially suitable for novices) thanks to a minimum of switches and controls. The P4E has 100 channels, 5W power output, 3 scan modes dual-function display and a 24hr system clock making this an ideal companion on the move.

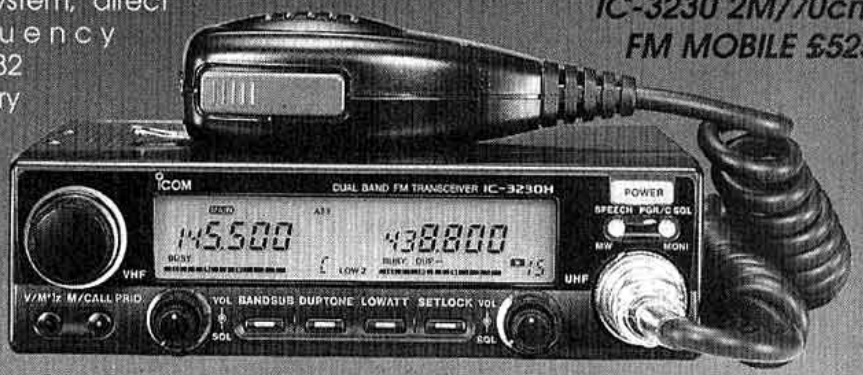
If your idea of moving is by car, then the ICOM **IC-3230E** dual-band FM mobile transceiver is an ideal and currently cheap way to realise the versatility of mobile radio communications (we wonder if Santa's got one?). Despite the 3230's compact size (140x 40x165mm) it is packed with features including dual-band readout with independent control, one-touch action switches, 30 memory and 2 call channels, 45W power output, 3 kinds of frequency search, priority-watch, built-in duplexer and so much more.

Lastly, but not leastly, we offer ICOM's superb **R-71E** all-purpose receiver, proven features include: all-mode and general coverage receive, superior RF circuitry, notch filter system, direct frequency entry, 32 memory channels, 3 scan functions, optional voice synthesizer unit, remote control, filters and CI-V system.

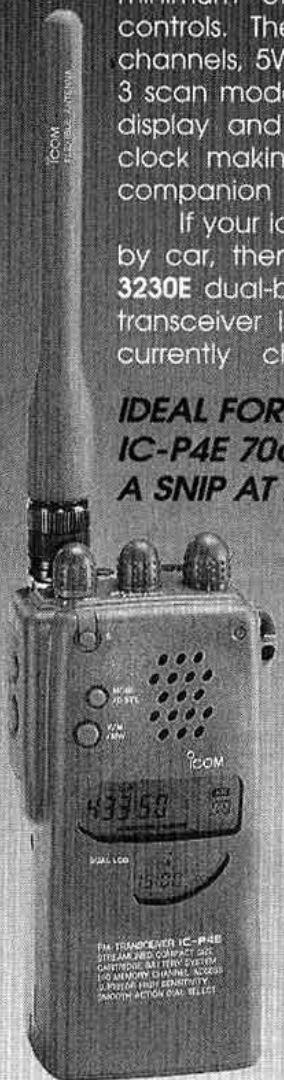
As we say this Christmas is an ideal time to snap up these little beauties at prices that will leave you some change for the mince pies!

ALL THE STAFF AT RADIO HAMSTORES WOULD LIKE TO WISH YOU A HAPPY CHRISTMAS AND COMMUNICATIVE NEW YEAR.

IC-3230 2M/70cm FM MOBILE £525



IDEAL FOR NOVICES IC-P4E 70cm FM. A SNIP AT £195



IC-R71 HF BASE-STATION RECEIVER £859

BIRMINGHAM: STORE IS JUST OFF M5 MOTORWAY AT JUNCTION 2
International House, 963 Wolverhampton Rd. Oldbury, West Midlands B69 4RJ.
Tel: 021 552 0073 Fax: 021 552 0051.
HERNE BAY: Unit 8, Herne Bay West Ind. Estate, Sea Street, Herne Bay, Kent CT6 8LD.
Tel: 0227 741555 Fax: 0227 741742.
SHUT FOR CHRISTMAS BREAK: 25/26/27th December and 1st/2nd January, otherwise open: Tuesdays to Fridays: 09:00-17:00 & Saturdays: 09:00-16:00.
N.B. Herne Bay branch closes for lunch 1300-1400.

RSGB VISA MasterCard ICOM SWITCH

SWL NEWS

BOB TREACHER BRS 32525
93 Elibank Road, Eltham, London SE9 1QJ

BECAUSE THIS represents the last SWL column of 1994, it is opportune to thank many my contributors during 1994. The highlight of the year was undoubtedly the production of two logging programs for SWLs (September and November *RadComs*). My thanks to Don, G0MDO, and Paul, EI5DI. Other notable successes were my SWL Challenge (results in June *RadCom*) and Liam, RS95272, receiving his DR48 receiver (photo in March).

I have arranged with the Whitton ARG to handle all SWL cards for the recent C56/G0MRF and C56DX (special call for *CQ*WW) expedition. If anyone who heard the Group still needs a QSL card for C5 (Gambia) send your cards to me.

SWL SOFTWARE

UNFORTUNATELY, THE holiday season prevented me from firming up the three SWL packages I have been referring to in recent columns. I have, however, heard from Alan, G3PMR, who confirmed that he will be producing an SWL version of SHACKLOG once his HF Convention organising is complete.

The situation with SUPER DUPER remains the same as reported last month but Don, G0MDO, responded to my comments about EASISWL and action is now with me. This should be finalised soon so watch next month's column for ordering details.

David Whitaker, BRS 25429, alerted me to the availability of computer software (PKTMON by G7DHM) which is ideal for SWLs wishing to monitor packet messages on both HF and VHF (1200 and 300 baud). The circuit diagram of the simple interface is reproduced here as **Fig 1**. It is a basic comparator circuit using a 741 chip, diodes, resistors/capacitors. September's *Datastream* Column gave details of a simple interface for SSTV - again courtesy of G7DHM. If any SWLs require further guidance, Bill G7DHM, is glad to oblige. He is QTHR.

NEW BEACON AWARD

Martin, G3USF, has provided details of a new award for SWLs for reception of beacons at all frequencies.

The International Beacons Award was introduced by a section of the ARI (the Italian National Society) for 1995. I did not find the rules very clear, but there appear to be different classes of award for hearing 15 and 25 different beacon stations.

The 'basic' requires you to hear the 15 stations in at least three continents, while the 'extra' requires 25 from six. As this is an Italian award, extra points can be claimed for hearing the Italian beacons on 28.195 and 21.151MHz.

Hearing the beacon on 28.195 corresponds to three countries for the basic and six for the extra, whereas hearing the 21.151 beacon will earn you an extra two countries for the basic and four for the extra. Confused?

The awards cost 10 IRCs and the Manager is IK1LBL, Mario Del Panta, Box N.3, 18012 Bordighera, Italy. So have a go. Finally, on this subject, Martin reminds all SWLs how useful beacons are, especially at times of low sunspot activity.

DX NEWS

I REFERRED LAST month to the rules of the White Rose ARS LF contest, but these will be included next month. Instead, a timely reminder that this popular event takes place over the weekend of 14 to 15 January. Mark your '95 RSGB diary now! [*If you haven't yet ordered your diary see page 34* - Ed].

Bill, BRS88921, listened for QRP stations during the 'Europe for QRP Weekend' at the beginning of October. Bill prefers this more *laid back* approach to contests as opposed to a *CQ*WW-type of contest - although some of the signals are of the 449 variety and hard work on the ears.

Most of those taking part in the event were running only a few watts, indeed one ran 300mW, while one, SM6BSM, used an Oxo Set. Bill remarked that it was a pleasure to listen to both good CW and good manners in a competitive event.

A letter from Gordon, BRS95210, mentioned a fine listening achievement and one which represented a lifetime ambition - hearing ZL on 1.8MHz SSB. He actually heard ZL2JR at 0607 on 28 September and ZL2SQ at 0625 on 4 October.

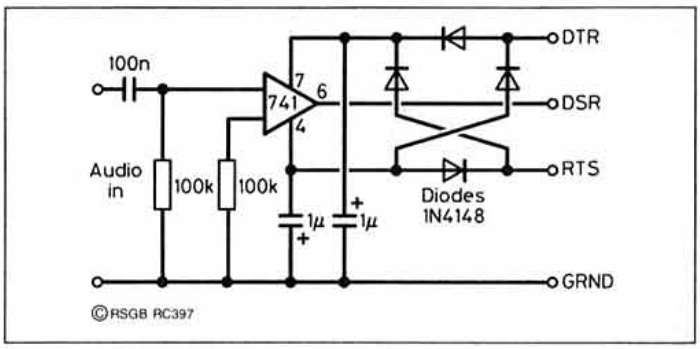


Fig 1: Interface circuit for monitoring packet (see SWL Software).

Gordon had been trying to hear a ZL for over a year and had changed his antennas a number of times.

The antenna which gave Gordon his prize was commercially produced in Holland - a Magnetic Longwire Balun which has only 20m of wound copper wire. It was supported from a pole on the chimney sloping down to a 6m high post at the bottom of the garden. A QSL card from ZL2JR was safely received.

In general, conditions in September and early October were up and down, but reporters noted some improvement. Indeed, I heard my first new country since March, 9J2 on 24MHz! 1.8MHz was interesting, with 5T5JC, S92SS and HV4NAC giving several listeners new countries on that band. Indeed, at this point in the sunspot cycle, 1.8MHz conditions should be quite good.

The Pacific returned to 14MHz with KH8, A35 and C21 bagged by Robert Small BRS8841. 18MHz was good on certain occasions with TU5BA/XT, T5AR, 7P28LI, 4U/F6FNL (9U) and YI0BIF heard.

Robert attended the Society's HF and IOTA Convention at Windsor (11th hour circumstances dictated that I was, unfortunately, unable to attend). Robert met BV4AS, DL2GAC (of H44MS fame), P29DX, WT2O, W4BAA, F6AJA, ON5NT, ZS6EZ, 4X6ZK, 4Z4DX, DK2OC, CT1DIZ, DL1MAQ, HA1AG, LA5MP, I1JQJ and UT8LL. Robert took a Morse test at the Convention and was hopeful of a pass. On the Tuesday following the event Robert heard BV4AS on 14MHz, 48 hours after meeting him in person!

The JOTA weekend produced plenty of activity and several listeners logged a good many stations using the GB prefix.

On VHF, the 'Indian Summer' in October provided several good evenings to Scandinavia on 432 and 144MHz. Indeed, SM6CEN gave me my first new country on 432MHz for eight years!

FIRST FIRTH UPDATE

MIKE, GM4SUC, provided some feedback from this year's event. All the GB stations were active as scheduled, but GB2PF operated only during the Sunday (that's why I didn't hear him!), and all experienced greater levels of QRM and QRN than previous years.

By the middle of September Mike had received 43 award claims from SWLs. 17 had claimed the Merit Award, with 5 - BRS94832, 95726, 95977, G1LMZ and GM7SJC - hearing all 11 stations. It took one listener 14 hours of listening to bag all 11, the others achieved this slightly quicker.

For those who want to send QSL cards, Mike has provided the following QSL information: GB2FC via GM4SUC; GB2FF via GM4DEX; GB2FL via GM0LKG; GB2FM via GM4WKO; GB2FT via GM0MFE; GB2FW via GM0HTH; GB2BF via GM4XKG; GB2CF via GM4FDT; GB2DF via GM0HLV; GB2PF via GM0KHP; GB2SF via GMØNBG.

In 1995 the August Bank Holiday weekend (which is not a holiday in GM, apparently) will see activity returning to Scottish Lighthouses. Because of difficulties in 1993, stations will not necessarily operate from a lighthouse but they will be located in the same WAB area as each lighthouse.

DXCC TOTALS

I HAVE NOT run any tables for a number of years, it would be good to find out what sort of nine band totals some of our more dedicated listeners have now. Drop me a line with your totals and if I get enough I will publish a table.

FINALE

AS THIS IS the December issue, my warmest greetings for the Festive Season to all my readers. Deadline for **February** is **15 December.**

OWN THE WORLD'S BEST 32 VALVE, 295 H.P., LEATHER-TRIMMED BASE STATION

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£595 ($895)

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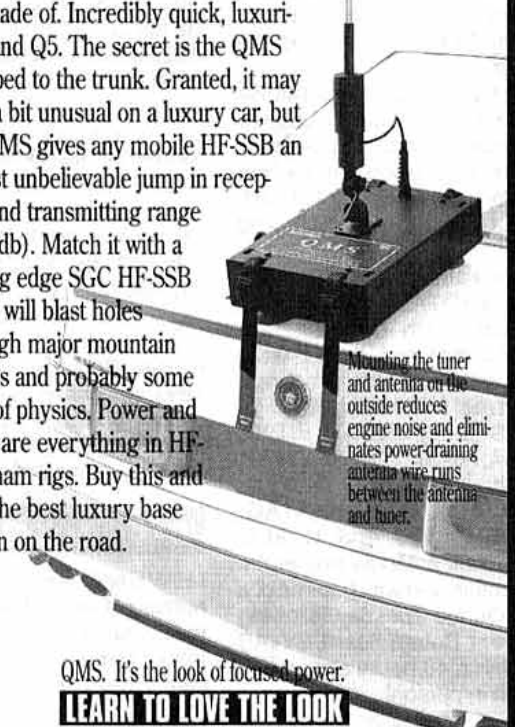

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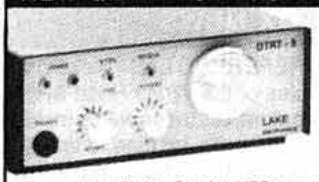

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Novice Note Book

IAN KEYSER, G3ROO
Rosemount, Church Whitfield, Dover, Kent CT16 3HZ

IT'S CHRISTMAS TIME again! I wonder how many Christmas presents will be electrical or electronic and will cost a fortune in batteries to keep going. Some do work on rechargeable batteries but they don't operate for long before requiring recharging.

Some electrical items will work on external supplies but the voltage requirements can vary quite a lot.

What I have described in this month's column is a method of running such a piece of equipment from a 12 volt battery normally found in a car or a caravan.

THE 78 SERIES REGULATORS

THE BEST WAY to solve this problem is to use one of the 78 series of fixed voltage regulators. These provide a regulated supply of up to 1 Amp at a voltage determined by the device. For example a 7806, see **Fig 1**, provides 6V and the 7808 gives 8V (the last two figures of the device number indicates the voltage output).

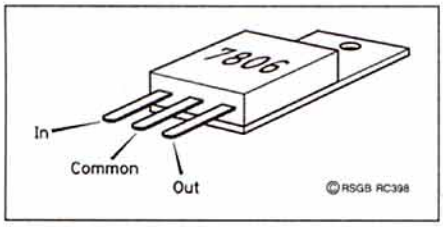


Fig 1: Three-terminal series regulator

The voltage output of any of these devices can be raised by changing the voltage at the reference point indicated by Common in Fig 1. This can be achieved using diodes. When a silicon diode is conducting the voltage across the diode is approximately 0.6 volts.

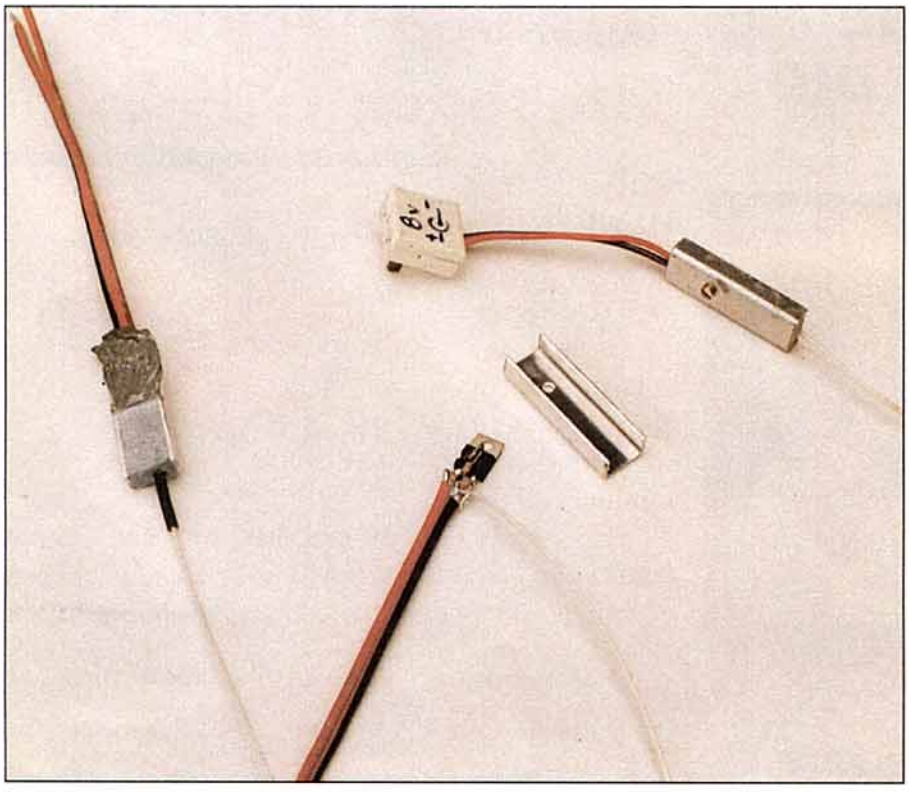
If we needed 7.2 volts output we would use a 6 volt regulator and two diodes in series with the common terminal to ground, as shown in **Fig 2(a)**. Likewise for a 9.8 volt supply we could use a 8 volt regulator with three diodes in the common to ground as shown in **Fig 2(b)**. A combination of regulators and diodes will give an output very close to the one required.

These circuits are so simple and require so few components that they are easily constructed using the pins of the regulator to support the passive components.

HEAT DISSIPATION.

QUITE A LOT OF heat is generated in the regulator because of the voltage dropped across it.

This heat has to be dissipated by connecting the regulator to a heat sink. I have constructed this regulator so that it is 'in line', see photo, and the small metal box serves as a container and a heat sink. The box is constructed by bending a a small piece of thin aluminium of about 50 by 30mm to form a 'U' shape. The regulator unit is then bolted to the heat sink inside the U section and then the whole of the section is filled with 'Plastic Padding'. After about ten minutes and before the resin has fully hardened the excess is trimmed off with a sharp knife to form a very neat module.



Construction of in-line series regulator.

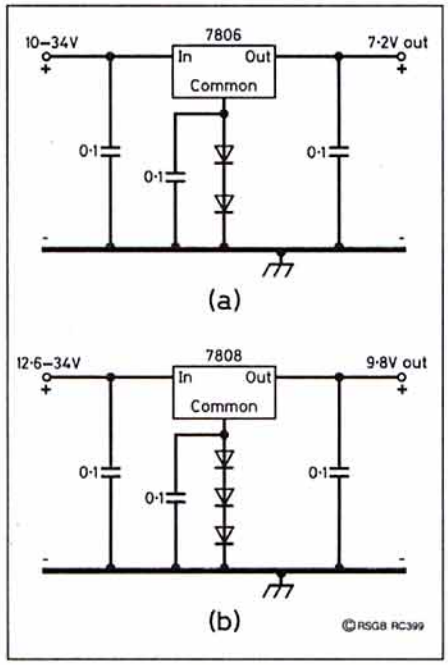


Fig 2: Fixed-voltage series regulators, using diodes to modify the output voltage.

A point to mention about the In and Out leads: These must be strong and able to cope with the rigours of use. I use 5 amp cable on the input and thin coaxial cable on the output. I have found that coax, such as RG174, or even screened audio lead is far more rugged for this purpose than the usual lightweight twin power cable.

FUSING AND CONNECTORS

SOME CIGAR LIGHTER connectors have a built-in fuse. If you use an unfused supply then it is important that a fuse is fitted.

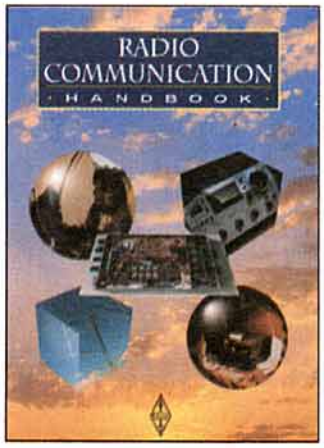
Cigar lighter connectors are not very good because they do not give a good electrical low resistance connection. A much improved connector is used for 12 volt systems in caravans. They are small, neat, non reversible and are capable of carrying high currents. They have an added advantage in that they have a flat surface where a clear note can be written of the unit's use and polarity.

HINT OF THE MONTH

THE MOST DIFFICULT way to cut aluminium sheeting is to use a hacksaw! Tin shears impart a bend into the sheet and so make it untidy. The simplest way is to carefully mark the sheet as required then, using a straight edge and a Stanley knife, deeply score each side of the required cut. Gently fatigue the cut line backwards and forwards and a neat break will occur which can quickly be cleaned up with a file.

RSGB Books for Christmas

Radio Communication Handbook



THE BOOK EVERY radio amateur has been waiting for. This brand new edition of one of the world's largest and most comprehensive amateur radio handbooks has been completely revised, and the content expanded to include new chapters on passive components, 'building blocks', microwaves and construction.

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Turn to pages 94/95 (November) for *MANY MORE AMATEUR RADIO BOOKS*

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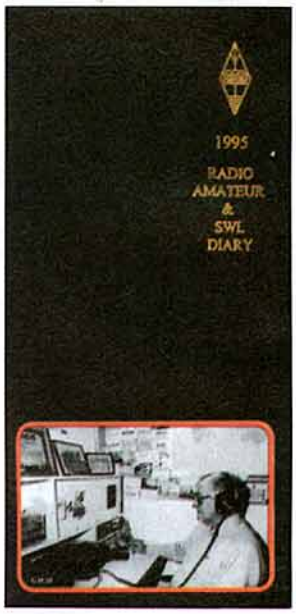

TOGETHER WITH the one-week-to-view diary, this pocket sized, gold edged, Letts diary is packed with over 60 pages of additional information and articles submitted by well known amateurs.
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Pat Hawker, G3VA

Pat Hawker's Technical Topics

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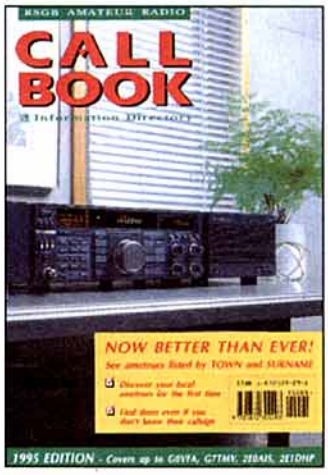
Please add postage and packing on all except D-i-Y Radio;

RSGB Books

RSGB Call Book 1995

Edited by Brett Rider, G4FLQ



AS WELL AS LISTING over 61,000 UK and Republic of Ireland callsigns, and over 100 pages of information, we have improved still further on this already popular directory with the inclusion of two new listings: You can now search by post town/county*AND* by surname.

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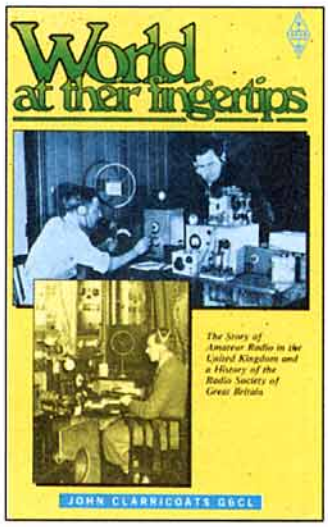
World At Their Fingertips

John Clarricoats, G6CL



(First published in 1967 and reprinted in 1984 – now available once again!)

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Beginners and Novices

Amateur Radio For Beginners

FIND OUT ALL ABOUT Amateur Radio - this book by **Victor Brand, G3JNB**, explains: how to build a crystal set, how to listen to radio amateurs, how to understand Morse code and how to choose equipment, and how to get a transmitting licence.

Members Christmas Offer Price: £2.00 (normally £3.50) **Non Members Price: £3.50**

Practical Antennas for Novices

THIS GUIDE, written especially for UK Novice Licensees by **John Heys, G3BDQ**, describes in detail how to build simple but efficient antennas for each of the Novice bands from 1.8 to 434MHz, plus ancillary equipment to ensure that they are working correctly. A chapter is devoted to the safety and common sense aspects of installing and using a transmitting antenna. This book will be invaluable not only to Novices, but also to any beginning amateur looking for easy-to-build antenna systems that really work. 60 pages.

Members Price: £3.83 **Non Members Price: £4.49**

D-i-Y Radio

EACH ISSUE OF THE RSGB's 24-page magazine, for beginners of all ages, (published six times a year) features three simple construction projects, a review, ham facts, news features, a pull-out poster, a prize competition and a special offer. Subscribe now and get *D-i-Y Radio* for the next year, plus a pack of goodies

Members Christmas Offer Price: £6.00 (normally £7.65) post free **Non Members Price: £9.00** (overseas rates on request).

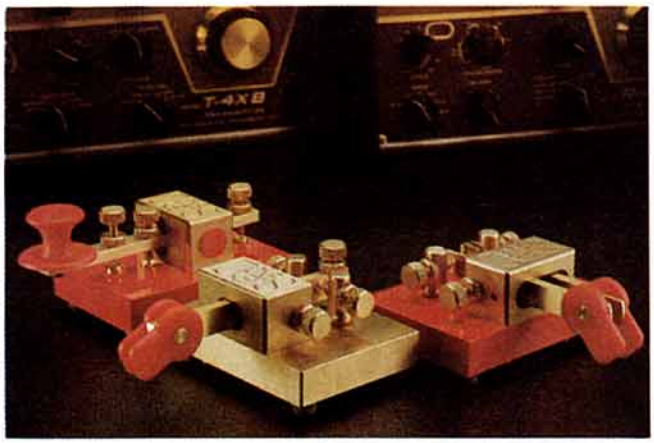
Don't miss the Christmas present bargain of the year:

SAVE A FURTHER £1.83 on the offer price of *Amateur Radio for Beginners*, *Practical Antennas for Novices* and a year's subscription to *D-i-Y Radio*.

All three for the Members Only Price of: £10.00 Offer expires 31 December

see page 95 for details. Special offers are available to members only and are valid until 31 December 1994.

JONES KEYS



Peter Jones, learning of the need for a good, solid and reliable twin paddle morse key, designed and built the ***JONES KEY***. It was given to expert cw operators, including members of FOC, to evaluate. Their suggestions for improvements were incorporated into the models now in production. The range now comprises a pump key plus single and twin lever paddles, with a choice of base finish (red enamel or natural brass).

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RADCOM TECHNICAL FEATURE

QRP Dummy Load Power Meter

By Tim Walford, G3PCJ

THIS INSTRUMENT IS a most useful thing to have in the shack for setting up low power rigs and for general development work. It reads up to 5 watts mean and presents a load resistance of 50Ω enabling it to be used as an indicating dummy load. Three ranges are provided using one scale with each range having a full scale deflection ten times the next lower range; thus each range adds 10dB of power to give FSDs of +17, +27 and +37dBm, corresponding to powers of 50mW, 0.5W and 5W. Useful indications can be obtained down to 1mW.

It will work over the whole HF band and, if the quality of construction is good, will also work in the VHF band. For calibration it has the great advantage that it can be set up with a DC voltmeter because it is a peak reading instrument. The intention is to indicate a general design concept so that readers may build one with the minimum of especially purchased parts and makes good use of whatever is already available. For this reason full construction details are intentionally omitted.

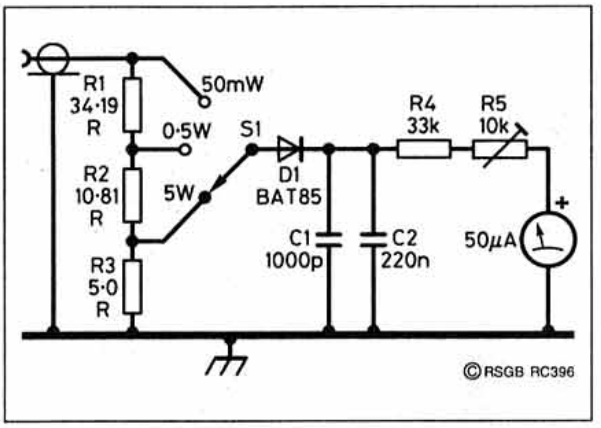


Fig 1: QRP dummy load power meter circuit diagram.

CONSTRUCTION

THE CIRCUIT IN **Fig 1** shows the exact resistor values required for the input attenuator. They should be non-inductive - wire wound types are not suitable. R1 is best achieved with two 68Ω 2W resistors in parallel; R2 with 18Ω in parallel with 27Ω (both 0.5W) and R3 can be two 10Ω 0.5W resistors in parallel. Keep all leads as short as possible particularly around the input and components R1, R2, R3, S1, D1, C1, C2. Use a physically small switch for S1. While it is not essential to mount everything in a metal box, it adds style and keeps the RF where it should be! The ground connections should also be short.

You can use any DC micro or milliameter with suitable resistors R4 and 5 in series to read about 2 volts full scale and with a minimum resistance of about 2kΩ; 1mA or less will do. I happened to have a surplus 50 microamp meter! The diode D1 should have low forward voltage drop which means it has to be either a Schottky type or germanium. A BAT85 Schottky diode or a OA47 or OA90/91 which are best suited to HF.

CALIBRATION

YOU SHOULD CALIBRATE the instrument with a stable variable low voltage DC source capable of giving up to 50mA into the 50Ω load (eg A 5 volt regulated PSU with a 100Ω pot across it). Read the applied DC voltage to the power meter as accurately as possible, preferably with a digital voltmeter. Adjust the supply/pot to the voltages in the table. You can then mark the power meter scale, either in dB power relative to 1mW into 50Ω (more commonly known as 0dBm) or in mW. You need only do it for the most sensitive range (S1 up in Fig 1).

Input DC volts	Power mW	dBm
2.240	50	17.0
2.000	40	16.0
1.730	30	14.8
1.410	20	13.0
1.000	10	10.0
0.837	7	8.5
0.707	5	7.0
0.548	3	4.8
0.447	2	3.0
0.316	1	0.0

Table 1: Calibration Data.

Table 1 is derived from the formula:

$$Vdc = \sqrt{(2RP)}$$

Where R = 50Ω and P equals power.

Start by applying 2.240 volts on the 50mW range and adjust your preset resistor R5 so that the meter reads full scale. Label this point + 17.0dBm (or 50mW etc). Then work down through the table as the scale space permits. The meter is only calibrated for steady RF levels but it will give an indication.

Always leave the instrument switched to the highest power range to minimise the possibility of damage.

COMPONENTS LIST

Resistors

R1	34.19R	see text
R2	18.81R	see text
R3	5.0R	see text
R4	33k	
RV1	10k preset	

Capacitors

C1	1000pF
C2	220μF

Semiconductors

D1	BAT85, OA47 or OA90/91

Additional Items

50μA meter

OSCILLOSCOPE MONITORING

I WOULD LIKE TO use my oscilloscope to monitor my modulation. My 'scope has a 40MHz Y bandwidth with sweep rates up to 0.2 microsecond/cm.

ON TRANSMIT, THERE seems to be no reason why you shouldn't be able to monitor your signals directly from the RF output. With modern wideband 'scopes you can monitor signals up to 30MHz by connecting straight into the Y input socket, without having to gain direct access to the Y plates as the old handbooks used to recommend. With a QRP HF transmitter you can probably clip a low-capacitance (x10) 'scope probe directly in parallel with the output.

For higher power levels, you'll have to take a small sample of the RF output, and **Fig 1** shows some ways of doing this. Options (a) and (b) are relatively broadband, while (c) has a rising frequency response. Component values will depend on the transmitter power level - to decrease the sensitivity you can increase R1, decrease C1 or increase the number of secondary turns on T1. Since only a few tens of millivolts are required with a modern oscilloscope, you may be able to find enough signal by less 'formal' methods from the low levels of stray RF around the shack. Try simply clipping the oscilloscope probe to the so-called 'ground' connection of the transmitter, for example.

As yet, rather few 'scopes owned by amateurs have sufficient Y bandwidth to monitor VHF/UHF signals. Having tried it, I wouldn't recommend a direct connection to the Y plates at these frequencies - the capacitances and stray fields in the shack are too large. You'd do better to monitor the signal through a diode detector, for example by connecting the Y input to the rectified output from your VSWR indicator **Fig 1(d)**. Unlike a direct RF display, the rectified signal will not be symmetrical with respect to ground, so a DC-coupled 'scope is essential.

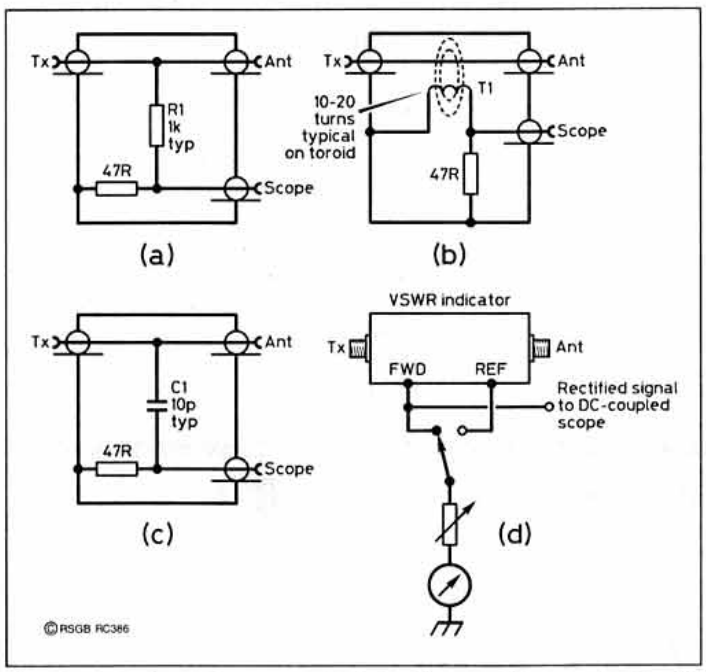


Fig 1: Methods of sampling a transmitted signal for an oscilloscope display. (a), (b) and (c) give a direct RF sample to the Y input of the 'scope - component values depend on transmitter power. (d) shows how to obtain a rectified signal from the 'Forward' output of a VSWR meter.

IN PRACTICE

IAN WHITE, G3SEK
52 Abingdon Road, Drayton, Abingdon, Oxon OX14 4HP – or @ GB7AVM

HOW DO I INTERPRET the results?

YOU NEED TO MONITOR only the outer shape or 'envelope' of the RF waveform, not the individual RF cycles themselves which convey little information. The timebase sweep rate only needs to be a few milliseconds/cm, to give a bright ribbon across the screen which is completely 'painted in' vertically by the RF cycles. The outer shape of the trace responds to the amplitude modulation.

An FM or FSK signal has no amplitude modulation so you should see simply a parallel ribbon of light across the screen, **Fig 2(a)**. With keyed CW (A1A) you will see on/off modulation corresponding to the keying, and will probably be able to lock the sweep on a steady stream of fast dots from a keyer, **Fig 2(b)**. You can then inspect the leading and trailing edges of the dots, which should be clean with round shoulders and no spikes. See Peter Hart's equipment reviews for further examples and comments. A rectified A1A signal shows a very similar display, **Fig 2(c)** - this test is essential for VHF meteor-scatter operators, who usually need to shorten the normal time constants in the transmitter to achieve crisp keying at 200WPM or more, while not shortening the rise and fall times so much that the signal becomes wide and 'clicky'.

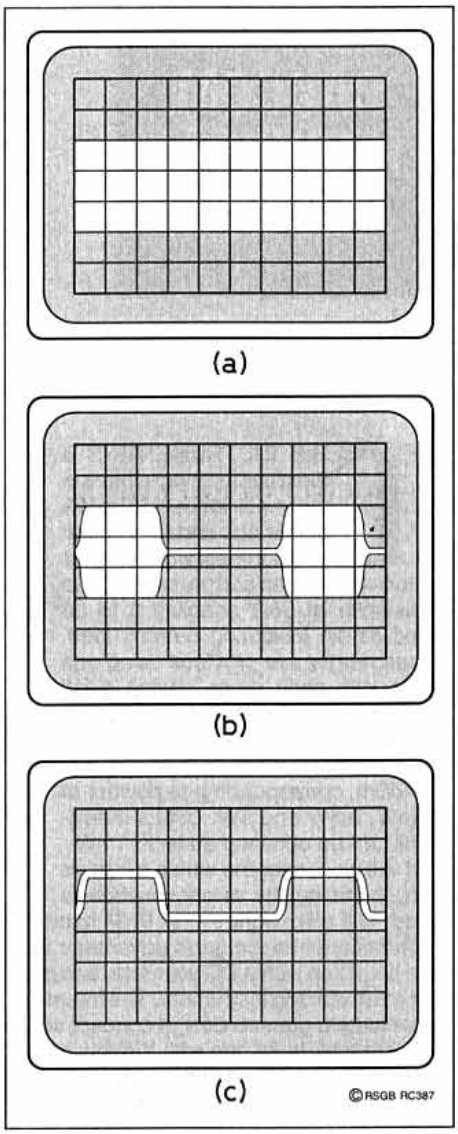


Fig 2: (a) A steady carrier or FM/FSK signal gives a clean ribbon-like display. (b) Keyed CW display showing clean leading and trailing edges. (c) Alternative rectified version of (b).

SSB signals are derived from an ever-varying mixture of speech frequencies, so you cannot expect a steady locked display unless you use a test signal from a two-tone audio generator (see most radio handbooks for details). On speech, set the sweep rate to about 10ms/cm and look at the general shape of the waveform envelope, particularly the modulation peaks. The main thing you're looking for is any sign of peak compression or overdriving.

As I've said before in this column, if you screw the maximum possible amount of RF out of the PA, that represents a situation in which the transmitter is being grossly overdriven. **Fig 3(a)** shows a typical undistorted display: compare this with the 'flat-topping' at the peaks of the waveform in **Fig 3(b)**. You need to reduce the drive, but don't stop at the point where there is no more visible flat-topping because that isn't far enough. Do this test using a dummy load, because by the time you can actually see the flat-topping on the 'scope, you're using far too much drive and the transmitted signal will be extremely insanitary! Keep turning down the drive until the 'scope deflection never exceeds about 90% of the maximum possible value. That will almost certainly guarantee a clean signal which will not annoy your neighbours on adjacent frequencies. It's then safe to reconnect the antenna and go on the air.

To emphasise the important points about overdriving: don't rely on the observed shape of the waveform - it's the peak amplitude you need to watch. And I do mean NEVER overdrive the transmitter, at any moment. Even occasional peaks of overdrive will send splatter across the band, and quite probably bring a stream of complaining 'visitors' to your frequency. So too will modulation that looks like **Fig 3c**, where the crossovers of the

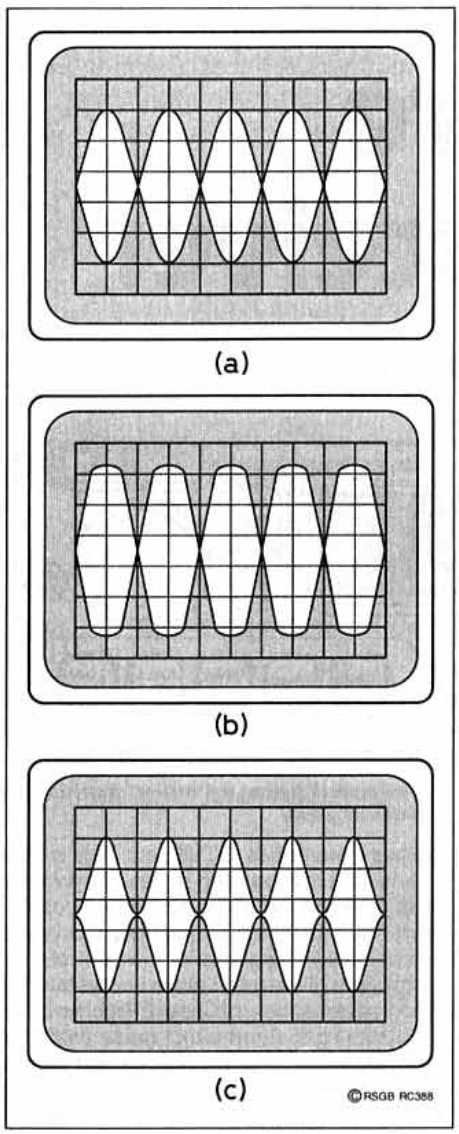


Fig 3: Typical waveforms from a two-tone test signal. Speech waveforms are similar but harder to read. (a) clean, sharp peaks, low distortion. (b) flattened peaks, severe distortion. (c) crossovers pinched out, probably incorrectly biased PA.

waveform are 'pinched out'. You would get this type of waveform by transmitting SSB through a power amplifier designed only for FM, which typically requires a substantial amount of drive before producing any output, and therefore clips out all the low-level components of the speech signal.

If your transmitter is capable of power levels at or near the legal limit, you can again use the monitor 'scope to make sure you never go 'over the top'. If you have a calibrated power meter, note the 'scope deflection when transmitting a steady carrier at the legal limit. The wording of the licence implies that you must NEVER drive the output beyond that limit. And of course you should also be using the 'scope to ensure that you are always transmitting a clean signal - all the more so because you're running high power.

Under some circumstances you can use the 'scope as a substitute for a power meter, by making a direct measurement of the RF voltage across a known dummy load resistance. The 'scope displays the peak-to-peak voltage, so you have to divide by $2\sqrt{2}$ to obtain the RMS voltage; then use W=V2/R to calculate the power. Unfortunately there are some problems with this approach. First of all, you cannot use a sampling method(Fig 1) without an accurate knowledge of the attenuation within the RF sampler. Otherwise you have to measure the whole RF voltage, which can be as high as 400V p-p for 400W into 50Ω.

Next there may be problems with the Y-calibration accuracy of the 'scope: the quoted bandwidth is always at the -3dB point, and even when the instrument is new and supposedly 'calibrated' the sensitivity may vary by a few decibels across the operating bandwidth. Add to all this the inaccuracy in measuring a rather fuzzy trace on the screen, and you have a method of measuring power which is not calculated to impress an RIS inspector in a critical frame of mind. If you're contemplating operation at or near the legal limit, you really should own a dedicated power meter. Either buy one, or better still build one (it's only an upmarket VSWR indicator, after all) and get it calibrated against a professional instrument.

ALL CHOKED UP

I'M BUILDING A solid-state transmitter for 10MHz that requires two RF chokes, 10μH and 15mH. My junk box contains several 75μH chokes. How critical are these choke values?

THEY'RE NOT. You just want a high reactance at that frequency (to 'choke off' the RF current) but a low resistance to allow DC current to flow. The next thought is normally "If I have to make it a high reactance at the lowest frequency, why can't I use 1 henry chokes everywhere?" This won't work because all inductors have some self-capacitance and therefore are parallel-resonant at some frequency. Above this frequency they will just present a decreasing capacitive reactance. They won't 'choke' the RF at all.

A good rules of thumb is use a value of a minimum of 4 times the reactance of other RF paths. For example, in the amplifier shown in **Fig 4** the RF choke provides a low-resistance DC feed to the active device (bipolar transistor, FET or valve) but because the RF bypass and blocking capacitors each present a very low reactance to RF, the choke appears directly in parallel with the 50W load at signal frequency.

For an RF load impedance of 50Ω at 10MHz you're looking for a reactance of about 4 x 50 = 200Ω, or perhaps a little more. Using $X_L = 2\pi fL$, this corresponds to $200 = 2\pi \times 10 \times L$, so L = 3.2μH (note the short-cut of using f in MHz to give L in μH.).

As noted above, this is a minimum value for a 50Ω impedance environment. In practice, anything in the range 3.3 - 4.7 - 10μH will probably be fine. According to the Cirkit Components catalogue, a typical ferrite-cored 10mH RF choke will have a self-resonance at about 30MHz, and will behave properly as an RF choke at any lower frequency. The 75μH chokes mentioned in the question seem to be self-resonant right around the 10MHz mark, but that means they will be decreasingly effective on the higher HF bands.

RF chokes for HF applications are often required to be non-resonant and work effectively over several amateur bands. However, at VHF and UHF there are many applications for parallel-resonant chokes that resonate

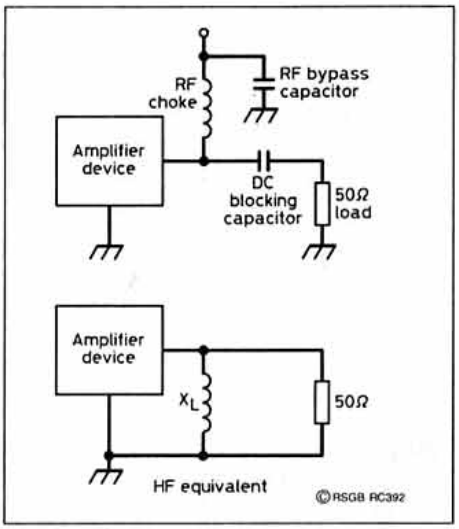


Fig 4: The RF choke appears directly in parallel with the 50Ω load at signal frequency.

with their own self-capacitance and present a particularly high impedance at one amateur band only. Page A.19 of the *RSGB VHF/UHF Manual* gives useful design data.

SOME PEOPLE SAY "Just use a resistor" while others say "Slip a ferrite bead over the wire" or "Wind some wire around the body of a resistor". Which is correct?

ANY ONE, DEPENDING on the circumstances. It all depends on the resistances and reactances (and thus the frequencies) involved. If low DC resistance is not required, you can of course use a plain resistor instead of a choke. Once again the rule-of-thumb value should be 4 or more times higher than the prevailing impedance in the RF path, eg 220Ω or more in **Fig 4**. However, this is unlikely to be the case in a transmitter. The ferrite bead can be considered as a single turn on a very small toroid. The resistance is low but so also is the inductance. Thus a ferrite bead works best at VHF and above, having very little self-capacitance.

Wind some wire around the body of the resistor when you need a low-quality choke. If the value of the resistor is high, the resistor body is just a convenient former. A choke wound on a low-value resistor (typically 100Ω or less) will have low DC resistance thanks to the wire, and also no pronounced resonances because of the damping effect of the resistor. This can be valuable when you specifically don't want a resonant choke. For example, using resonant chokes at both input and output of a VHF amplifier is an open invitation to tuned-input/tuned-output oscillation. Changing one of the chokes (usually the one at the input) to a low-Q type will often cure the problem.

(Thanks to the Internet for this topic, and Kevin Purcell, N7WIM / G8UDP for much of the information.)

CORRECTIONS

AS WELL AS HAVING its caption interchanged with the figure below, Fig 6 in the November column is incorrect: there should be a vertical connection joining all four components together in the middle.

Photo credit for November's Fig 1 should go to GW4FRX.

RADCOM USER REVIEW

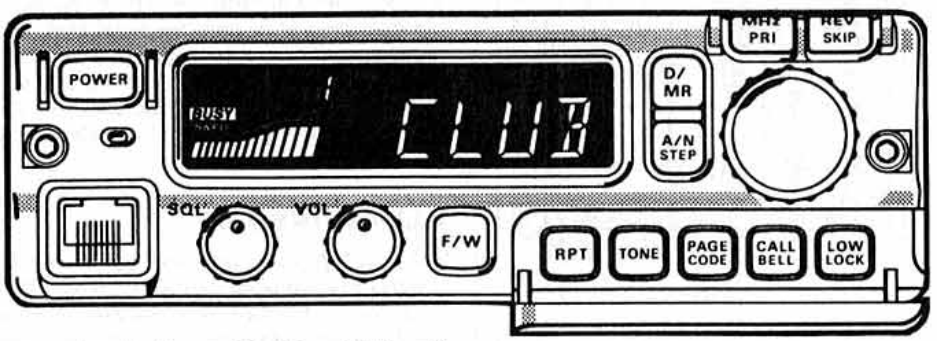
FT-2500M Two Metre FM Transceiver

Reviewed by RSGB Headquarters Staff

THE LATEST 12-volt two-metre FM rig from Yaesu runs up to 50 watts, boasts 'military spec construction' and is packed with facilities. It comes with a microphone and dash-board clip, a mobile bracket, a 2.5m power cable, a handbook and of course a Yaesu sticker.

The FT-2500M has an integrated die-cast chassis and heat sink, designed to protect against shock, vibration and overheating.

The loudspeaker is mounted on the underside so, unless the radio is to be mounted near vertically, an external speaker will be needed.



Five control buttons are 'hidden' under a flap on the front panel.

FRONT AND BACK

THE DECEPTIVELY uncluttered front panel includes a good sized tuning knob and chunky audio and squelch controls. Each of these knobs is knurled and covered in a non-slip plastic that makes adjustment easy, even in the dark (important when mobile). These three controls are also backlit with the same orange light that illuminates the display. On the left are the push-on, push-off power switch and the microphone socket. No separate TNC socket is provided.

The microphone, which uses Yaesu's oblong latching plug, is small and has a fiddly transmit button with a rather strong spring. It contains a tone button which sends a 1750Hz tone whenever (and for however long) it is pressed. UP/DOWN buttons step the frequency or memory channels, or start the scanning; these have a 'cheap' feel to them and the sharp-edged stowage hook tends to get in the way of them.

Five other push-buttons are visible. 'A/N' switches the display between frequency and a programmable alphanumeric name, 'D/MR' toggles between memory and dial, 'MHz/PRI' allows rapid switching of the frequency between 144.*** and 145.***MHz, 'REV/SKIP' toggles between 'repeat' and 'reverse' splits, and 'F/W' activates a second (less commonly used) function on each of the other buttons. The first four buttons are handily grouped round the frequency knob and are easy to find without looking - clearly some effort has gone into ergonomics.

Five other buttons lurk under a robust flap below the tuning knob (see the illustration above): Four control repeater shift, CTCSS, DTMF paging (if fitted) and the CALL channel memory. The fifth switches Tx power level between 50, 25 and 5W or (in conjunction with the 'F/W' button) locks the other controls.

A 77mm x 18mm LCD panel gives comprehensive information (see the illustration below) but this does not obscure its main purpose of displaying frequency clearly. The orange backlighting adjusts automatically to the ambient light level, though like so many of the facilities on the FT-2500M this can also be adjusted manually from the front panel. The result is pleasant and easy to read.

The rear panel carries the fused 'pigtail' power lead, 3.5mm speaker jack and SO239 antenna socket.

DOCUMENTATION

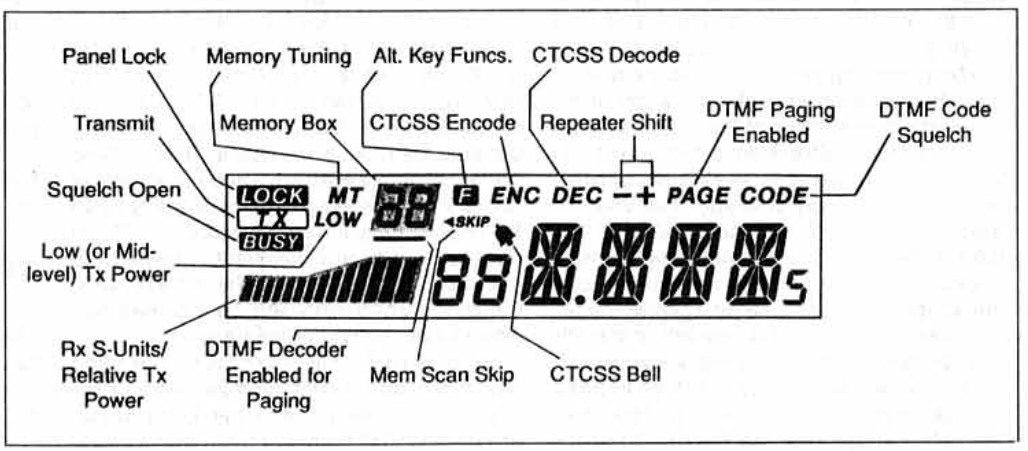
AT FIRST GLANCE the handbook looks overwhelming at over 160 A5-sized pages, but only the first 54 are in English, the rest being the same information but in French and Spanish.

The controls are described clearly and the installation instructions include safety notes, important for a radio of this power. The bulk of the manual explains how to use the advanced facilities: memories, DTMF, etc. This is done in a helpful manner and boxes are provided from time to time giving tips about possible 'idiot traps' (such as accidentally locking out the controls). Diagrams of the controls and display are given as an aid to understanding. A two-page section 'In Case of Problems' isn't the usual cause-and-effect guide (which so often list every fault possible except the one you're experiencing). Instead it aims to help the user understand the display and the function buttons.

Connecting packet radio TNC via the microphone socket is explained with much helpful detail, as is modifying the radio for 9600 Baud working. This latter should be carried out only by someone experienced with surface mount devices.

A two-page quick reference chart is included but it is a pity that this wasn't printed on facing pages so it could be left open beside the rig, especially as the following page is blank.

Finally, block and circuit diagrams are provided on a separate A3 sheet.



The comprehensive LCD display (shown actual size).

BELLS AND WHISTLES

ALTHOUGH THE RUGGED construction and high power are important, the FT-2500M really comes into its own with a large number of well thought out built-in features. These are customised from the front panel using both the visible and hidden buttons, with and without the function button. Different tone bleeps for each function give a helpful confirmation that you have pressed the right button. The transmit power switch even responds with low, medium or high tones, corresponding with the power level selected. The tone level adjusts with the volume control - useful when travelling in a noisy car - or the bleep can be disabled.

Several channel spacings are available from the synthesizer (see Manufacturer's Specifications box) and these are easily selected. However, the receive selectivity and the transmit deviation would need to be modified for *optimum* operation at, say, 12.5kHz channel spacing. Nevertheless, this flexibility is useful for transverting to 6m or when holidaying abroad.

There are 31 memories, each of which can store independent transmit and receive frequencies, repeater shift and direction, and CTCSS settings. Each memory can be assigned a four-digit name (eg S21, 3CF or CLUB) which can be displayed instead of the frequency if required. Any memories (except Ch 1) can be masked so that the radio ignores them until un-masked again; the hanbook suggests this would be useful if you "regularly move from one operating area to another". A priority channel can be set to interrupt your monitoring of another frequency when the squelch opens on that channel.

Holding down the UP/DOWN buttons on the microphone initiates the scanning. This can operate over the memories, the whole band or between limits set by the user to the nearest 100kHz. Scanning stops when the squelch opens and will resume either after five seconds or shortly after the squelch closes, programmable by the user. Memories can be programmed to be skipped by the scanner, though they may still be selected manually.

To prevent the transmitter being left on accidentally a Time-out Timer can be implemented to turn off the Tx after between 5 and 60 minutes of continuous sending. Automatic Power-off can be set to switch off the radio after a period of no button or PTT activity; times of between 1 and 24 hours are available.

The repeater shift on the FT-2500M is initially set to 600kHz but any split can be set, either globally or by using the memory channels. Repeater shift is available manually on any channel but a most useful facility is Automatic Repeater Shift which enables a -600kHz shift whenever a recieve frequency is selected in the sub-band 145.600 to 145.850MHz. It's a pity that the top three channels are included in this - they have long ceased to be allocated to repeaters in IARU Region 1, but this is a minor niggle.

A CTCSS tone encoder is built in (see page 67 for information on the use of CTCSS in the UK) and there is an optional decoder available. Selecting a tone is easy but fiddly if mobile, as it involves one of the 'hidden' front panel buttons. If you use several co-channel repeaters habitually with different tones, these can be set in the memories; the tone group could be stored as part of the analogue display (eg R4_E, R6_A, R6_C etc).

ON THE AIR

THE FT-2500M was easy to use, once set up and performed well. The high power proved useful and there was adequate audio output for mobile use. The backlit display was found to be easy to read, as was the bargraph 'S' meter. Good reports were received on the transmit audio.

CONCLUSION

A GREAT DEAL of thought has gone into the design of the FT-2500M. It has a very ergonomic front panel and a wealth of facilities, the majority of which may be tailored to the user's preference. It is one of the highest power 2m mobiles available and is certainly built solidly.

Two small things let the radio down: the microphone feels cheap, and the loudspeaker is in the wrong place for most uses. These can be fixed easily but at an additional cost.

Optional extras include a CTCSS decoder, a DTMF pager, a DTMF keypad microphone, an external loudspeaker and a mains power supply.

The FT-2500M transceiver costs around £350 and is available from Yaesu dealers, many of whom advertise in *RadCom*. Our grateful thanks to Yaesu (UK) for the loan of the review model.

MANUFACTURER'S SPECIFICATIONS

General	
Frequency range (as supplied):	144.025 - 146.000MHz
Channel steps (selectable):	5, 10, 12.5, 15, 25 or 50kHz
Frequency stability:	< ± 10ppm (-20 to +60°C)
Mode of emission:	F3 (G3E)
Antenna impedance:	50Ω unbalanced
Supply voltage:	13.8V DC ± 10% negative ground
Current consumption (typical):	Rx: 600mA, Tx hi/mid/low: 12/9/5A
Operating temperature range:	-20 to +60°C
Case size (WHD) without knobs:	160 x 50 x 180mm
Transmitter	
Output power (hi/mid/low)	50 / 25 / 5W
Modulation type:	Variable reactance
Maximum deviation:	± 5kHz
Spurious radiation:	< 60dB
Microphone impedance:	2kΩ
Receiver	
Circuit type:	Double Conversion Superhet
IFs:	21.4MHz and 455kHz
Sensitivity (for 12dB SINAD):	Better than 0.2µV
Selectivity (-6 / -60dB):	12 / 30kHz
IF rejection:	Better than 70dB
Image rejection:	Better than 70dB
Maximum AF output:	3.5W into 4Ω at 10% THD

RADCOM NEWS FEATURE

Friendly Islands for IOTA Award

by Jim Smith, VK9NS

OVER SEVERAL YEARS I have DXpeditioned to many parts of the world in the name of the DXCC Award programme. During the last year or so, since I completed DXCC on CW and SSB, I have become interested in the RSGB's Islands on the Air Programme (IOTA), so it was in the name of IOTA that I went to the Kingdom of Tonga early in 1994. All DXers know that Tonga (A35), is not rare but in the *RSGB IOTA Directory*, the Kingdom of Tonga has five listings (**Fig 1**).

It was the ★★★★★ entry against Niuatoputapu Is which attracted my attention - it had never been active in amateur radio terms, so it was a chance to create a *new one* for 'Island Hunters'.

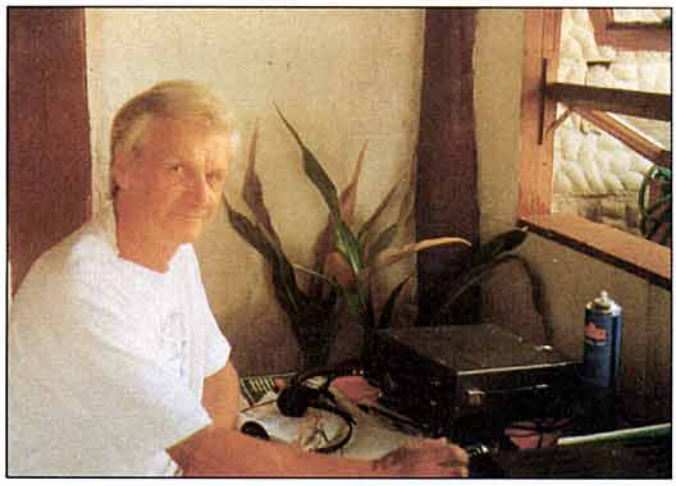
As I spoke to Father Kevin, A35KB, a Catholic Priest living on

Father Kevin, A35KB.

Vava'u, on a regular basis (he is a member of HIDXA) I started to talk about Niuatoputapu which he knew quite well. It had no electric power, and local groups depended on individual small petrol generators - Kevin was sure that the Catholic Mission on the island had such a generator.

Niuatoputapu

THE ISLAND HAS a population of around 1,200 and has a small grass airfield with flights to and from Vava'u every couple of weeks. The small twin engined Otter aircraft carries a few passengers and reportedly had a fairly strict baggage limitation of 10kg plus a hand luggage allowance. Since I rarely carry less than 90kg on any normal mini DXpedition, the idea of carrying a linear was quickly ruled out, and it was necessary to work out what the minimum amount of equipment was for the operation. A small freighter service delivers the main supplies to the island by sea, calling every few weeks with fuel, food and of course a few inter-island passengers.



Jim, A35MR/P - rig is a Kenwood TS690S.

In due course Kevin confirmed the availability of a generator and that my permission to visit the island was cleared. The islanders had agreed to sell me around 100 - 150 litres of fuel from their precious stocks and things began to look good. I arranged with the help of the National Radio Society, HIDXA, that Kevin would accompany me to Niuatoputapu as his years of experience in living and working in Tonga would be invaluable. However the plans for our visit in November 1993 were brought abruptly to a halt, as it was announced that the freighter was running three weeks late and the islanders could not spare any fuel! HIDXA came to the rescue and arranged, via Kevin, that a 200 litre drum of fuel would be put aboard the freighter at Tongatapu.

With Christmas and New Year out of the way I made airline bookings to get to Tongatapu and a few days later I also had internal flight bookings for Kevin and myself to Niuatoputapu. There was a last-minute scramble as Kevin tried to get final confirmation from the Catholic Mission that the fuel was there, and the generator was also available for our use. The third telegram to the Mission was finally answered with just two days to spare. It now looked certain that the 'Island Hunters' might soon have a new island to chase.

Our Arrival

A COUPLE OF DAYS later I was on my way to Tonga via Auckland where I had an enforced weekend stop-over but I arrived in Tongatapu on Monday evening, and started clearing customs with my radio equipment. Early on Tuesday morning I paid my excess baggage and was on my way to Vava'u.

Kevin met me at the airport and I was soon settled in as his guest at the Mission. Since we were due to leave for Niuatoputapu early Friday morning we spent the next day or so checking our resources. I had arrived completely self-sufficient: rig, AC power supply, antenna, coax, power line extension cord, coax cable and so on. Kevin had a very limited equipment. Neither of his rigs had an AC power supply, instead he used a rather large battery and small charger as his base station rig supply. He packed his equipment, wire antennas and his battery charger, convinced that he would be able to borrow a battery on the island.

Friday morning had us checking in at the airport. Kevin knew everyone and this certainly

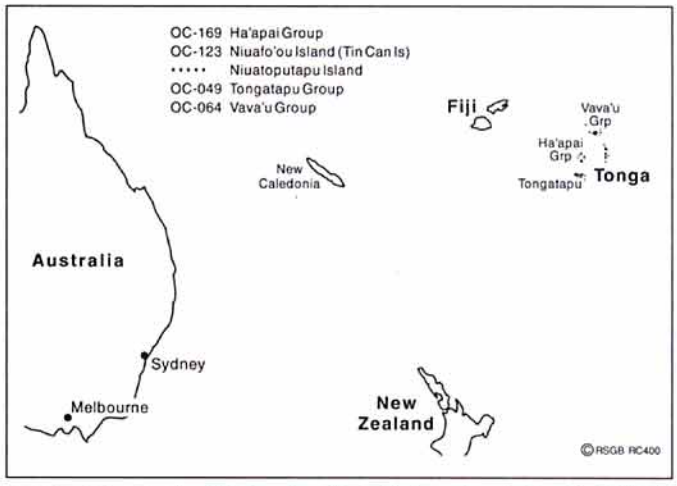
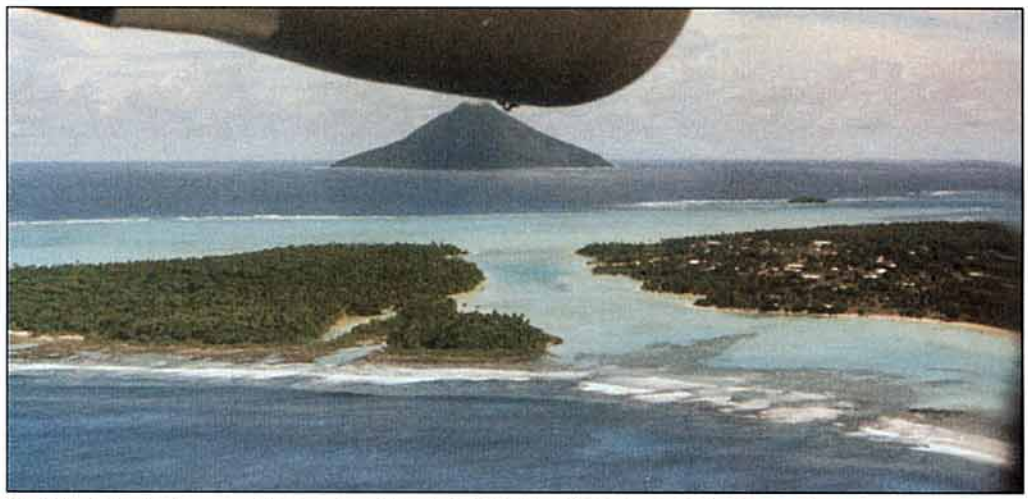


Fig 1: The Friendly Islands (Tonga) and their IOTA numbers before the A35MR/P expedition took place.

helped avoid any problems. An hour or so later the 'Twin Otter' touched down on the grass airstrip on Niuatoputapu Island and we were met by Sione Laina, the Tongan Catholic Priest. He was leaving the island on the same plane but he assured us that everything was OK for our stay. After seeing him off, we were on our way. All our gear had been loaded on a large lorry and with a bunch of other passengers we set off, dropping people here and there on the way. My first impression of the Catholic Mission was very good and I soon realised that we would each have a room to sleep in and that there was a shower and toilet facilities. This was much more than I ever expected.

At ground level there was a large covered area and it seemed ideal to set up our stations. In the case of the generator, we were also very lucky. The freighter in December had brought a new 3kVA generator for the Mission and this had been installed in a small shed about 50 metres away. As a further bonus the generator output of 230V AC had been run underground to the Mission building terminating in a three pin power socket. Since a fluorescent light had also been installed in the room where we had decided to set up our rigs, it seemed that we were really in business.

Within an hour or so I had my station set up using a Kenwood TS-690S which is fitted with a built-in antenna tuner. The Butternut HF6V vertical was quickly assembled and with the radial system in place I was more or less ready to go. I started up the generator and informed the gang on 21,260kHz that we had arrived and would be fully operational soon. ZL2VS was first in the A35MR/P log. I signed A35MR/P as I wanted to differentiate between any of my later A35MR operations.



The 'Twin Otter' arrives over Niuatoputapu Island - Tafahi Island (656m) is in the background.

Trouble

MEANWHILE KEVIN was in trouble as he needed a battery to power his rig. This took some time to locate and Kevin could not stay on the air for more than an hour or so before the battery was flat. The small charger he had carried simply could not charge the battery fast enough. Of course back in Vava'u his battery was very large and the steady trickle charge was sufficient for most circumstances. To overcome the problem he shared my rig for a few days but it was not an ideal arrangement. I then took a chance and connected his rig to my Kenwood PS52, heavy-duty AC power supply. Fortunately it was able to handle both rigs and this is how we worked from then on. No more battery problems.

We experienced some problems of interference between our stations but there was little to be done - proper grounding was a major problem. There was one other awkward situation and that was that we did not run the generator after about 2200 local (1100UTC). It just did not seem right to have the generator running when all others around us were asleep.

After a few hours of operation we had well over the minimum number of QSOs and number of countries worked for the island to be given an official IOTA number, and very soon IOTA Director Roger Balister, G3KMA, was kind enough to allocate OC-191 to Niuatoputapu Island. So the unnumbered island of Tonga was no more and Kevin and I went on to work as many of the island chasers as possible.

In our activities on the island I must mention the generosity and the kindness of the islanders. Kevin was known to many from his previous stay and with his fluency in Tongan and his unique knowledge of the Tongan people the visit became very special. The children loved us. On their way to and from school they had to pass our door and they really wondered what we were doing. With Kevin speaking into a microphone that was not so bad, but what was I doing when I was sending Morse? That had them baffled. During my daily sked with XYL Kirsti, VK9NL, many of the children and people around said hello.

Like all DXpeditions the time passed in a blur. Fuelling the generator, eating, sleeping and operating became a vicious circle. Band conditions after 5 February were terrible, with hours of dead bands and we fought for every QSO. During our stay, many were chasing Peter 1 Island (3Y0PI) and this also contributed to low QSO rates. However there were some good openings and one of the highlights was working 3Y0PI on 20 and 40m SSB with our 100W and an HF6V. Many JA stations were worked on several bands.

In due course the day of our departure came near but we had a one day extension because the plane went on a rescue mission to Tin Can Island to airlift two very sick people. Then it was time to take the antennas down, get our equipment packed and finally we were once again at the small airfield. With some 3,200 QSOs in my log I was sure that most of the island chasers had worked that brand new IOTA Island OC-199.

A35MR/P - HF6V roof mounted with multiband radial system in place. The shack is underneath.

We were soon back in Vava'u and a couple of days later I was once again travelling. This time I set up station on Lifuka Island in the Ha'Apai Group, OC-69, but that is another story. Some 3,000 QSOs later, signing A35MR, I was once again packing up and finally on my way home heading for Norfolk Island.

The Friendly Islands is a very good name for the Kingdom of Tonga because that was exactly what I found. Perhaps I will return to the area one day - Minerva Reef, OC-055, is badly needed by Island Hunters. Watch this space!

This was our usual school-children audience, stopping on the way to school some 2km away.

Described by RadCom's Technical Editor Peter Dodd, G3LDO

RADIO COMMUNICATION HANDBOOK

Edited by Dick Biddulph, G8DPS Published by the Radio Society of Great Britain, 1994. 700+ pages (272 by 199mm) soft covers. Price £20 (£17 with RSGB Members' discount) plus £1 UK post and packing. See page 95 for how to order. ISBN 1 872309 24 0.

THE RADIO COMMUNICATION Handbook has now reached its sixth edition. The increase of technical information to well over 700 pages reflects the complexity of the technology associated with amateur radio. In addition to many hundreds of diagrams, the book contains over thirty reproducible PCB layouts.

Since the last edition (published 1976), technology and amateur radio practice have advanced considerably and the new *Handbook* reflects these changes.

The book is divided into 22 chapters:

- Principles
- Passive components
- Semiconductors
- Electronic tubes and valves
- Building blocks
- HF receivers
- HF transmitters and transceivers
- VHF/UHF receivers, transmitters and transceivers
- Microwaves
- Telegraphy and keying
- Propagation
- HF antennas
- VHF/UHF antennas
- Power supplies
- Measurements and test gear
- Construction and workshop practice
- Electromagnetic compatibility
- Amateur satellites and space communications
- Image techniques
- Data communications
- Operating technique and station layout
- General data

Expanded and Re-Written

THE CHAPTER ENTITLED 'Principles' in the 5th edition has been expanded into two chapters as 'Principles' and 'Passive components'.

'Semiconductors' has been completely rewritten, with much more emphasis on modern integrated circuits. This has been done at the expense of the solid state physics which appeared in the 5th edition, resulting in a much more practical treatment.

A completely new chapter has been introduced called 'Building blocks'. Rather than describing the design and construction of a specific piece of equipment, such as a receiver, this chapter provides information on all manner of circuits that one can use to design any item of equipment. The characteristics of oscillators, mixers, semiconductor and valve amplifiers are given, together with a large number of practical circuit diagrams.

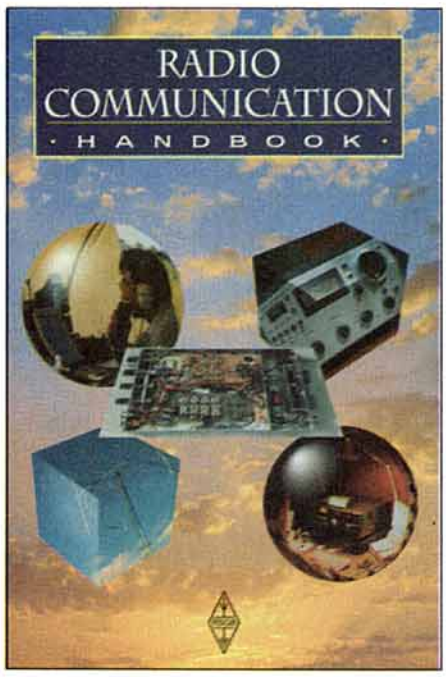
The 'HF receivers' chapter has been completely rewritten and gives details of modern receiver design. It discusses strong-signal performance, selectivity, oscillator noise/reciprocal mixing, cross modulation blocking and intermodulation. The chapter uses a 'building block' approach by providing useful circuits and advice on how to assemble them. Two simple receiver projects are detailed.

A new chapter, 'HF transmitters and transceivers', reflects the modern tendency to use transceivers. It covers theory of transmitter circuits and solid state power amplifiers (HF valve PAs are described in chapter 5). The chapter has detailed constructional projects, including a 160/80m CW transceiver, a 14MHz CW transceiver, an updated version of the G3TSO modular multiband transceiver and a 600W solid state PA.

Another new chapter 'VHF/UHF receivers, transmitters and transceivers' starts with the theory of VHF/UHF circuits and goes on to provide detailed construction projects, including a 50MHz transverter and a 50MHz solid state PA. There are projects using air-cooled valves, such as the 4CX250B, in 50, 70 and 144MHz PAs.

Microwaves and Solid State

YET ANOTHER NEW SECTION deals with Microwaves. It is mostly devoted to constructing high performance narrow-band projects which are described in detail with components lists. The projects described are: High quality microwave sources for 1.0 to 1.3GHz, 2.0 to 2.6GHz, and 10.0 to 10.5GHz; multipliers for 1296 or 1152MHz; a waveguide multiplier for 5.7GHz; and GaAsFET preamplifiers for 2.3GHz and 10GHz. There is also a 10GHz to 144MHz receive converter and a 144MHz to 10GHz transmit converter by G3WDG. The chapter also covers microwave antennas.



The chapter on keying has been rewritten and the G3BIK electronic keyer is described in detail.

The laws of physics change little so it comes as no surprise that the chapter on 'Propagation' is very similar to that in the 5th edition. Amongst the revisions is an item on grey-line HF propagation.

HF antennas runs to 108 pages with 178 illustrations. It covers theory, directive arrays, polar diagrams, earth conductivity, transmission lines, standing waves, transformers, impedance matching and Smith charts. Practical loop antennas are described for the first time. The chapter concludes with details of mobile antennas, mast and rigging, receiving antennas and measurements.

The VHF/UHF antenna chapter has been upgraded to include long yagi design. Additionally there are a number of practical antenna designs including the quadruple quad, the log periodic and yagi and a multi-polarisation design using crossed yagis. There are also practical designs for collinear antennas.

The 'Power supplies' chapter has been revised to cover switch-mode PSUs. The rewritten and retitled 'Measurements and test gear' reflects the use of modern digital measuring gear. It gives construction details of equipment such as a 0.8 to 170MHz dip oscillator and an impedance noise bridge. Also described is a 600MHz digital frequency counter and the G4PMK spectrum analyser.

'Construction and workshop practice' has been added. There are useful descriptions of materials such as metals, plastics, and adhesives. A whole range of tools and their applications are described as are methods of designing and making PCBs. Finally there is information on how to obtain a professional finish to your home-made equipment.

Modern Trends

THE OLD 'INTERFERENCE' section is now renamed 'Electromagnetic compatibility', and the completely revised 'Amateur satellites and space communication' chapter describes the numerous satellites that have been launched since the 5th edition, together with methods of plotting them. A small chapter on image techniques covers slow scan television, facsimile and fast scan television. The Data communication section now gives an outline of RTTY, AMTOR, Packet (including mailboxes), PACTOR and CLOVER.

'Operating technique and station layout' has been revised to reflect the new bands and changed licence conditions. Safety and planning permission is also dealt with.

The final part, 'General data', gives a wealth of formulas, tables, definitions and nomograms. Several pages are devoted to filter design.

Summary

EVEN IF YOU ALREADY have a copy of the fifth edition on your shelf - and I'll bet it is well-thumbed - this new edition contains enough revised, updated and new information to be a good read. As a reference work, it should form an essential part of everyone's shack.

IDEAS FROM ABROAD

TRANSLATED AND EDITED BY ERWIN DAVID, G4LQI

A **home-built Packet Modem with Digital Squelch** for Baycom-type software was described by **Fred Hopman, PA3CYN** in *Electron* (NL) 9/94.

THIS PACKET MODEM works with *Baycom*-like software such as SP and Graphic Packet, together with the TNC-emulator TFPCX. Note that this modem does nothing unless a PC is on-line; this is unlike a full-featured TNC, which can accept and hold incoming messages by itself for reading later, after a computer has been connected. The modem is a stand-alone instrument with a self-contained mains power supply delivering 12V DC and 5V DC, both regulated.

A standard RS232 cable connects the modem to the 'communication' port of the computer, but a special modem-to-radio cable must be made up, as microphone/speaker connectors differ between radios.

THE CIRCUIT

THE HEART OF THIS design is Texas Instruments' well-known FSK modem IC TCM3105. It comprises a separate transmitter and receiver as well as an oscillator on the crystal frequency of 4.4336MHz. The IC's tone generators and decoders work off this frequency. See **Fig 1**.

The audio from the receiver, 0.78V p-p max, is fed into pin 4 of IC2. The presence of a signal is indicated by the lighting of the LED D8. The decoded packets appear at pin 8 at TTL level. In IC1 this signal is then translated to the RS232 level of ±9V. Packets arriving from the computer for transmission are translated to TTL level in IC1 and applied to IC2 at pin 14. Simultaneously, the PTT line is earthed at IC1 pin 8 and the LED D4 lights.

A 'Watchdog' circuit, consisting of C10, D1 and R2 ensures that the PTT times out after one minute in case of a software hang-up.

IC3, an XR2211, is a digital hardware squelch; it is useful with older transceivers whose own squelch is too slow for packet radio. D7 is a DCD (squelch-open) LED which lights when a packet is being received.

Relay RL1 is used to key transceivers which require PTT switching in the positive supply line; with transceivers which are keyed by earthing the PTT line, RL1 is not needed, but then the dotted jumper is. If a transceiver's accessory socket is used for the cable to the modem and a microphone is connected, the latter is muted in the modem by TR2. If the modem cable plugs into the transceiver's microphone socket, R21 and TR2 may be omitted.

The power supply, shown in **Fig 2**, consists of a standard transformer-rectifier-capacitor chain, followed by a 12V regulator. This feeds the 12V bus and, via a 5V regulator, the 5V bus. If an external 12V power source is to be used the components marked (*) in the parts list are not used.

THE CONSTRUCTION

THE INSTRUMENT IS BUILT on a single-sided PCB measuring 120 x 70mm, which fits a standard *EUROBOX*. The PCB and assembly instructions are available from: F J A Hopman, Kamperfoelieweg 125, NL-1032HJ Amsterdam, upon receipt of Hfl25

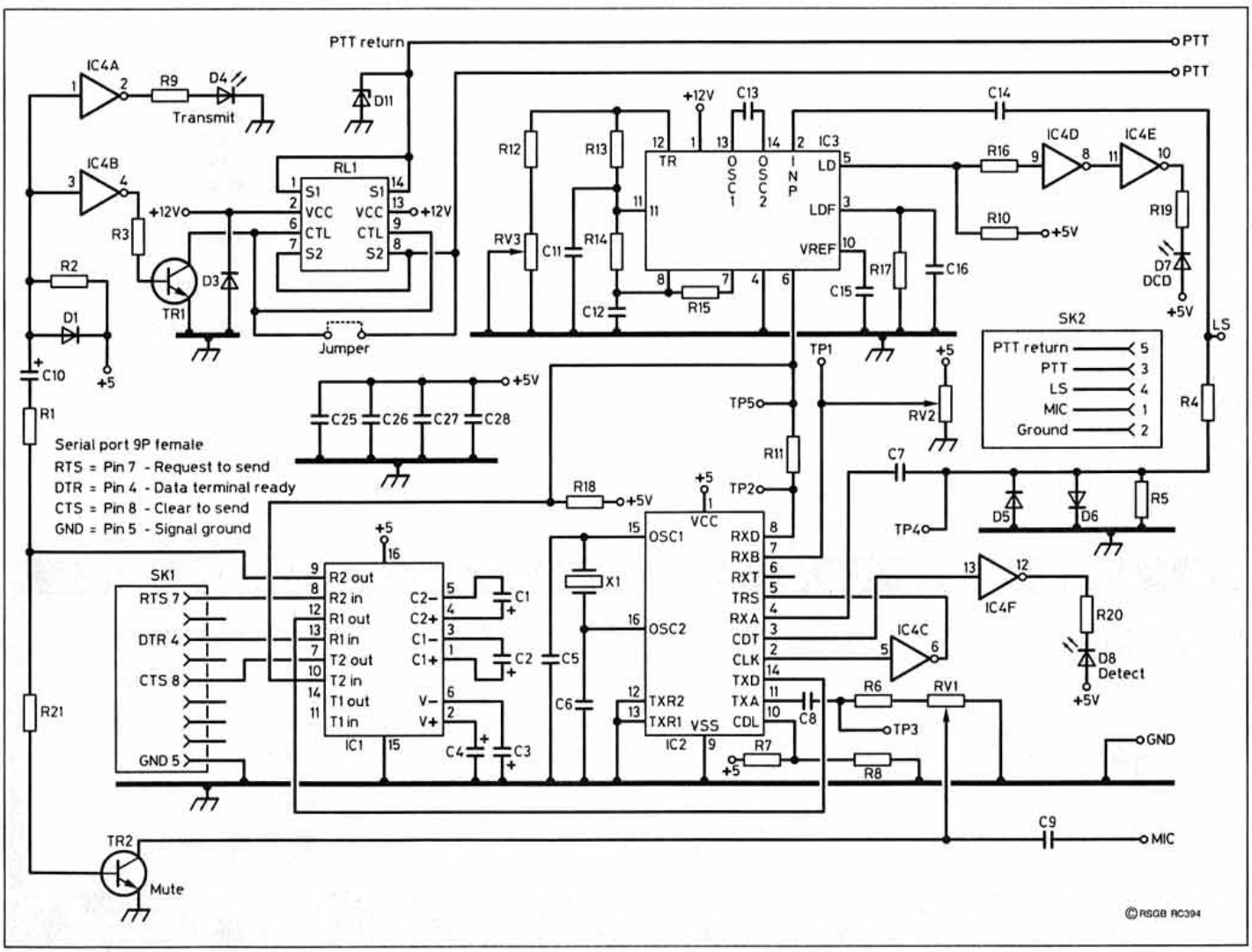


Fig 1: PA3CYN's modem with digital squelch.

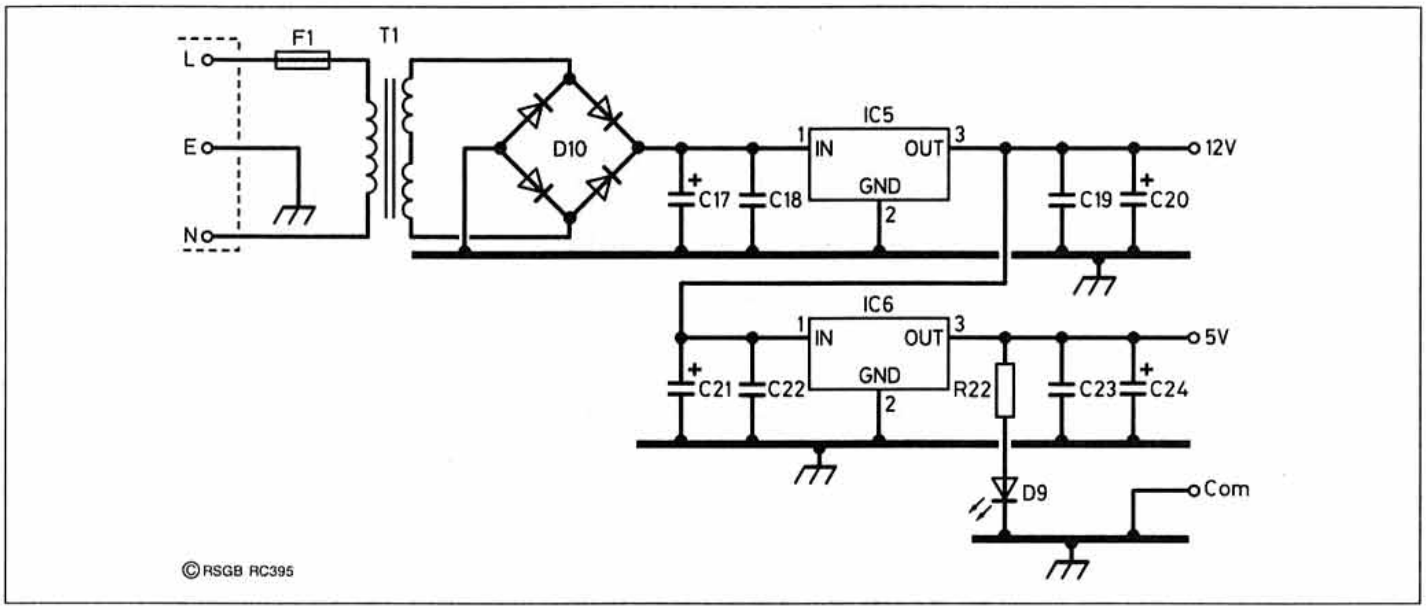


Fig 2: Mains power supply for PA3CYM's modem.

by Eurocheque or International Postal Money Order. [No *Eurostandard* 1.6VA mains transformer was found in the catalogues of several popular UK component vendors. If their smallest-available model (3VA with wire leads) must be used, PCB-surgery may be required - *G4LQI*]

Observe all the usual cautions: use sockets for IC1, IC2 and IC3, carefully inspect for cold joints and solder bridges between tracks, and check voltages before plugging ICs into their sockets.

ADJUSTMENT

CONNECT THE RS232 CABLE and apply power to the modem.

Adjust RV2 for 2.7V on TP1. Make a loopback connection from TP3 to TP4; adjust RV3 to where the DCD LED D7 just lights; remove the loop-back connection. This completes the adjustment of the digital squelch.

Connect and power the transceiver. RV1 now must be adjusted for the proper audio level at the microphone input of the transceiver; in practice, the centre position of RV1 does just that. Monitor your signal with another receiver; the packets from your transceiver should be just about as loud as those from other stations; a bit low is better than too high. Your modem is now operational.

COMPONENTS LIST

Resistors - All resistors 0.6W metal film	
R1, 14	M10 5%
R2	3M3 5%
R3 6	10k 5%
R4	100 5%
R7	15k 5%
R8	33k 5%
R9, 19, 20, 22	470 5%
R10, 12 ,16, 18, 21	22k 5%
R11	1k0 5%
R13	43k 1%
R15	M51 1%
R17	M47 1%
RV1	1k0 25 turns, Bourns 3296
RV2	50k 25 turns, Bourns 3296
RV3	10k 25 turns, Bourns 3296
Capacitors	
C1, 2-4, 10, 24	10µ/16V Electrolytic
C5, 6	33p ceramic
C7-9, 14, 15, 18*, 19*, 22, 23, 25, 26-28	100n ceramic
C11	4n7 ceramic
C12	2n2 ceramic
C13	22n polyester
C16	150n polyester
C17*	470µ
C21	100µ 25V

Semiconductors	
D1, 3, 5, 6	1N4148
D4, 9	LED 3mm red
D7	LED 3mm yellow
D8	LED 3mm green
D10*	B40C1500 bridge rectifier
D11	Zener, 18V
TR1, 2	BC547
IC1	MAX232 (Maxim)
IC2	TCM3105 (Texas Instr.)
IC3	XR2211 (Exar)
IC4	74HCT04
IC5*	LM78L12
IC6	LM78L05
Additional Items	
RL1	Relay, DIL, SPST, NO, 12V coil, Clare PRME 15003
T1*	Mains transformer, sec 6-0-6V 1.6VA
F1*	Fuse 63mA slow-blow
X1	Crystal 4.433,61MHz
SK1	D9 socket, 90° PCB mtg
SK2	DIN chassis socket 5-pin 180°

Components marked * make an integral 12VDC mains supply.
Relay RL1 is used only for PTT in the positive supply line.

PRODUCT NEWS

Note: Product news is compiled from press releases sent in by the manufacturers and distributors concerned. Details are published in good faith but *Radio Communication* cannot be held responsible for false or exaggerated claims made in the source material.

A NEW ANTENNA company has just started in business - **Vine Antenna Products**. They can advise and supply you at competitive prices, and their range includes everything from a type N connector to a 3-element Yagi for 80 metres. Popular brands in stock include KLM, Cushcraft, HyGain, Force 12 and more. Rotators from Emoto, Create and Yaesu are also stocked. Vine is run by Ron Stone, GW3YDX, and for further information you can write to him at:

The Vine, Llandrinio, Powys SY22 6SH. Tel: 01691 831111.

BEN SPENCER, G4YNM, now produces **kits** for the amateur radio market, and has sent us his Thermally Operated DC Fan Controller kit which is suitable for both the Novice and experienced radio amateur. The kit costs £4.90, or can be supplied assembled and tested for £7.40. Information can be obtained from:

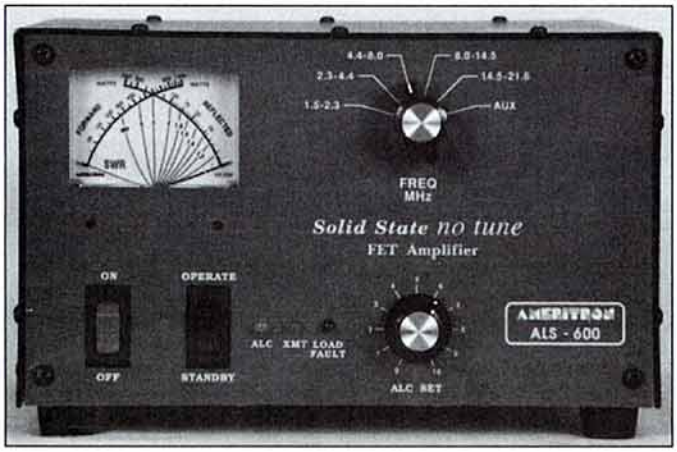
Ben Spencer Consultants, Enterprise House, 33 New King Street, Bath BA1 2BL. Tel: 01793 642856.

AMERITRON HAS announced the **ALS600 No Tune Solid State FET Amplifier** runs 700W PEP/500W CW, over a continuous range of 1.5 - 22MHz with an optional 10/12 metre kit, instant bandswitching, no warm up, no valves and is fully SWR protected. An extremely compact unit, measuring just 6 x 9½ x 12 inches, weighing 12½ pounds.

It features an illuminated cross-needle SWR/wattmeter allowing you to read the SWR, forward and reflected peak power simultaneously. A front panel ALC control lets you adjust your output power. The ALS600 also has a separate power supply which can be placed conveniently out of the way and plugged into your nearest 240 VAC outlet - with no special wiring.

Priced at £1575 you canobtain more details from:

Waters & Stanton, 22 Main Road, Hockley, Essex SS5 4QS. Tel: 01702 206835.

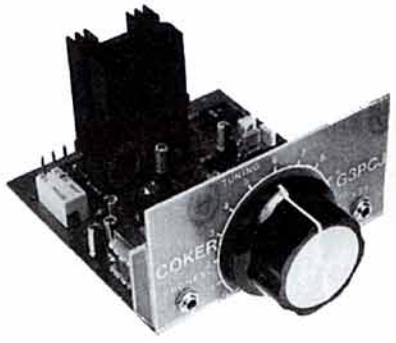


THE NEW CIRKIT catalogue is now available from:
Cirkit Distribution Ltd, Park Lane, Broxbourne, Herts EN10 7NQ.

IF YOU ARE looking for a good club construction project or just want to do a bit of home-brewing, then the new **Coker kit** from Walford Electronics is a good product to consider.

The Coker is a simple direct conversion CW transceiver for 80m. The receiver has four FETs in a novel high gain arrangement. The single knob VFO tuning uses a varactor diode with a stabilised supply voltage. Although the audio filter is intended for CW it is possible to copy SSB and the tuning range allows coverage of part of the SSB section of the band. A low impedance output suits modern phones or a small loudspeaker. The transmitter runs 5W with semi-break-in, Tx frequency offset and sidetone. There is also a version for 160m. The transceiver kit costs £45.00 and can be purchased from:

Walford Electronics, Upton Bridge Farm, Long Sutton, Langport, Somerset TA10 9NJ.



THE LAKE ELECTRONICS November 1994 **catalogue** describes the range of low-priced kits available. These include: CW transceivers for 1.8, 3.5 and 7MHz (a new one Is a 5W 7MHz Tx); antenna system tuners (Tx up to 80W with built-in SWR meter, or a receiver-only version); a direct conversion receiver for 3.5, 7 and 14MHz; a dummy load / power meter; a 13.8V, 1.5A regulated PSU; an SWR meter; and audio filter and a code practice oscillator. Components and ready-built kits are also available.

Details from:

Lake Electronics, 7 Middleton Close, Nuthall Close, Nottingham NG16 1BX. Tel: 0115 9382509.

DO YOU NEED a clock on your PC? **Qclock v1.4** from Shoestring Software could be the answer. Qclock is a utility for a PC (286 or better) running Windows 3.1. It can display the time in 12 or 24-hour format in the currently active window or in its own dedicted window.

Two alarms have the facility of audio only or a dialogue box to alert the user, or both together. The program costs £4 + P&P.

Shoestring Software, 78 Carmarthen Road, Waun Wen, Swansea SA1 1HS.

FOR BROADCAST listeners, the ***Guide to English Language Short Wave Broadcasts to Europe (Winter Schedules - 1994)*** will be of interest. This book from the International Short Wave League (ISWL) costs a mere £1.50, post paid, (three IRCs or stamps to the value of £1.50 are also acceptable). Contact:

ISWL, 10 Clyde Crescent, Wharton, Winsford, Cheshire CW7 3LA.

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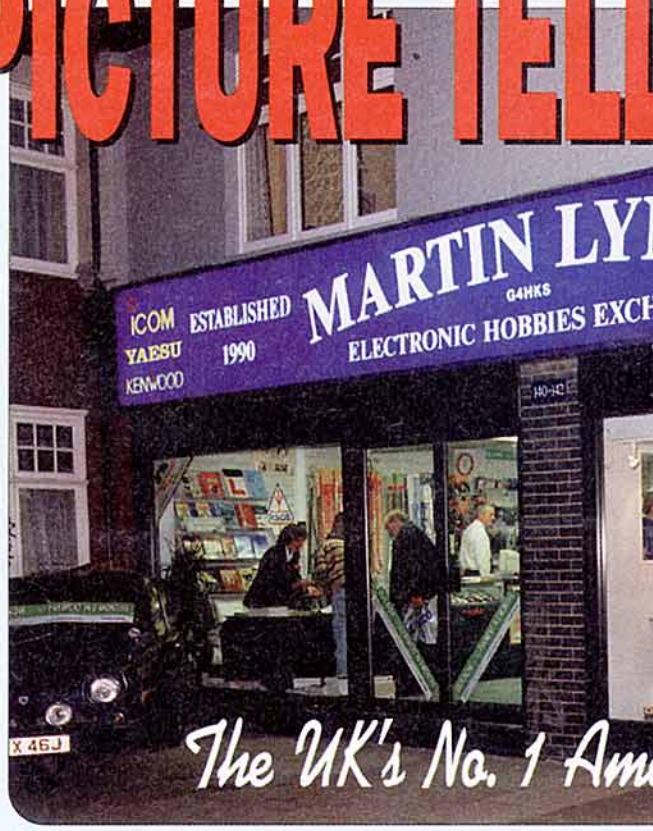

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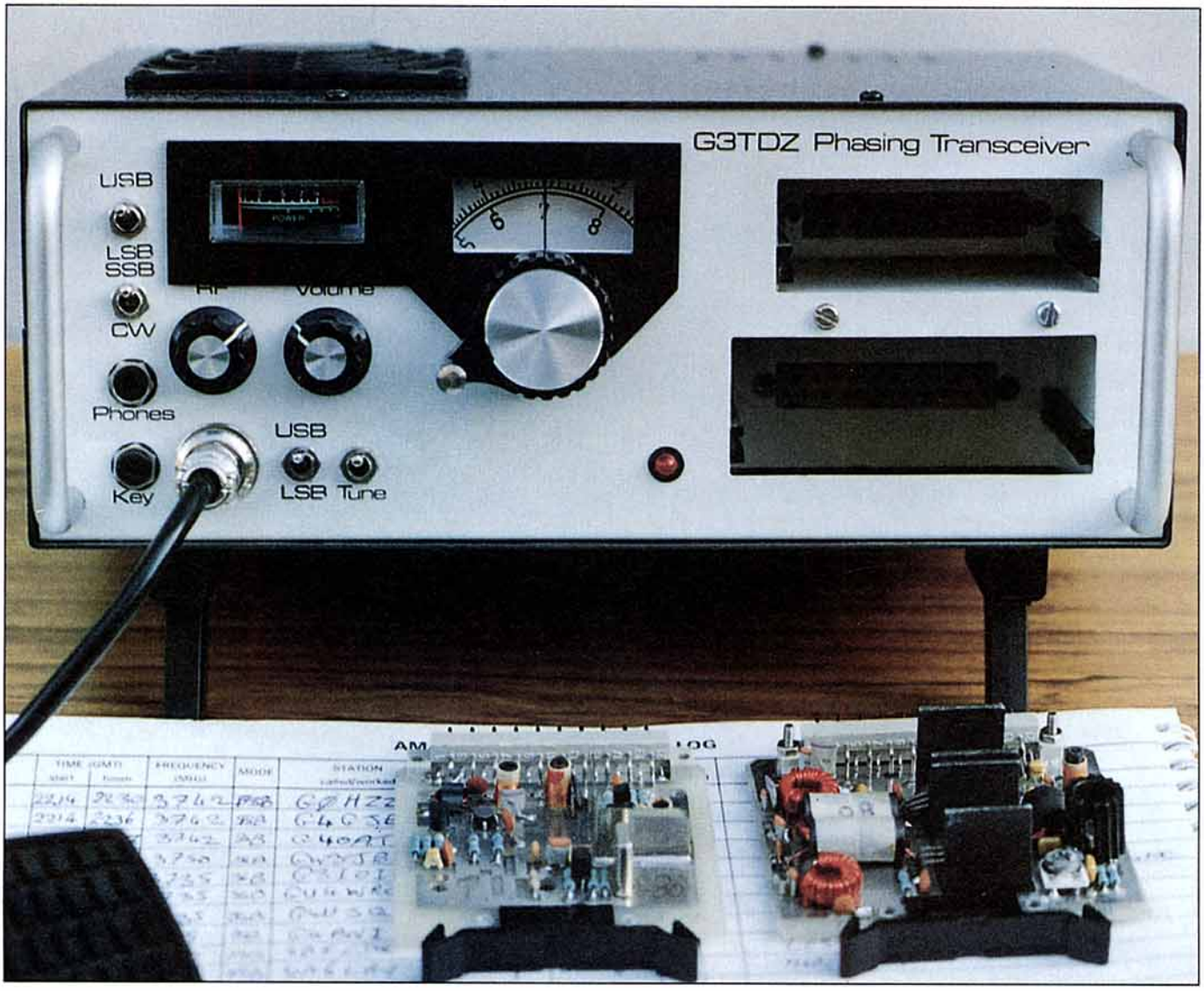
RADCOM TECHNICAL FEATURE

CW for the G3TDZ Transceiver

by Tony Langton, GM4HTU



The G3TDZ Phasing Transceiver was described in *RadCom*, Feb 1990 (receiver) and Jul/Aug 1993 (transmitter).

THIS CIRCUIT WAS BUILT to provide a Morse code facility for the multi-band phasing transceiver [1]. It comprises two parts: a tone generator for signalling and a transmit/receive switch delay to provide semi break-in operation.

A common way of generating a CW signal from an SSB exciter is to feed the carrier through the modulator by unbalancing it. The adjustment of a phasing exciter requires some care, so I did not want to modify the circuit once it was working. For this reason I chose the less usual method of injecting an audio tone via a keying circuit. This still generates a genuine A1A signal, not A2 or FSK. The transmitter acts as a frequency shifter (as it does with speech) and moves the keyed signal from AF to RF.

My transceiver operates with a fixed IF of 8000kHz, USB only. Injecting a 700Hz tone produces an intermediate frequency of 8000.7kHz. When this is mixed with 20,100kHz a transmit signal is generated to produce a signal on 28,100.7kHz. A DX station hearing my signal nets on to it, so that he is also on 28,100.7kHz. He then adjusts his BFO to produce his favourite receiving tone, which maybe above or below his receiver IF frequency (it is unimportant which side of the IF passband the BFO is set). When he transmits, his signal mixes with my 28,100kHz carrier to produce a 700 Hz tone in my receiver.

The operating frequency display on my transceiver is calculated from the VFO output, so a correction has to be added when switching from SSB to CW to allow for the transmitted signal being 700Hz higher than the 'carrier'. But beware, if you use this method with LSB, be careful you do not stray below the lower band edge.

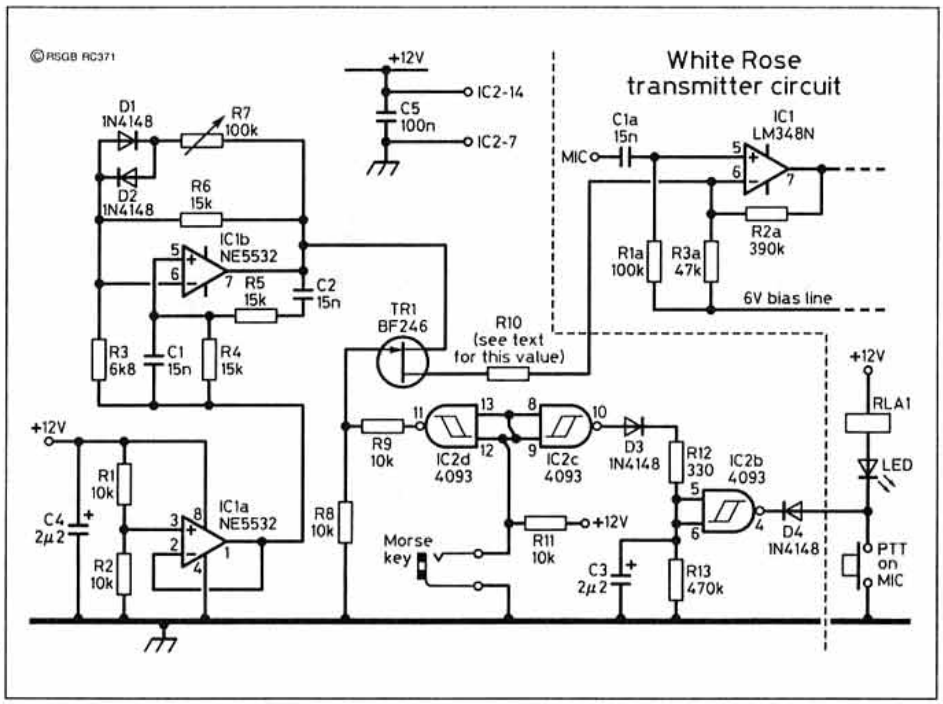


Fig 1: Circuit diagram of the CW tone oscillator.

CIRCUIT OPERATION

INTEGRATED CIRCUIT IC1a, see **Fig 1**, provides a 6-volt centre tap from the 12V supply. IC1b is the familiar Wien bridge oscillator that generates a continuous tone of 700Hz. The frequency is determined by C1, C2, R4 and R5. Resistor R7 and the diodes form a non-linear resistor which controls amplifier gain and therefore the output level. The DC output of the op-amp is 6 volts, the same as the input point on the exciter IC1a-6. These voltages provide the operating bias for the FET, which therefore works with 6 volts on the source and the drain. It is quite happy to do this, and acts as a variable resistor. In fact, only two states are used: Off, when the gate is at 0 volts, and On, when the gate is at 6 volts. By not using coupling capacitors the possibility of clicks and thumps caused by capacitor charging when the circuit is keyed are eliminated.

The first stage of the exciter now receives speech on one input and a keyed tone on the other, but obviously not at the same time! I have reduced the gain of the first stage as my microphone amplifier and filters are on a separate board. I found that one volt peak-to-peak from the Wien oscillator was best suited to my transmitter. If you are using the exciter as the designer intended, you will have to increase R10 to around 470k.

Closing the Morse key grounds the input of IC2d and causes the output to go high, turning on the FET. Releasing the key does the opposite, so the tone output to the exciter follows the key operation.

When the key is down, IC2c-10 also goes high, charging C3 via the diode D3 and the limiting resistor R12. This results in IC2b-4 going low and grounding the PTT line. Diode D4 prevents the output being shorted when the push-to-talk switch on the microphone is used. When the key is released C3 can only discharge through the large value R13 so IC2b-4 stays low. This gives a delay of about 0.5 seconds between the release of the key and the transmit/receive switch returning to receive. Adjust R13 to give a delay to suit your keying speed.

IC2 must be a Schmitt type NAND. The 4000 series CMOS logic was designed to work on 15 volts, so it is quite comfortable on 12V. Although it is now becoming obsolete the 4903 is still available. These components can be obtained from Maplin and their part numbers are: QW53H for the 4903, QF16S for the BF244A FET (which is similar to the one I used) and UH35Q for the NE5532. The remaining components are generally available.

COMPONENTS LIST

Resistors: All 0.25W 5% unless stated

R1, R2, R8, R9, R11	10k
R3	6.8k
R4, R5, R6	15k
R12	330R
R13	470R
RV1	100 linear

Capacitors

C1, C2	15n
C3, C4	2µ2
C5	100n

Semiconductors

TR1	BF246
IC1	NE5532
IC2	4093
D1,D2,D3,D4	1N4148

Additional Items

J1 3.5mm jack plug to suit morse key

Component Sources

JAB Electronic Components, The Industrial Estate, 1180 Aldridge Road, Great Barr, Birmingham B44 8PB.

Maplin, PO Box 3, Rayleigh, Essex SS6 8LR.

REPRINTS

REPRINTS OF the original articles can be obtained from the *RadCom* office for £2.50 (receiver) and £5.00 (transmitter).

REFERENCES

[1] 'Multi-band phasing transmitter', John Hey, G3TDZ, *Radio Communication*, July and August 1993.

RADCOM TECHNICAL FEATURE

RF Coil Dimensions - The Easy Way

By E Chicken MBE, G3BIK

THIS ARTICLE REMOVES much of the mystery from the design of single-layer radio-frequency coils, by providing simplified yet acceptably accurate formulas for those who usually find calculations daunting. Pre-calculated tables are included for those who prefer to avoid calculations altogether or to check the results of calculations. Worked examples in a no-frills manner are included for guidance on using the formulas.

If making an RF Coil from existing formulas winds you up, try the methods described here.

RESONANCE

HF RADIO AND RF COILS are inseparable. Without the RF coil there is no LC resonance, and without resonance there is no radio. This is true even of the satellite microwave bands where microstrip and dielectric resonators prevail, and yet reception of their direct TV broadcasts requires an immediate down-conversion in frequency to the more familiar VHF and HF ranges, ie to the domain of the RF coil/capacitor (LC) resonator.

Before discussing RF coils however, consider first the familiar formula for calculation of the resonant frequency of a series LC tuned circuit, that is, an RF coil with a capacitor connected in series with it.

Assuming good quality LC components with minimal resistive losses, this formula is equally valid for a parallel resonant LC circuit, ie a coil with a capacitor connected across it.

$$\text{Frequency } f = \frac{1}{2\pi\sqrt{L \times C}}$$

It seems harmless enough at first glance, but in amateur radio applications it is far from being user friendly, in that it needs the values for inductance L to be in henries (H), and capacitance (C) to be in farads (F). Then it would give the frequency in hertz (Hz) not the more relevant megahertz (MHz).

The frequency range of interest to the typical short-wave radio enthusiast is, say, from about 2 - 200MHz. Not far below 2MHz lies the medium-wave broadcast band which requires multi-layer RF coils, and above 200MHz the coil dimensions become small enough to be replaced by other resonance techniques such as microstrip transmission lines.

Inductance values of RF coils at the frequencies mentioned, range from about 50µH at 2MHz, down to about 0.1µH at 200MHz - ie *millionths* of a henry, not henries.

And similarly for the values of capacitors associated with those small values of inductance, ranging from around 200 picofarad (pF) at 2MHz, to a few pF at 200MHz - again not farads, but *million-millionths* of a farad.

Arithmetical handling of such miniscule dimensions can present a problem for the non-mathematically inclined. Certainly, even some scientific pocket-calculators cannot accept decimal fraction calculations in the form 0.000005 (for 5µH) multiplied by 0.00000000005 (for 50pF) to give a value for L x C as required in the formula for resonant frequency.

The alternative methods using logarithms or powers of ten with or without a calculator, may be equally unpalatable to the radio experimenter.

So, with the ordinary pocket-calculator and its user in mind, the formula for frequency of a series or parallel LC circuit resonant in the HF/VHF range, has been simplified to:

$$\text{Frequency } f \text{ (in MHz)} = \frac{159}{\sqrt{L \times C}}$$

Where L is inductance in µH
and C is capacitance in pF

Example No 1

Find the resonant frequency of an LC tuned-circuit comprising a coil of inductance L = 2µH in parallel or series with a capacitor C = 50pF.

f (MHz) = (159) divided by square root of (2 x 50)
= (159) divided by (10)
= 15.9MHz

Most of the basic pocket-calculators can give the square root of a number as well as add, subtract, multiply and divide. Some may even have an invert (1/x) key which is useful for working out fractions, because it allows the denominator (below the line) to be calculated first, then inverted, then multiplied by the numerator (above the line).

To demonstrate this, the previous example would be calculated by pressing key entries as follows:-

Example No 2

2	×	50	= 100
√			= 10
1/x			= 0.1
×	159		= *15.9* (MHz)

INDUCTANCE BY CALCULATION

A LONG-ESTABLISHED FORMULA for the calculation of the inductance of a coil of known dimensions is:-

$$L\mu H = \frac{(RN)^2}{(9R + 10S)}$$

where R is the mean radius in inches.

Converting to metric units and *simplifying* gives the G3BIK formula for inductance:-

$$L\mu H = \frac{(DN)^2}{500(D + 2S)}$$

where D = inner diameter of coil (mm)
N = Number of turns
S = span (length) of winding (mm). Assumes S equal to or greater than approx D/2

This simplified formula gives results which are accurate enough for practical purposes, typically to within 2% of the earlier established formula. See **Fig 1** for definition of coil dimensions.

It does *not* require information on the wire with which the coil is wound. One needs only to measure in millimetres the inside diameter D of the coil (or the outside diameter of the former on which it is wound), the distance S in millimetres from end to end of the winding, and to count the number of turns by running a soft-pointed probe over them.

The calculation is quick and easy using a basic pocket-calculator first to calculate below the line, invert that value, then multiply above the line, using key entries as follows:

		2	×	S				PRESS	=	
			+	D				PRESS	=	
			×	500				PRESS	=	
								PRESS	1/x	
×	D	×	D	×	N	×	N			
								PRESS	=	

Alternatively, if the calculator does not have the inverting 1/x key, the memory key may be used thus:-

2	×	S	PRESS =
+		D	PRESS =

[X] 500 PRESS [=]

PRESS [M+]

PRESS [C]

D [X] D [X] N [X] N [÷] [MR]

PRESS [=]

For practice and to gain confidence, the above key entry sequence should be used in the following examples:-

Example No 3

Calculate the inductance of an enamelled copper-wire coil of:-

inner diameter D = 12.5mm
no of turns N = 41
span of winding S = 21mm

$$L\mu H = \frac{(DN)^2}{500(D+2S)} = \frac{12.5\times12.5\times41\times41}{500\times(12.5+(2\times21))}$$

= 10μH approx

Example No 4

Calculate the inductance of an enamelled copper-wire coil of:-

inner diameter D = 4.8mm
no of turns N = 14
span of winding S = 7mm

$$L\mu H = \frac{(DN)^2}{500(D+2S)} = \frac{4.8\times4.8\times14\times14}{500\times(4.8+(2\times7))}$$

= 0.5μH

All results have been rounded up or down to the nearest whole digit.

NUMBER OF TURNS BY CALCULATION

THE CONVERSE OF FINDING the inductance of a given number of turns, is to determine the number of turns required to produce a required value of inductance, from given coil diameter and wire details.

Classical published formulas for the calculation of the number of turns for an RF coil, can be horrific and daunting. Take for example the following formula prior to simplification:-

$$N = \frac{5L}{nR^2}\left(1+\sqrt{1+\frac{0.36n^2R^3}{L}}\right)$$

Again a not too user friendly formula, being in dimensions of yesteryear and involving the radius rather than the more measurable diameter.

Converting to metric, and to inner diameter instead of outer radius, and simplifying, gives the G3BIK formula for number of turns of an air-cored single layer coil:-

$$N = \frac{500L}{nD^2}\left(1+\sqrt{1+\frac{(n^2D^3)}{(500L)}}\right)$$

where N = number of turns, air-cored
L = inductance in μH
n = turns per mm (close-wound or spaced)
D = inner diameter in mm

It may still look somewhat complex, but is in fact *really* easy to use, as will now be demonstrated by worked examples and guidance on how to manipulate the everyday non-scientific type of pocket-calculator.

For this formula, one needs to know the turns per millimetre, ie the winding-pitch for the coil. Assuming close-wound coils, the turns per mm values are as given in Table 1 for the most practical range of standard wire gauge enamelled copper-wires.

Note that turns per mm does not simply equal (1/dia), because it allows for the thickness of the enamel covering. The diameter of the wire is not in fact needed, and is given for interest only.

If there is any doubt about the actual gauge of the wire available, the turns per millimetre can be easily obtained by close-winding enough turns onto the coil-former or pencil to cover 10mm, then to divide by ten to get turns per mm for a close-wound coil.

The simplified formula for number of turns N may be calculated on a pocket-calculator by the following key entries:-

n [X] n [X] D [X] D [X] D

[÷] 500 [÷] L PRESS [=]

[+] 1 PRESS [=]

PRESS [√]

[+] 1 PRESS [=]

[X] 500 [X] L [÷] n [÷] D

[÷] D [=] Number of turns N

Example No 5

Inductance of L = 0.5μH to be close-wound on standard former of 4.8mm dia, with air core, using 28SWG enamelled copper-wire, close-wound.

From **Table 1**, number of turns per mm for 28SWG wire = 2.4 t/mm = n

For formula calculations, L = 0.5
D = 4.8
n = 2.4

Using calculator, number of turns is given by:-

2.4 [X] 2.4 [X] 4.8 [X] 4.8

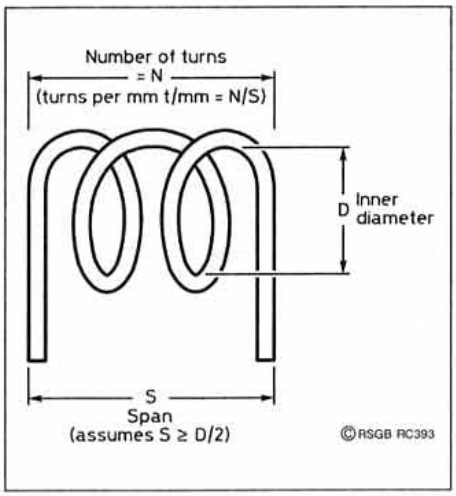


Fig 1: Coil Dimensions: D = Inner Diameter mm; N = Number of Turns; S = Span of Winding mm.

[X] 4.8 [÷] 500 [÷] 0.5

PRESS [=] *2.55*

[+] 1 PRESS [=] *3.55*

PRESS [√] *1.88*

[+] 1 PRESS [=] *2.88*

[X] 500 [X] 0.5 [÷] 2.4 [÷]

4.8 [÷] 4.8 [=] *13* turns of 28SWG wire on 4.8mm dia former

Example No 6

L required = 10μH
Dia D = 12.5mm
Wire = 26SWG enamelled
From Table 1 n = 1.98 t/mm close-wound

Using calculator, number of turns is given by:-

1.98 [X] 1.98 [X] 12.5 [X] 12.5

[X] 12.5 [÷] 500 [÷] 10

PRESS [=] *1.53*

[+] 1 PRESS [=] *2.53*

PRESS [√] *1.59*

[+] 1 PRESS [=] *2.59*

[X] 500 [X] 10 [÷] 1.98 [÷]

12.5 [÷] 12.5 [=] *42* turns of 26SWG wire on 12.5mm former

USING THE TABLES

THE PRECEDING EXAMPLES were based on the simplified formulas for inductance and formula for number of turns as appropriate.

To avoid calculations however, **Tables 2 to 6** provide a quick and easy way of determining either inductance or number of turns, over the range of values of immediate interest, and assuming close-wound coils. The results are again based upon the simplified formulas and are exact enough for practical purposes.

The table entries indicated with a # were calculated from the longer established empirical formulas by others, and are included to demonstrate the comparative accuracy of the G3BIK simplified formulas.

The calculated values given in the tables have been rounded off for convenience of tabulation.

Use of the tables is straightforward, to derive the coil dimensions for a required value of inductance; or conversely the inductance value from dimensions of an existing coil.

To determine number of turns and span in millimetres for a required value of inductance L in μH:-

1 Decide diameter of coil former and select related Table
2 Decide wire gauge to be used and go to related column heading
3 Move down column to intersect with required L μH

4 Read off number of turns N, and Coil-Span S mm

To determine value of L µH for an existing coil:-

1 Measure inner diameter of coil D mm
2 Select related Table
3 Count number of turns N
4 Measure coil-span S mm
5 Divide N by S to get turns per mm (t/mm = n = N divided by S)
6 Find that t/mm column heading
7 Look down its N column to find the nearest number of turns
8 Read off inductance L µH

Whilst the tables apply to close-wound single layer coils, the previous G3BIK simplified formulas for inductance and number of turns do also apply to coils which are wound with spaced turns, ie the turns per millimetre value will be less than that for close-wound.

It will be appreciated that it is almost impossible to hand-wind a coil to perfection, because of unintentional gaps in spacing between turns and the fact that the connecting-tails add to the inductance — as do the connections from a resonating capacitor.

In all of the previous considerations allowance has been made for connecting-tails of circa 10mm length, but on coils of inductance less than say 0.2µH (for use at VHF) the coil tails will significantly affect the inductance value, so they must be kept as short as possible.

Fractional values for the number of turns obtained from the tables should *not* be taken as sacrosanct, but should in practice be rounded up or down to the nearest whole number. This also applies to the coil span dimensions.

It should be noted also that the accuracy of calculated inductance diminishes when the coil span becomes significantly greater than, say, three times the coil diameter.

COIL CORES

AS PREVIOUSLY DISCUSSED, the formulas and related Tables assume an air-core within the coil. The standard 4.8mm and 7.1mm formers do have a threaded inner-surface to allow the use of a 4mm or 6mm diameter screw-slug respectively for adjustment of the inductance value.

Generalising, an iron-dust or ferrite slug *increases* the inductance as the slug is screwed into the coil, whilst conversely, a non-ferrous (eg brass or aluminium) slug decreases the inductance.

There are different grades of iron-dust or ferrite slug material, some of which are more suited for use at VHF or HF than others - but that is a subject in its own right and will not be expanded upon herein. Without being definitive, suffice to say that some iron-dust slugs can almost quadruple the inductance value, whereas a non-ferrous slug would typically produce only a modest decrease in inductance to say half of its former value.

Some minor adjustment of inductance *can* be achieved by opening out the spacing between turns, the inductance decreasing as the spacing increases.

It should be borne in mind that increasing the value of inductance in an LC resonant circuit lowers the resonant frequency, whilst decreasing the value of inductance increases the resonant frequency.

The previous calculations and tables apply reasonably well to non-enamelled wire, on the assumption that the close-spaced turns do not electrically touch.

SWG	30	28	26	24	22	20	18	16
dia mm	0.31	0.38	0.46	0.56	0.71	0.91	1.22	1.63
t/mm	2.85	2.40	1.98	1.64	1.30	1.02	0.78	0.58

Table 1: Enamelled Copper Wire Dimensions.

WINDING COILS

THE COIL DIAMETERS in the Tables cater for the use of standard coil-formers or readily available tubular materials such as plastic water-pipe or electrical conduit.

On the larger diameter formers, two small close-spaced holes drilled at each end of the coil-span would allow the wire ends to be secured by being fed into the former via one hole and out again via the adjacent hole. Alternatively, a solder tag secured by a small diameter machine-screw and nut may be used to anchor the wire at each end of the former.

Inner Diameter D = 25mm	N = Number of Turns										S = Span of Winding mm			
SWG	30		28		26		24		22		20		18	
t/mm	2.85		2.40		1.98		1.64		1.30		1.02		0.78	
	N	S	N	S	N	S	N	S	N	S	N	S	N	S
LµH														
0.5#	3.17	1.1	3.20	1.3	3.33	1.6	3.3	2.0	3.4	2.6	3.5	3.4	3.6	4.6
0.5	3.31	1.2	3.33	1.4	3.37	1.7	3.4	2.1	3.5	2,7	3.6	3.5	3.7	4.8
1.0	4.8	1.7	4.8	2.0	4.9	2.5	5.0	3.0	5.1	4.0	5.3	5.2	5.6	7.2
2.0	6.9	2.4	7.0	2.9	7.2	3.6	7.4	4.5	7.7	5.9	8.1	7.9	8.7	11
3.0	8.6	3.3	8.80	3.7	9.1	4.6	9.4	5.7	9.8	7.6	10.5	10	11.4	15
4.0	10.1	3.6	10.4	4.3	10.7	5.4	11.1	6.8	11.7	9.0	12.6	12	13.9	18
5.0#	11.1	3.9	11.4	4.8	11.8	6.0	12.4	7.5	13.2	10	14.3	14	16.1	21#
5.0	11.5	4.0	11.8	4.9	12.2	6.2	12.7	7.8	13.5	10	14.7	14	16.4	21
6.0	12.8	4.5	13.1	5.5	13.6	6.9	14.3	8.7	15.3	12	16.7	16	18.7	24
7.0	14.0	4.9	14.4	6.0	15.0	7.6	15.7	9.6	16.9	13	18.5	18	21.0	27
8.0	15.1	5.3	15.6	6.5	16.3	8.2	17.1	11	18.5	14	20.4	20	23.3	30
9.0	16.2	5.7	16.8	7.0	17.5	8.9	18.5	11	20.1	15	22.2	22	25.5	33
10.0#	16.7	5.9	17.3	7.2	18.2	9.2	19.4	12	21.2	16	23.7	23	27.5	35#
10.0	17.2	6.0	17.9	7.4	18.8	9.5	19.8	12	21.8	17	24.0	24	27.2	36
20.0	26.4	9.3	27.7	12	29.7	15	32.0	20	35.8	28	41.1	40	49.2	63
30.0	34.3	12	35.5	15	39.5	20	43.2	26	49.1	38	57.5	56	70.1	90
40.0	41.7	15	44.6	19	48.7	25	53.9	33	62.1	48	73.6	72	90.0	117
50.0	48.6	17	52.4	22	57.8	29	64.3	39	74.9	58	89.6	88	112	143
50.0#	47.7	17	51.6	22	57.1	29	63.9	39	74.8	58	89.9	88	111	143

= results of non-simplified formulas

Table 2: Inductance of 25mm coil v number of turns v Standard Wire Gauge for close-wound single-layer air-cored coil, of enamelled copper-wire (based on G3BIK simplified formula).

Inner Diameter D = 20mm	N = Number of Turns										S = Span of Winding mm			
SWG	30		28		26		24		22		20		18	
t/mm	2.85		2.40		1.98		1.64		1.30		1.02		0.78	
	N	S	N	S	N	S	N	S	N	S	N	S	N	S
LµH														
0.5	3.76	1.3	3.8	1.6	3.87	2.0	3.94	2.4	4.1	3.1	4.2	4.1	4.4	5.7
1.0	5.5	1.9	5.6	2.3	5.7	2.9	5.8	3.6	6.1	4.7	6.4	6.2	6.9	8.8
2.0	8.0	2.8	8.2	3.4	8.5	4.3	8.8	5.3	9.3	7.1	9.9	9.7	11.0	14
3.0	10.0	3.5	10.4	4	10.8	5	11.2	7	12.0	9	13.1	13	14.7	19
4.0	11.9	4	12.3	5	12.8	6.5	13.5	8	14.6	11	16.0	16	18.3	24
5.0#	13.2	4.6	13.7	5.7	14.4	7.3	15.2	9.3	16.6	12.8	18.6	18.2	21.6	28#
5.0	13.6	4.8	14.1	5.9	14.8	7.5	15.6	9.5	17.0	13.1	18.9	18.5	21.8	28
6.0	15.2	5	15.8	7	16.6	8	12.7	11	19.3	15	21.6	21	25.2	32
7.0	16.7	6	17.4	7	18.4	9	19.6	12	21.6	17	24.4	24	28.6	37
8.0	18.1	6	18.9	8	20.1	10	21.5	13	23.8	18	27.0	27	31.9	40
9.0	19.5	7	20.4	8	21.7	11	23.4	14	26.0	20	29.7	29	35.2	45
10	20.8	7	21.9	9	23.4	12	25.2	15	28.1	22	32.3	32	38.5	49
20	32.8	12	35.1	15	38.3	19	42.3	26	48.7	38	57.7	57	71.1	91
30.0	43.5	15	47.2	20	52.2	26	58.5	36	68.6	53	82.6	81	103	133
40.0	53.7	19	58.7	25	65.7	33	74.4	45	88.3	68	107	105	136	174
50.0	63.5	22	70.0	29	79.0	40	90.1	55	108	83	132	129	168	215

= results from non-simplified formulas

Table 3: Inductance of 20mm coil v number of turns v Standard Wire Gauge for close-wound single-layer air-cored coil, of enamelled copper-wire (based on G3BIK simplified formula).

Inner Diameter D = 12.5mm	N = Number of Turns										S = Span of Winding mm			
SWG	30		28		26		24		22		20		18	
t/mm	2.85		2.40		1.98		1.64		1.30		1.02		0.78	
	N	S	N	S	N	S	N	S	N	S	N	S	N	S
LμH														
0.5	5.1	1.8	5.2	2.2	5.4	2.7	5.6	3.4	5.9	4.5	6.3	6.2	7.0	8.9
1.0	7.6	2.8	7.8	3.3	8.1	4.1	8.6	5.2	9.3	7.1	10.2	10	11.6	15
2.0	11.5	4.0	12.0	5.0	12.7	6.4	13.7	8.3	15.1	12	17.2	17	20.3	26
3.0	14.8	5	15.7	7	16.8	9	18.3	11	20.6	16	23.9	22	28.8	37
4.0	17.9	6	19.1	8	20.7	10	22.7	14	25.9	20	30.3	30	37.1	48
5.0	20.8	7	22.3	9	24.4	12	26.9	17	31.0	24	36.8	36	45.4	58
6.0	23.6	8	25.4	11	28.0	14	31.2	19	36.2	28	43.2	42	53.7	69
7.0	26.4	9	28.5	12	31.5	16	35.3	22	41.3	32	49.6	49	62.0	79
8.0	29.0	10	31.5	13	35.0	18	39.4	24	46.3	36	55.9	55	70.2	90
9.0	31.6	11	34.5	14	38.5	19	43.4	27	51.3	40	62.3	61	78.4	101
10.0#	33.7	12	37.0	15	41.6	21	47.4	29	56.5	44	69.1	68	87.5	112
10.0	34.2	12	37.4	16	41.9	21	47.5	29	56.3	43	68.6	67	86.7	111
20.0	58.6	21	65.5	27	75.3	38	87.2	53	106	82	132	129	169	217
30.0	82	29	93	39	108	55	127	77	155	120	194	191	251	322
40.0	105	37	120	50	141	71	166	101	205	158	257	252	333	427
50.0	128	45	147	61	173	88	205	125	254	195	320	314	415	532

= results from non-simplified formulas

Table 4: Inductance of 12.5mm coil v number of turns v Standard Wire Gauge for close-wound single-layer air-cored coil, of enamelled copper-wire (based on G3BIK simplified formula).

Inner Diameter D = 7.1mm	N - Number of Turns								S = Span of Winding mm (max 25.4mm)					
SWG	30		28		26		24		22		20		18	
t/mm	2.85		2.40		1.98		1.64		1.30		1.02		0.78	
	N	S	N	S	N	S	N	S	N	S	N	S	N	S
LμH														
0.5 #	*7.7*	*2.7*	*8.2*	*3.4*	*8.8*	*4.4*	*9.5*	*5.8*	*10.8*	*8.3*	*12.5*	*12.2*	*15.1*	*19#*
0.5	7.9	2.8	8.4	3.5	9.0	4.5	9.7	5.9	10.9	8.4	12.5	12.3	15.1	19
1.0	12.6	4.4	13.5	5.6	14.8	7.5	16.4	10	19.0	15	22.6	22.0	28.0	36
2.0	20.7	7.3	22.7	9.5	25.6	12.9	29.0	17.7	34.6	26.6				
3.0	28.3	9.9	31.5	13.1	35.9	18.2	41.4	25.2	50.0	38.5				
4.0	35.7	12.5	40.1	16.7	46.2	23.3	53.6	32.7						
5.0 #	42.9	15.0	48.6	20.3	56.6	28.6 #								
5.0	43.0	15.1	48.6	20.2	56.3	28.5								
6.0	50.2	17.6	57.0	23.8	66.5	33.6								
7.0	57.3	20.1	65.4	27.3										
8.0	68.8	24.1	73.8	30.7										
9.0	71.5	25.1	82.1	34.2										
10.0	71.5	25.1	82.1	34.2										
10.0	78.6	27.6												

= results from non-simplified formulas

Table 5: Inductance of 7.1mm coil v number of turns v Standard Wire Gauge for close-wound single-layer air-cored coil, of enamelled copper-wire (based on G3BIK simplified formula).

Inner Diameter D = 4.8mm	N = Number of Turns								S = Span of Winding mm (max 15mm)					
SWG	30		28		26		24		22		20		18	
t/mm	2.85		2.40		1.98		1.64		1.30		1.02		0.78	
	N	S	N	S	N	S	N	S	N	S	N	S	N	S
LμH														
0.5	12.0	4.2	13.0	5.4	14.5	7.3	16.4	10.0	19.4	14.9	23.5	23.0	29.6	38
1.0	20.4	7.1	22.5	9.3	25.9	13.1	29.9	18.3	36.3	27.9				
2.0 #	36.2	12.7	41.4	17.3#										
2.0	36.2	12.7	41.2	17.2										
3.0	51.7	18.2												

= results from non-simplified formulas

Table 6: Inductance of 4.8mm coil v number of turns v Standard Wire Gauge for close-wound single layer air-cored coil, of enamelled copper wire (based on G3BIK simplified formula).

Winding a coil with constant tension on the wire can be tiring to the fingers. It is a good ploy to have available a few pieces of self-adhesive tape to hold the turns in place during rest periods, or when mechanically anchoring the ends.

An inductor is only as good as its construction. If there is any slack in the finished product, a smear of epoxy-resin glue or nail varnish should hold the turns secure.

The easiest and least damaging method of straightening out enamelled copper-wire before commencing the winding, is to pull it gently through a cloth whilst nipping the wire between finger and thumb. Care must be taken when approaching loops in the wire to avoid kinking, which mechanically weakens the wire and damages the enamel insulation.

Older wire salvaged from electrical motors etc may have enamel that needs to be removed *carefully* prior to soldering, but the modern polyurethane enamels are said to be self-fluxing so do not need to be removed. The heat of the soldering-iron should in effect melt away the enamel coating without detriment to the quality of soldering. It is still wise to use a flux-cored solder rather than rely upon the polyurethane enamel as the fluxing agent. NOTE: It is wise to minimise the inhalation of fumes given off from the polyurethane coated wire.

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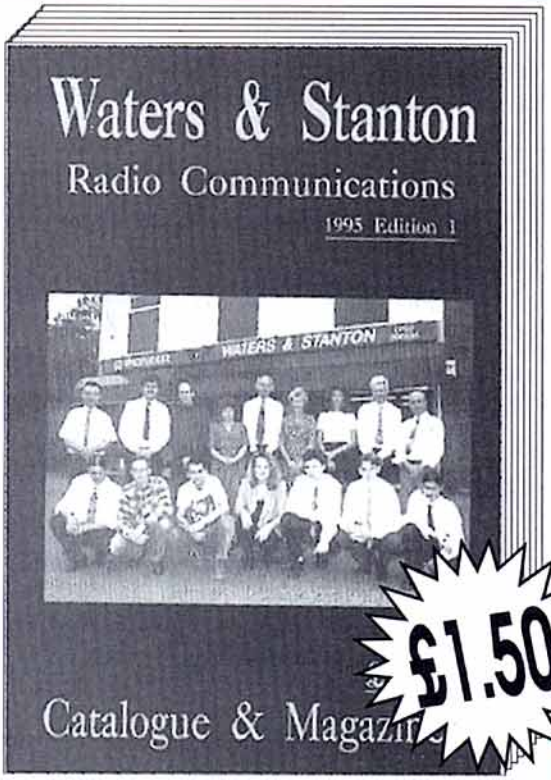

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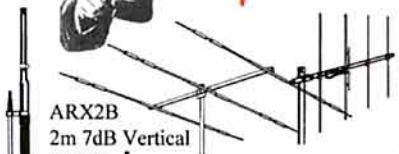

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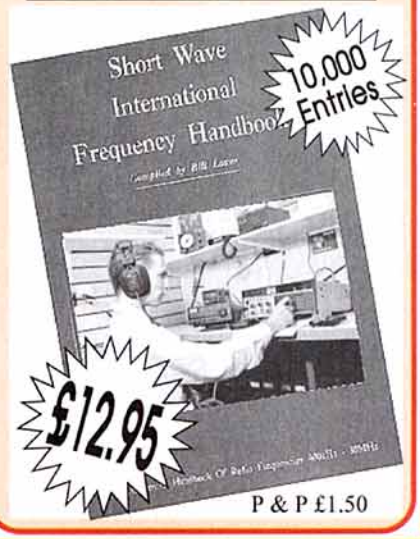

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Technical Topics

MILITARY AND CLANDESTINE RADIOS OF WW2

RECENTLY, ALONG WITH Graham Phillips, G3XTZ, (who kindly provided transport), Geoff Voller, G3JUL and Jimmy Bolton, G3HBN, I paid my first visit to the Royal Signals Museum at Blandford, Dorset. Over the years, this collection of equipment and memorabilia has grown into a truly impressive display. Not only does this museum contain most of the transmitters used by Signals in WW1 and WW2, but many items of special clandestine equipment and those of the Special Air Service (SAS) in the post-war period. There are also a few of the German Abwehr 'agentfunken' that were used to send messages back to Germany under Allied control.

I was especially interested to see such transmitters as the Whaddon Mk 10 which used an 813PA to deliver an output of some 150 watts, and the Mk 33, the later version of the ubiquitous Whaddon Mk 3 (6V6-807) 30-watt transmitter. SOE and the London Polish equipment are also well represented, although, as for Whaddon, there still seem to be some gaps. This could be filled by donations from those wondering what they should do with ageing equipment while perhaps not anxious to see them all departing to private collectors on the other side of the Atlantic. Someone must surely be able to dig out an example of the simple Mk VII (Paraset) transmitter-receiver (**Fig 1**), one of the mainstays of Intelligence and de Gaulle's BCRA Resistance networks in France and the Low Countries - or the pocket Sweetheart (Type 31/1) receiver designed in 1942 by the Norwegian engineer, Willy Simonsen, at the Polish Radio Centre. Around 50,000 of these sets where built by Hale Electric. Sweetheart was a straight three-valve receiver using the then new 1T4 1.4V battery valves.

The 'Sweetheart' was not the first clandestine equipment built in the pocket type metal containers, later used by SOE for the Type 51/1 mains-operated transmitters and by the London Poles for their OP-3 superhet receivers (Photo on page 61). This form of container seems to have originated with the Abwehr super-regenerative ground-to-air radio-telephone of 1939/40 using British Hivac midget valves, a concept that was soon copied in a different form in the UK for the widely-used 350MHz S-phone. The first HF equipment using this type of pocket container appears to have been the 'Stumpf' and 'Kynnel' series used by Finnish reconnaissance agents in their 1939/40 winter campaign against the USSR. The three-valve receiver used two DF11 battery pentodes and a DDD11 double-triode. The associated transmitter had a single DLL21 double-pentode as self-excited power oscillator. In 1945, the London Poles developed a prototype mains-operated superhet-receiver/transmitter (AP-7) in two of these pocket containers, although this did not go into production.

Can any reader identify the Service for which this equipment was built and when? Its purpose? The receiver appears similar to that used in the 68P Airborne/Paratroops man-pack. The transmitter is marked 'Sender SST Mk II' made by MICO Company Ltd of London.

Ted Price, G3JPP has brought to my notice that the 1953 book by Major General Nalder *British Army Signals in the Second World War* includes a table providing brief "Data concerning the Principal Wireless Sets" used by the British Army during the war. This lists no less than 46 items of equipment ranging in power output from 0.2 watts to the 10kW Marconi S 11E (3 - 22.2MHz), used as a static long-range station for high speed keying. The better known SWB 8E ('Swab 8') with an output of 3.5kW, (an example of which is in the Royal Signals museum), was used in the Golden Arrow mobile station.

The table includes four long-range items of equipment; nine medium-range sets (including the No 12HP, No 33, No 52, No 53 and the No 63 (1kW for teleprinter traffic); eight short range vehicle sets; 11 short-range man-pack sets; five armoured fighting vehicle sets; two armoured fighting vehicle intercommunication sets (including the No 19B set on about 235MHz); three radio link sets (including the 4.4GHz No 10 multiplexed set providing 8 duplex speech channels); three anti-aircraft sets; and two ground-to-air sets including the TR1143 normally associated with the RAF. Thus anybody attempting to build up a complete collection of WW2 Army sets would have a long way to go - and the Nalder list does not include any of the special sets for clandestine links etc.

The mention in the September *TT* of the No 10 set with its pulse-width-modulation has reminded Ian Waters, G3KKD, (who joined Pye in 1948) that the company used the experience gained with the No 10 set to develop a 'Videosonic' TV sound system. This used a single 10,125kHz (line frequency of the 405-line system) audio pulse placed in each line blanking interval. The idea was to remove the need for a separate sound transmitter. The system was proposed to the BBC in time for the restart of the 405-line TV service.

While the system was turned down on the grounds that the pulse rate would limit the audio bandwidth to about 5kHz, it seems likely that the BBC/GPO were primarily concerned not to make obsolete surviving pre-war sets (probably a few thousand of the 20,000 sets sold between 1936-39). The fate of the system was sealed when, during a demonstration to industry chiefs, one receiver went out of line-hold. This caused the audio gate to sweep across the video information and produce a long loud 'raspberry'.

It may also be worth recalling that EMI offered a 605-line system which, if it had been adopted, would have almost certainly become the European standard. This would have eliminated the trauma of the much later change over from 405 to 625 at a time when

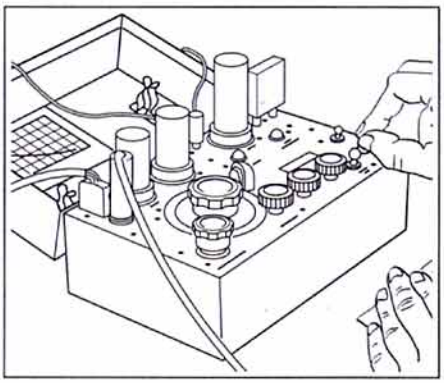
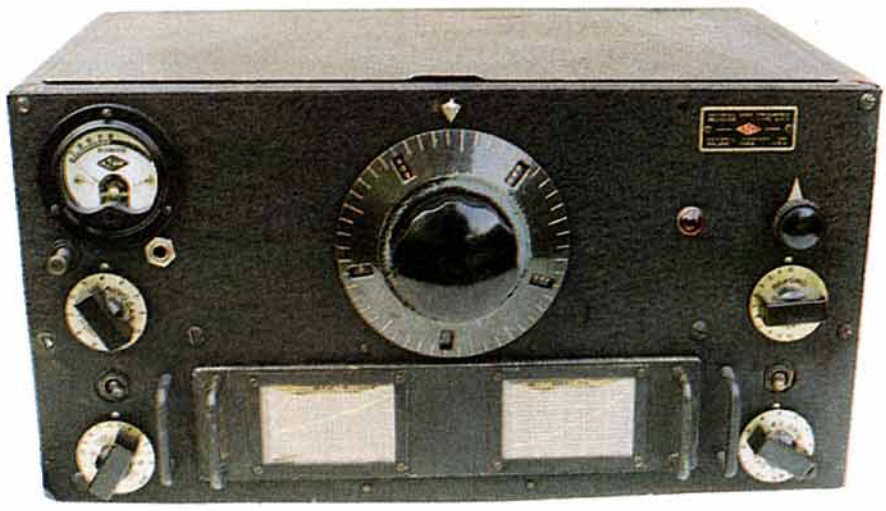


Fig 1: The Whaddon Mk VII/2 'Paraset' clandestine transmitter-receiver widely used between 1941-44. Drawing reproduced by courtesy of Pierre Lorain, F2WL from his book *Secret Warfare* (Orbis Publishing, 1983). Circuit diagram and panel layout diagrams were given in *TT*, November 1982, p961). The transmitter was a 6V6 crystal oscillator. The receiver used two 6SK7 valves in a straight (regenerative) circuit covering about 3 to 8MHz.



The HRO Senior receiver with bandspread coils and glass valves now in the possession of PA0SE.

Polish OP-3 MW/2.5/5-12MHz superhet receiver in the type of pocket containers used in a number of war-time clandestine equipments (about 7x5x1 inches).

there were millions rather than a few thousand sets; 605 lines would also have significantly increased the audio bandwidth if combined with the Pye Videosonic proposal.

G3KKZ points out that if the system had been further developed and adopted it would have greatly simplified the design of TV transmitters and reduced their cost. It would have been particularly beneficial for transposers for local relays where the linear amplification of a combined vision and sound signal, without undue intermodulation, has always presented difficulties. The Videosonic system was resurrected in the 1960s by TV amateurs in the Cambridge area and used successfully to provide a sound channel for the 405-line AM 70cm TV transmissions then in use.

One curiosity was that if video was faded to black, leaving only sync and audio-modulated pulse, anyone tuning a communications receiver would find an audio signal every 10kHz across several MHz of the band! The sound-in-sync system used by the BBC for many years to convey mono and now stereo along programme links (and the basis of the present Nicam system) can be seen as a direct descendant of the Videosonics system but using high bit-rate digital pulse-code-modulation (PCM) rather than analogue pulse-width-modulation.

I took along to the Royal Signals Museum a photograph (on page 60) sent me by Staf Keustgers, ON5RE, of a boxed equipment that is proving difficult to identify. It may date from the immediate post-war period since it uses the American FT-type crystals that were not widely used in British equipment before 1945 (an exception was the SOE Type 51/1 pocket transmitter mentioned earlier). The receiver closely resembles that in the No 68P parachute man-pack used by airborne forces in 1944, developed from the earlier No 18 set. However the transmitter labelled 'Sender Set SST MK II' and made by 'MICO Ltd of London' is not the one used in the No 68P equipment. The PSU is suitable for mains or car-battery operation.

The SST-1 was the main OSS (American) suitcase transmitter but the SST Mk II equipment is clearly British. The suggestion has been made (based on the panel colour and what appears to be a waterproof container) that it could be Naval or Royal Marine equipment rather than clandestine equipment. I wonder if anyone can identify the equipment, its application, date of manufacture or supply information on 'MICO Ltd'?

The discovery by GI2FHN that the classic HRO dial was based on the 1934 patent issued to W G Harding and the Sperry Gyroscope Company - a British subject and firm - was of particular interest to Dick Rollema, PA0SE, who recently inherited from the late PA0ID a vintage HRO receiver. He has cured some instability in the IF amplifier by replacing the 300Ω cathode resistor for the 2nd IF valve shown in the circuit diagram with the original 2.5kΩ resistor, making the amplifier perfectly stable with plenty of receiver gain.

PA0SE is so charmed by the ingenious HRO tuning dial and gear drive that he plans to use such a unit for a new 1.8-28MHz transceiver that he is planning. He has obtained one from a wartime German copy of the HRO made by the firm Koerting who in 1939-41 were able to import the gear drive with associated capacitors from the USA via Portugal and Spain. The photographs (on pages 60 and 62) taken by PA0SE show the clean lines of the early HRO receivers with glass valves, and a close-up of the dial and drive unit from the German receiver.

Stewart Revell, G3PMJ, was similarly interested in the *TT* note that the RCA AR88

THE SODA PRIMARY CELL

THE APRIL 1994 *TT* drew attention to the large Leclanche air cells used widely in the past for British railway signalling but also used in the 1970s in South Africa as a means of trickle charging smaller nicad cells able to supply intermittently the heavier currents required for operating remote repeater transmitters. These disposable Leclanche zinc-air cells delivered a small continuous current over many months.

Dr Alan Parkes, G7AXW, has sent me photocopies of some pages from the book *Railway Signalling and Communications* published in 1935 which not only covers these AD Wet Cells (220 and 222 types) but also the 'soda cell' form which would seem to have advantages over the AD Wet Cells in being capable of supplying relatively large currents at near-constant voltage over a long period, with a very low internal resistance.

To quote the 1935 text: "The caustic-soda cell is a comparatively modern type of primary cell, employed where a constant voltage is necessary and comparatively large current discharges are required, as in colour-light signalling. Its internal resistance is very low. The capacity of soda cells may be made high whilst keeping the size within such limits that the cells are convenient to handle. The essential parts of the soda cell are elements of carbon and zinc, immersed in a solution of caustic soda (sodium hydroxide) in water, the carbon being attached to the positive terminal and the zinc to the negative."

After describing the chemical reactions etc, the author continued: "The containers for soda cells are usually of heat-resisting glass; the state of the elements can be seen without removing them from the electrolytic. This has led to the introduction of certain refinements, such as the moulding of a small indicating panel in the zinc which perforates when approximately 90% of the rated capacity of the cell has been expended, thus enabling the maintainer to see at a glance that the zinc needs attention.

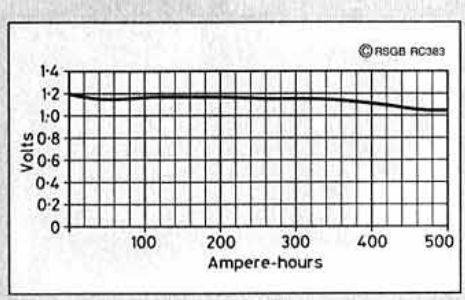


Fig 2: Voltage discharge curve of the large 'Soda' (zinc-air) cells used on the railways from about the mid-1930s.

As a result, the renewal may be carried out before the voltage of the battery is affected, and failures of apparatus are avoided. The open-circuit voltage of the AD 218 cell, of the type just described, is 1.4 to 1.5 volts. Currents up to 3A may be obtained: at 3A approximately 1.08V, at 1A 1.2V; and at 0.5A 1.24V. It is usual to attach the carbon and zinc to the porcelain lid of the cell so that the electrodes may be removed from the cell with a minimum of trouble." **Fig 2** shows the voltage obtainable from a 1935 AD caustic-soda cell on a constant load of 1A. It will be noted that the voltage is practically constant throughout the discharge.

I would imagine that it is this form of zinc-air cell that has been developed in Israel and is now being tried out for electric vehicles by the German Post Office as mentioned in the April *TT* and which one reader appeared to consider an April Fool joke.

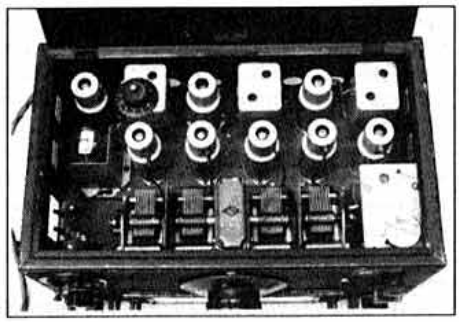
[Readers may be assured that having over 30 years ago reproduced a filter in *TT* without realising it was a joke-circuit from an April issue of Radio-REF, and then seen it reproduced from *TT* in several overseas journals, I have a jaundiced view of realistic-looking April-fool technical articles, particularly those with a foreign-language text].

was developed in 1940-1 to meet a British Inter-Services specification (far more AR88s were acquired for amateur use after the war in the UK than in the USA where it has always been quite rare). He bought one of these in 1964 for £45 and it still provides an excellent general-purpose performance, following some careful maintenance. He writes: "About 15 years ago the performance became pretty bad with distortion and poor sensitivity. To cut a long story short, the problems were caused by most of the waxed paper capacitors in the AGC and noise limiter circuits becoming extremely leaky, showing insulation resistance of around 50K to 100K ohms. New polyester 400V capacitors were fitted inside the little metal boxes to replace the original ones. Also, C118 and C132, the audio-coupling capacitors, were changed (each 4700pF). Other waxed paper capacitors in the HT decoupling circuits were replaced (and fitted into their metal boxes). The result was that reception and sensitivity restored to normal and the AR88 fit for another 30 years or so. He also mentions that other owners should check that there is a small voltage across the cathode resistor of the 6SJ7 AF amplifier (V10) as he found this was short-circuited by internal connection of the valve's suppressor grid going to earth.

G3PMJ is puzzled by the style of circuit diagram used by the Americans for the AR88 and many other designs in the 1930-40s in which band-change switches are shown in pictorial rather than theoretical form. It can prove a time-consuming job figuring out where each contact of each wafer goes on each band.

Some years ago I asked the RCA London representative to try and trace some of the background to the design and production of the AR88. He did his best but the firm came up with little information except some leaflets on the post-war CR88 version the high cost of which ruled out amateur use. G3PMJ poses a number of questions and wonders if anyone knows the answers: How many AR88D and AR88LF receivers were built and when [1941-45], and where [not all at Camden NJ I believe - G3VA], cost to British Government, and how many lost in bringing them across the Atlantic due to U-Boats etc, and how many are still giving useful service after 50 years? Ray Moore in 'Communications Receivers' points out that "Most of production sold to England during World War II" and identifies Lester T Fowler as responsible for the electrical design, and George Baker the mechanical design.

A wartime British communications receiver that came near to the performance of the AR88 and HRO was the Marconi CR100 series, of which some 20,000 were produced between 1941 and 1946, with a production rate of 100 per week. One of the design team was Dr G L Grisdale, G5GZ, and he provides a detailed description including background information, full circuit diagram and notes on the associated CR100/2, CR150/3, CR200 (Navy B29) and CR300 models, together with suggestions on how to restore them to full performance, in *Radio Bygones*, No 31, October/November 1994. A feature was the inclusion of both a crystal-filter and a narrow-band CW audio filter.



The clean chassis layout and the four-gang tuning capacitor with its PW drive.

144MHZ J-POLE & SLIM JIM ANTENNAS

BACK IN 1978 the late Fred Judd, G2BCX, described in *Practical Wireless*, a low-cost 144MHz vertical antenna based on the classic J-Pole antenna (**Fig 3(a)**) but with a folded element structure along with the integrated matching stub (**Fig 3(b)**). He named this antenna the 'Slim Jim'.

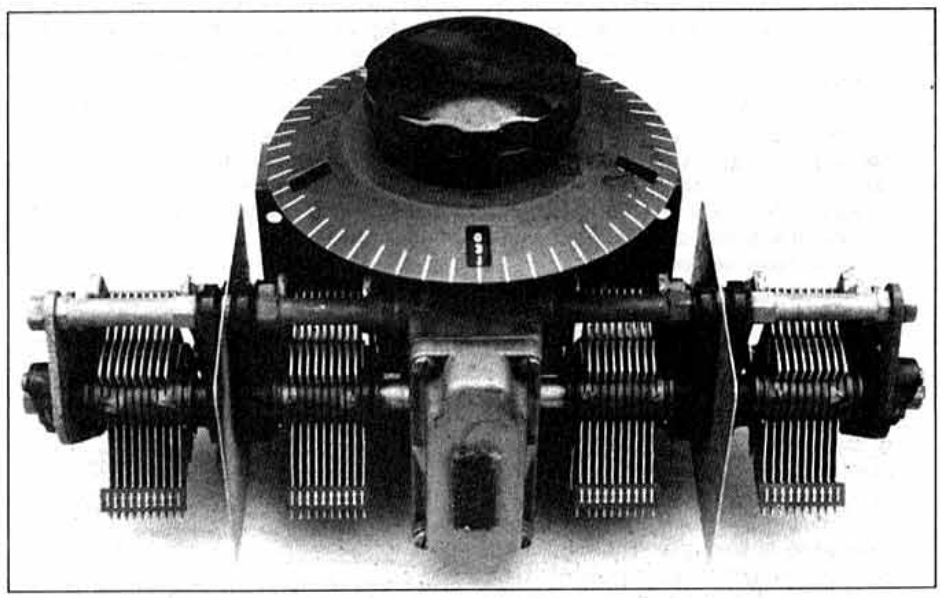
Later, in *TT*, September 1986 (see also *Technical Topics Scrapbook 1985-89*, pp124-5) I noted that a Modified Slim Jim (MSJ) antenna had been described and analysed in *IEEE Transactions on Broadcasting* (March, 1986) by Greek university authors as a suitable antenna for 101.8MHz VHF/FM local sound radio. Computer analysis of the G2BCX design (**Fig 3(b)**) had shown that this provided a 50Ω resistive match at 155MHz rather than the intended 145Mhz, with maximum radiation at about 22° above horizontal. VHF broadcast antennas (and amateur repeaters etc) should ideally radiate most energy at 0° or even slightly tilted downwards since the transmitters are normally located at a high site, serving adjacent lower areas. The Greek MSJ dimensions for 101.8MHz were thus not an exact scaling of those shown in **Fig 3(b)**. The dimensions used were: height 2.21m; leg distance 0.06m; height of gap (beginning) 1.10m; height of gap (ending) 1.25m; height of the feedpoints 0.37m; radius of wire 0.004m. These dimensions could be scaled for 145MHz.

The principle, if not the origination, of the Slim Jim has crossed the Atlantic. In 'More Bang for the Buck - How to build a really cheap but good antenna for 2 metres', Lew Mccoy, W1ICP (*CQ*, July 1994, pp50-51) recounts how, while attending a meeting of the Quarter Century Wireless Association in Palm Springs, he came across a group of local amateurs building Slim-Jim type antennas using ordinary 300Ω twin-wire feeder: "They had had very good luck with the antenna". W1ICP took a note of the dimensions they were using (**Fig 4(a)**) but found it difficult to get a good match for 50Ω; Their suggestion was to wrap a small piece of aluminium foil around the twin lead and then slide it up and down to achieve a match." In the outcome, W1ICP reverted to a design closer to the classic J-pole antenna but retaining the use of twin-wire line for the element, although using 450Ω ladder line rather than the solid 300ohm type: **Fig 4(b)**. He used an ELNEC program for the wire lengths, and then found that he could reproduce similar results (less than 1.5:1 SWR across the American band of 144-148MHz). In the USA the cost of such ladder line is less than 20 cents a foot and, since only 5ft is required, the cost is less than the dollar (buck) of his title.

He writes: "The antenna undoubtedly has good gain as compared to a quarter-wave ground plane and immeasurably more gain than a rubber duck. It is simple to hang one end of the antenna up on a support as high as possible. Also, it would be a good traveller's antenna because it can be coiled up and easily stored in luggage. The antenna connections could be coated with waterproofing material and installed outside. Still another method would be to slip the antenna inside a length of 1 inch PVC and mount the PVC up in the air. There are scores of possibilities . . I think it's pretty hard to beat one dollar or less for a fine-performing antenna."

VHF/HF FOX HUNTING

GLEN RICKARD, KC6TNF, in *QST*, January 1994, described a technique for obtaining accurate directional headings when using a



Close-up of the tuning capacitors and drive as recovered from a German-built copy of the HRO produced by the firm Koerting.

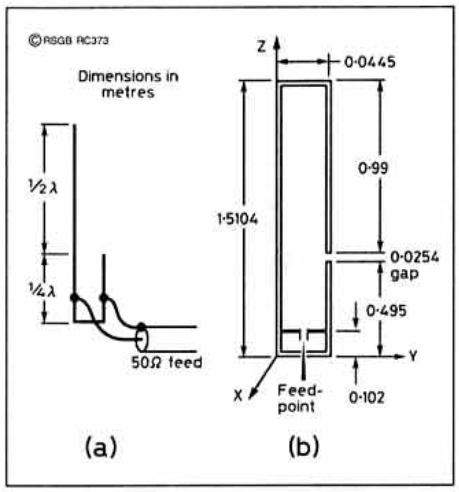


Fig 3: (a) The classic J-Pole antenna provides a vertical half-wave radiating element with quarter-wave matching stub: It rather resembles an inverted form of the original Zepp antenna as patented by Dr Hans Beggerow in 1909 as an antenna for balloons or airships. (b) Dimensions of the original 'Slim Jim' 145MHz antennas described by G2BCX in *Practical Wireless* in 1978, although later computed as resonating about 155MHz.

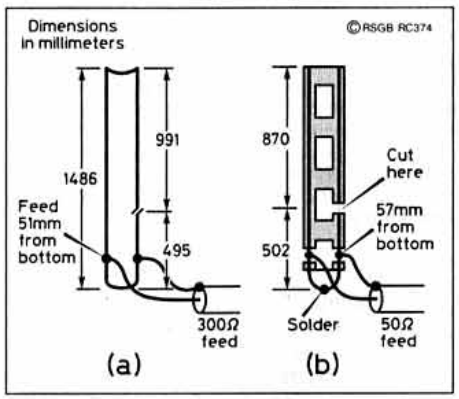


Fig 4: (a) The 300Ω twin-lead Slim Jim antenna as used by a group of Californian amateurs, although W1ICP found it difficult to obtain a good match. (b) The easily reproduced J-pole antenna made from 450Ω ladder line by W1ICP: Flat across 144-148MHz (SWR less than 1.5:1). Found to work very well with hand-held transceivers etc as a fixed or traveller's antenna.

hand-held VHF transmitter using body absorption. An additional simple device is used when near the hidden transmitter to attenuate the very strong signals that can defeat the body fade.

The method of using body fade for direction finding with a 144MHz hand-held transceiver (H-T) is simple. KC6INF writes: "You stand, holding the H-T to your chest, and slowly turn around, looking for a fade in signal strength as your body intervenes between the 'fox' transmitter and the H-T. Your body provides a shield that gives the H-T a cardioid sensitivity pattern, with a sharp decrease in sensitivity ('null') to the rear that indicates the direction of the transmitter: **Fig 5**.

"Unfortunately, it is not always quite that simple. As KC6INF puts it: "Anything that affects signal strength - including transmitter power, distance, receiver sensitivity, or the size and shape of your body - can work to smear or obliterate the null. The body fade null, which is rather shallow to begin with, can be obscured by reflections.

"The solution, according to KC6TNF, is to use a foil-covered mailing pasteboard (cardboard) tube that acts as a 'waveguide beyond cutoff". The tube should have sufficient inside diameter to accommodate the H-T. "Cover the tube completely with aluminium (kitchen) foil. If the tube is long enough there may be no need to cover the bottom end of the tube. Since the foil tends to be fragile, it is advisable to protect that by wrapping the foil in packing tape. Also needed is a short stout cord attached to the H-T like a wrist strap."

When an H-T is lowered into the tube, the signal will be attenuated at a logarithmic rate depending on how far the H-T is inside the tube, which forms an 'air attenuator'. In practice, the tube is used to reduce the received signal level until the required cardioid sensitivity pattern is re-established. The procedure recommended by KC6INF is as follows:

"Hold the tube to your chest (vertically), and lower your H-T into it until the signal begins to weaken. Holding the H-T in place, turn around slowly and listen for a sudden decrease in signal strength. If you don't get a good null, vary the depth of the H-T in the tube and try again. Repeat until you get the null that you need to determine the direction. You do not need to watch the S-meter; in fact it will likely be out of sight in the tube. Keep adjusting the depth until you get a sharp null.

"This method of direction finding is highly dependent on your body's particular shielding characteristics. The depth of suspension that works for another person will not necessarily work for you. Experiment until you get a feel for what works best . . . A word of warning about reflections: they can and will obscure or shift the null in unpredictable ways. If you are hunting in a car, step well away from the vehicle before trying to get a bearing. Avoid large buildings, metal fences, metal signposts and the like. Hunting in a crowd of people is nearly useless because many will be tall enough to form good reflectors at 146MHz. Make sure that anyone standing nearby is at least 10 to 15 feet away when you are taking a bearing.

"Precautions against reflections apply, of course, to other more complex VHF D/F techniques. KC6INF points out that a foil covered tube can supply an impressive amount of attenuation; he has obtained a good null while standing less than five feet away from a 30-watt transmitter, by extending the wrist strap with a shoelace to get sufficient depth in the tube.

A letter from O G ('Mike') Villard, W6QYT draws attention to an article 'Simple Equipment for HF Fox Hunting' (*QST*, August 1994, pp33-5) which, in connection with colleagues at SRI International (G H Hagn and J M Lomasney, WA6NIL), he wrote to show how the basic approach used by KC6TNF can be adopted for HF. This offers a simple technique not only for fox hunting on frequencies between about 3 and 30MHz but also for tracing local sources of RFI.

In essence, the principle is to use a compact battery-operated HF (broadcast or communications receiver (eg Sony ICF-7600 or similar, preferably with a BFO) with telescopic whip antenna, mounted on a conductive plate considerably larger than the receiver, using rubber bands to hold the receiver in place, and with a home-made Faraday shield placed around the antenna for close-in work.

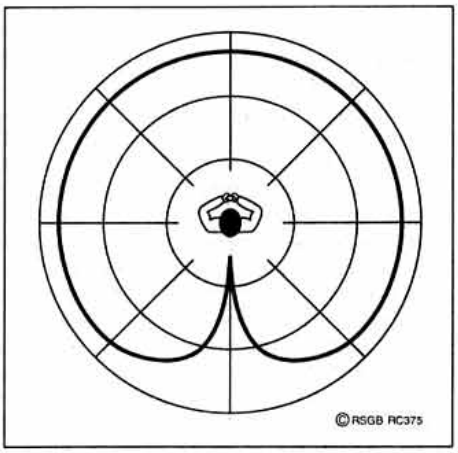


Fig 5: Idealised receive-sensitivity of a VHF hand-held transceiver when using body fade for direction finding. It is important to stand clear of reflective sources and nearby people who can distort the sensitivity pattern.

Such a device works best on ground-wave or local signals but, under some conditions, is capable of nulling sky wave signals, with a performance roughly equal to the long-established technique of using a shielded, single loop. **Fig 6(a)** shows how the receiver is mounted on a conductive plate (aluminium, brass, copper or copper-clad PC-board material, or even a foil covered wooden board) with the whip antenna extended along the diagonal of the square plate, in the plane of the plate.

To quote the *QST* article: "**Fig 6(b)** shows how the receiver's whip is pointed on end with respect to a radio wave. The wave has parallel fronts, so that the whip is aligned so as to be perpendicular to the electric field. No RF current is induced in the whip, except as a result of field distortion caused by the radio itself. If the reradiated energy is electrically symmetrical with respect to the whip, however, the antenna will still null the signal. Fortunately, the radio can be combined with a conductive plate in such a way that the reflected energy is symmetrical. In the null direction (the direction of whip, radio and plate), neither the incident wave nor the backward-directed symmetrical receiver scatter induce signal energy into the whip and the radio. The result is a clean null if there are no additional signal sources present.

"Modern portable SW receivers are thin enough to mount face up on the metal plate. When grounded to the plate, the radio effectively becomes part of the plate. (For best results the receiver ground (earth) should be connected directly to the plate, although receiver-to-plate capacitance will - at least partially - provide a connection in any event.). . ."

"When D/Fing, the plate, receiver and whip must always maintain the same mechanical position with respect to one another. The whip should always lie along a line formed by an extension of a line drawn diagonally across the plate and in the plane of the plate. . . .Arranging for the radio and plate to form a symmetrical structure is complicated by the unsymmetrical mounting of whips on most portable receivers. A plate area 20 to 50% larger than that of the radio usually permits a symmetrical layout. The strings supporting the plate and radio must be nonconducting. The device can be rotated back and forth like

a puppet, while being held a foot or so from your body. Attach the radio to the plate with rubber bands attached to cup hooks. . . .

"The swinging plate device works particularly well when the signal is weak. By adjusting whip length, you can to some degree control sensitivity. Sometimes the signal becomes so strong that, even with the whip retracted to the last section, the gain changes can no longer be distinguished. You can further reduce sensitivity by holding the equipment close to the ground. A more elegant way to attenuate the received signal is to cover the whip with a partial Faraday shield. Make the shield in the form of a concentric cage of equally spaced parallel wires grounded at one end to the plate or receiver chassis (**Fig 7**). Cage diameter and length are not critical. About 0.50 to 1 inch diameter is about right. The shield reduces the amount of RF reaching the whip, but doesn't significantly alter directionality, because the whip and the shield are essentially parallel and concentric. The shield can be made from hookup wire taped to a paper cylinder that slips over the whip without electrical contact. A shield of eight wires introduces an attenuation of about 15dB. With more wires, the attenuation is proportionally increased.

"As with a loop, the null occurs when the whip is pointed directly towards or directly away from the transmitter or source of interference. Body absorption, as used by KC6TNF, may help determine the 'sense' of direction or be useful in checking results obtained with the device. If the received signal is so strong that it leaks directly into the receiver circuits, the radio may need to be placed inside a metal cylinder for further attenuation.

SCRAP INDUCTION MOTORS

IN *TT*, JUNE 1994, ZL2AXO described a method of making a 230V AC petrol-electric generator from scrap. Sid Newton, G7RDE was one of the readers who felt uneasy about using a single-phase induction motor as an induction AC generator. In the follow-up notes in the August *TT*, Bruce Carter, GW8AAG, referred to *Electric Motors* by Jim Cox (published by Argus Books). G7RDE wrote to Jim Cox seeking an expert opinion on this unorthodox use of induction motors.

Jim Cox has kindly replied to G7RDE as follows: "You are quite right in assuming that induction motors used as generators normally need to be driven over synchronous speed while connected to a main supply which controls the generated frequency. This is a stable operating condition, small changes in the driven speed control the current delivered to the main supply and it is the main supply that primarily determines the output voltage and frequency.

"If the driven motor is not connected to a main supply but driving a capacitative load, it can still generate output but the output voltage and frequency is unstable and very dependent on the type of iron used in the rotor and the load that the generator is driving.

"The basic characteristic is rather similar to a shunt wound DC generator but with the important difference that there is no independent control of field excitation and the field magnetic path (in this case the rotor) uses a thoroughly unsuitable grade of iron.

"The field path of a DC generator is chosen to be sufficiently magnetically 'hard' (ie the coercive force is high enough) to retain enough residual magnetism to initiate the necessary build up of field strength when the generator is first run up to speed. A magnetically 'hard' material has a large area hysteresis loop and therefore exhibits large hysteresis losses when operated with AC excitation. This is an undesirable characteristic in an induction motor rotor so rotor stampings are normally manufactured from the same material as the stator. This is an electrical grade of silicon iron processed to give the lowest possible hysteresis and eddy current loss. Because of this, there may well be insufficient residual magnetism to allow the induction generator to 'build up' when driving a load.

"In most cases (not all) there is sufficient residual to initiate build up if feeding a purely capacitative load (ie no resistive load) but the output voltage is not controllable and simply rises until the iron circuit saturates. Because of the very high iron losses this is not a practicable generating mode but can be used for regenerative braking (see *Electric Motors*, p96).

"If you are lucky enough to find a machine that retains enough residual magnetism to build up under load, there remains the voltage and frequency regulation problem. The voltage regulation is inherently bad because changes of load change the effective excitation level and this magnifies the effect of the load change. The only effective voltage control available is shaft speed and this is only practicable on a fixed or nearly fixed load. In principle, an external triac voltage regulator could be fitted but this is liable to run into severe stability problems arising from the interaction between output voltage and excitation level.

"Summing up, this type of generator is an interesting curiosity but of extremely limited practical use. If you need a home-brew alternator a better route is to machine away most of the rotor conductors of a motor and replace them as appropriate with a two or four pole field winding plus slip rings. Alternatively it is relatively easy to rewind a car alternator to operate as a low-power, high-voltage alternator." It is only fair to ZL1AXO to mention that he did in fact stress that there could be problems of insufficient residual magnetism and that the poor voltage regulation etc did not permit the use of such a generator to power SSB transceivers which present a widely fluctuating load. It is also now clear that the better the design of an induction motor, the more likely it is that the rotor material may not retain sufficient residual magnetism's to permit it to be run up as a generator under load. However, it is also clear that ZL1AXO's lawn-mower/scrap induction-motor generator is capable of providing a source of AC power for some limited applications without involving modifications.

G3VA

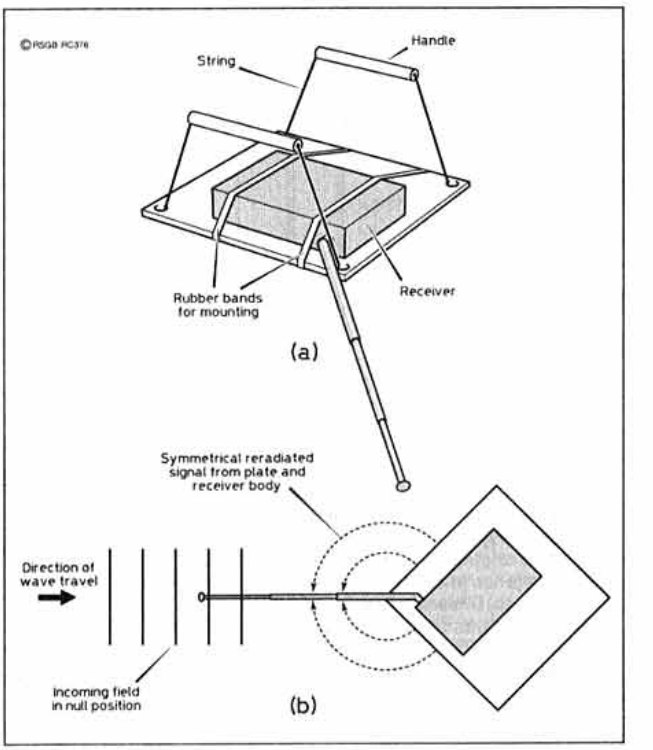


Fig 6: (a) How a small HF general-purpose receiver is mounted on the conductive plate. The receiver whip is extended along the diagonal of the square plate, and should always be in the plane of the plate. Use rubber bands to hold the receiver in place. (b) When the receiver is mounted on the conductive plate, the receiver is symmetrical with respect to the whip. Field lines of the incoming wave are perpendicular to the whip when this is pointed at or away from the transmitter and induce no voltage in the whip.

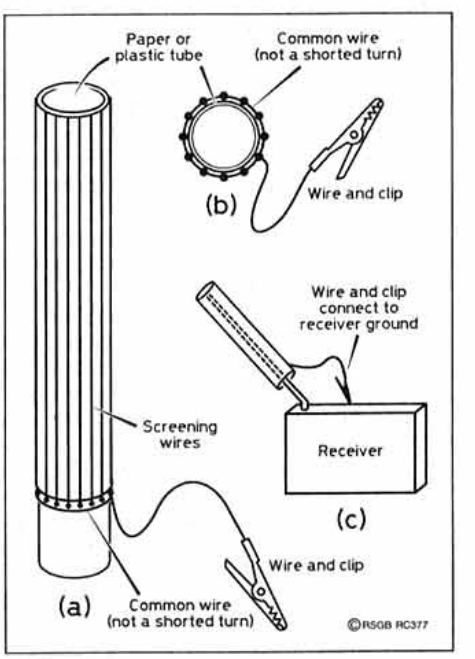


Fig 7: A home-brew Faraday shield over the whip reduces signal pickup and makes directional nulls more apparent on strong or local signals. Wires in the shield are insulated from the antenna by the hollow paper or plastic tube (about 1-in diameter) but connected to the receiver ground through a crocodile clip connected to one side of an external power or antenna connector or headphone jack. (a) Side view of shield. (b) End view. (c) Shield in place.

RADCOM TECHNICAL FEATURE

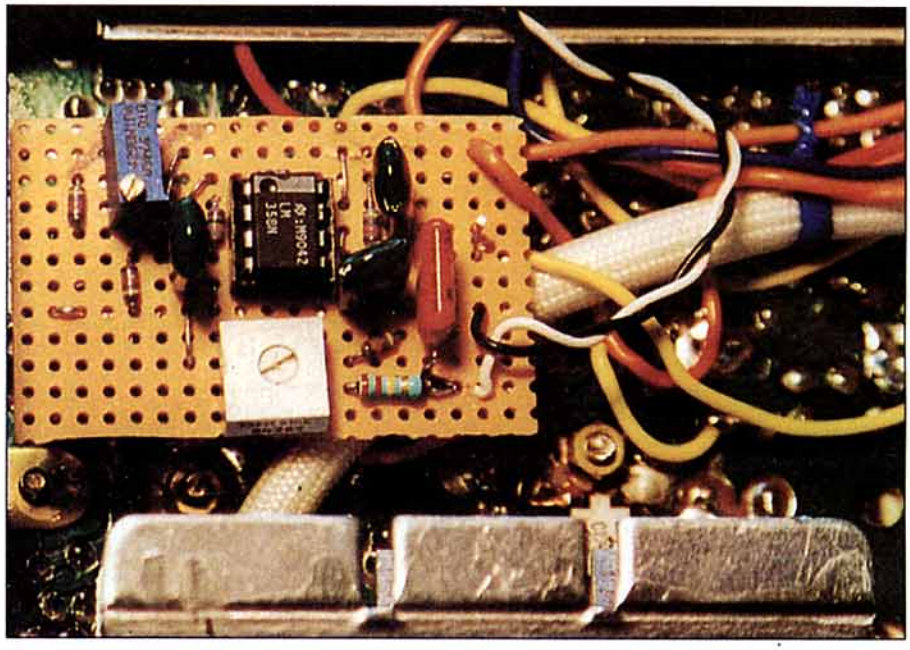
Add CTCSS to your VHF or UHF Radio

by Dave McQue, G4NJU

THE CONTINUOUS TONE coded squelch system has been used on commercial radio systems for more than ten years. As voice communications need only use the audio frequencies from 300Hz to 3kHz for recognisable speech The frequency band from zero to 300Hz can be used for signalling, using 'subaudible' tones. Originally there were 33 discrete tones ranging from 67Hz to 250.3Hz, then four more were added interspersed between the six lowest (see table opposite). These are used for selective receiver squelch.

Nearly all modern FM rigs use the familiar noise squelch. Here use is made of the fact that the noise output of the receiver's FM discriminator in the absence of a signal is of large amplitude and has a significant high frequency components well above the required audio speech band. So the discriminator is connected to the squelch detector via a high pass filter having a cut-off around 6kHz, while the speech path is low pass filtered and switched off when the HF noise is sufficient to activate the squelch. This arrangement has proved a great advance on the carrier sense systems used in the past.

CTCSS goes one step further. In addition to the noise squelch, a unique tone has to be received to open the receiver squelch. To appreciate the advantages this provides the commercial user one must recognise the different practices of such users. Unlike amateurs, who seem to deplore a silent frequency and have to keep it in continuous occupancy to prevent it being taken over by another net, commercial users in general need only intermittent use for short messages. So, somewhat like packet, several separate groups of users can time share a single radio frequency channel using radios equipped with CTCSS.



The CTCSS tone generator can be built on a small piece of stripboard.

The protocol required means that:-

1. Each group is issued with a unique CTCSS tone frequency both for transmit and receive.
2. Transceivers are equipped with circuitry to indicate and prevent transmission while other users with different tones are transmitting, ie 'Channel Busy'
3. Transmitters are equippedwith timeout circuitry to prevent channel hogging.

In addition, groups within its coverage area can share the services of a community repeater. Here the different user groups are identified by their CTCSS tone for billing purposes! The user's CTCSS tone frequency often appears on the RA licence together with the channel radio frequency.

By making use of the capture effect in FM systems (where the strongest received signal 'captures' the receiver), groups geographically close enough to hear one another without CTCSS, can still operate without apparent mutual interference using separate subtones. This is something that Raynet groups may wish to consider.

How can the use of CTCSS benefit the amateur community? Many repeaters are now equipped for CTCSS and a common tone has been allocated for each area for repeaters on different radio frequencies (see the map opposite). At the present there are many times when a distant station will access more than one repeater and while we retain 1750Hz toneburst access with carrier reaccess the full benefits will not accrue. However if the distant station is benign, ie using the CTCSS tone for his local repeater a modern controller will ignore this 'foreign' tone. It is only the distant stations without a tone that will remain a nuisance.

Around my home, Milton Keynes, all repeaters use the same 77Hz tone. Simply for access, all that is required is a 77Hz oscillator which runs continuously during transmission. This is as easy as building a 1750Hz toneburst, with the advantage of not needing timing logic and/or a separate button.

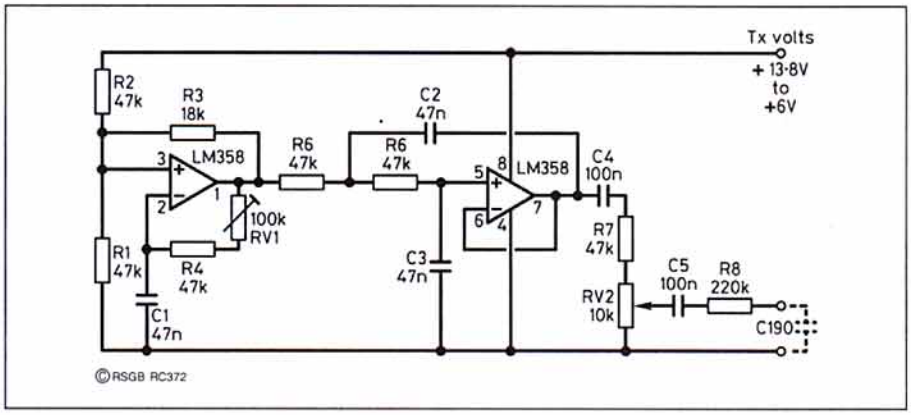
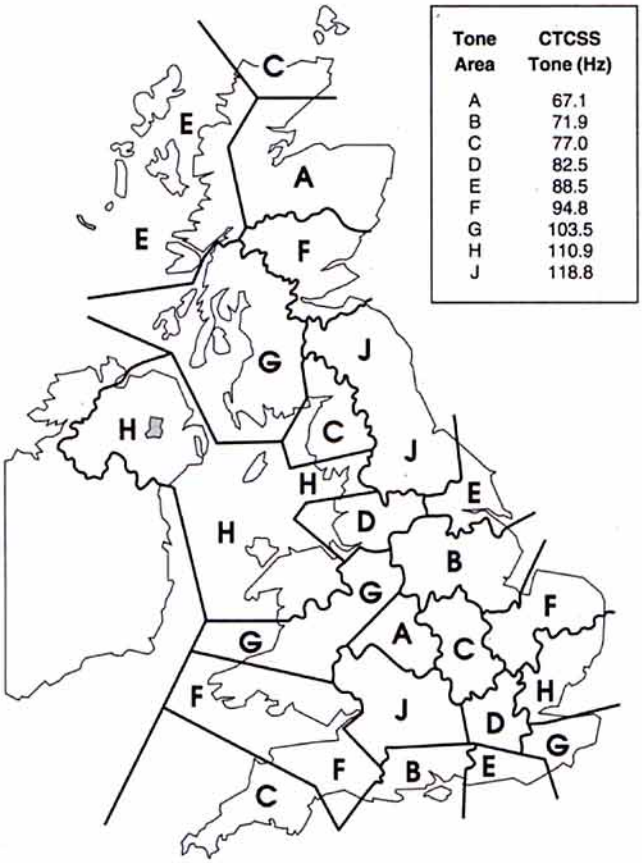


Fig 1: Circuit of the CTCSS tone generator.

CTCSS Repeater Areas



Tone Area	CTCSS Tone (Hz)
A	67.1
B	71.9
C	77.0
D	82.5
E	88.5
F	94.8
G	103.5
H	110.9
J	118.8

CTCSS REPEATER TONES

CTCSS tones are now being permitted by the RA as an optional feature on 2 m and 70 cm repeaters to improve the effectiveness of the UK network.

The principle of CTCSS (Continuous Tone-Coded Squelch System) is that a sub-audible tone is continuously transmitted in addition to the usual signal. Being below the normal speech frequencies, it does not intrude with the received signal.

A repeater user who is on the border of more than one repeater's coverage area can now be selective. By transmitting the appropriate CTCSS tone, only one repeater will be activated rather than all the others on the same channel. The system will operate in parallel with the usual 1750 Hz access tone - so you will be able to use either the appropriate CTCSS tone or 1750 Hz tone-burst to access a repeater.

In addition, a repeater will only transmit its CTCSS tone when relaying speech, but not with its periodic idents. A suitably equipped amateur station will be able to screen out the annoying idents, so making it more convenient to monitor the repeater.

The UK has been divided into 23 different CTCSS regions, so that repeaters in the same area share the same CTCSS tone as shown in the map The scheme is optional and will not be used to form 'closed repeaters'. Users will know when a particular repeater has the CTCSS facility available because it will transmit the appropriate letter in morse code after the repeater callsign.

I have built a CTCSS board and fitted it in my TS-280FM transceiver to access GB3BF. This cost all of £3 using new parts bought from the local Maplin store. The most most expensive component was the miniature multiturn pot essential for accurate frequency setting.

CONSTRUCTION

THE ACTIVE COMPONENTS are contained in an 8-pin chip, an LM358 dual operational amplifier as shown in **Fig 1**. The first Op Amp is used as a square wave generator which is insensitive to supply voltage variations, the second is used as a low pass filter. The tone has to be injected at a point close to the modulating diode after the speech limiter.

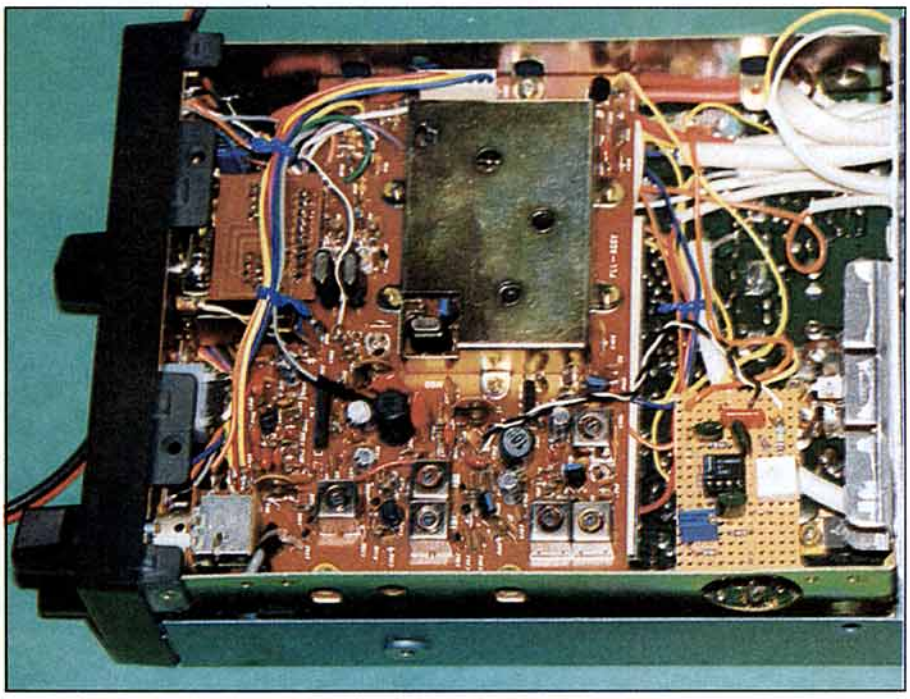
COMPONENTS LIST

Resistors	
R1, R2, R4, R5, R6, R7	47k
R3	18k
R8	220k
RV1 (amplitude)	100k
RV2 (frequency)	47k
Capacitors	
C1, C2, C3	47n
C4, C5	100n
C6	120pF
Semiconductors	
IC1	LM358
Additional Items	
Stripboard	1039

Here I measured the peak speech signal as 2.1V peak to peak for 5kHz deviation; so set the tone amplitude by RV1 to 0.2V for just less than 500Hz deviation.

This circuit is quite useful in rigs where there is room for it to fit, such as ex-PMR handhelds as shown below.

I must confess that I bought the option boards for my TS2700 and C520 as these provide for CTCSS decode and encode of the full range of tones. Fitting was quick and simple - just a matter of opening up and plugging in. The Japanese lady in the TS2700 even tells me the selected tone frequency.



My CTCSS board located in a modified PMR transceiver.

RADCOM TECHNICAL FEATURE

Seven Antennas On One Tower

Second of three parts by Tony Preedy CEng MIEE, A45ZZ

A tuning range of 14.2 to 31MHz (director) or 13.4 to 27 MHz, (reflector) was achieved in two bands with modified 500pF 2kV capacitors from the junk box (EF Jonhson type 500E20). The modification was to convert the capacitors to split-stator types of 4kV overall rating by carefully sawing in half the stator and removing the two centre fixed plates. This gave about 115pF maximum capacitance.

The slightly greater capacitance swing, 135pF, expected from a proper split stator 300pF capacitor would have made the hairpin tuning to cover 14 to 21MHz less critical and is recommended.

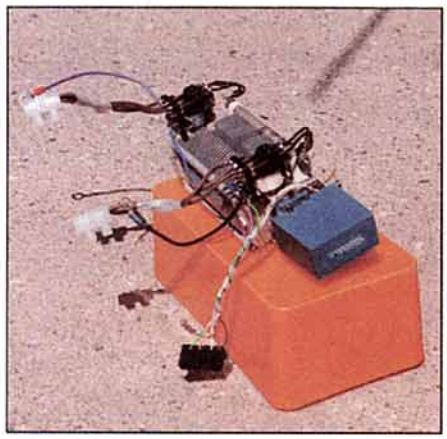
The rear, reflector, element has the standard aluminium wire shorting hairpin replaced by two lengths of original beta match rods appropriately bent and drilled, plus the extra connection clamps.

The same tuning principle is used as at the director except the resonant frequency range is lower. The 10MHz tuning condition, for element plus hairpin, is given by a length in meters of 154/f. The G and H relays were necessary because the whole HF tuning range could not be obtained when using a common HF and 10MHz tuning condition. Relays A to F are used in pairs to reduce contact voltages. These relays used at the centres of the elements are standard open types available from various manufacturers. I used some from RS Components which are tested to withstand 1000 Volts across contacts. However, I made a minor modification to reduce self impedance whereby the pigtails of the moving contacts are disconnected from their solder tags and connected directly to the RF circuit. The components are all chosen to handle up to 1kW PEP.

HF DRIVEN ELEMENT

THE CENTRE ELEMENT, which is resonant as a half wavelength at f=10.125MHz, from the formula length = 145/f, when the parasitic elements are coupled. This element is redundant on 7MHz because element spacing would be too close for efficient three element operation on that band. A relay pair switches the balanced feed from this element to the front element on 7MHz. Having thus removed the path to ground there would be nothing to prevent an electrostatic voltage accumulating on the centre element were it not for the leak resistors.

These together with the 10A open type relays are mounted inside an ABS or diecast box which doubles as a junction point for the dual coaxial and control cables. The two outer elements, being the most likely to be influenced by a local atmospheric electrical discharge, shield the centre element by being effectively grounded via the low impedance tuning hairpins.



The split stator capacitor.

The antenna is not matched to the feeder, except as below, because the matched impedance depends on the tuning of all elements and we would lose the flexibility of remote tuning of the parasitic elements if we did not use an aerial system tuning unit (ASTU) to tune the driven element. In any case one invariably relies on an ASTU, if full power is required from the radio at the bandwidth limits of even the best antennas, to counteract the modern transmitter's automatic power reduction activated by VSWR. An ASTU, either automatic or manual, is therefore desirable in any HF station. Another factor in favour of an ASTU is that it is easily accessible and not exposed to the environment unlike traps or coils used for matching at the antenna. The design therefore aims for feed impedances in the region of 450Ω at the end of the 100Ω matching line to enable feeder loss to be minimised without resort to an expensive coaxial cable.

IMPEDANCE MATCHING

TO AVOID BOTH VERY high standing waves at the ASTU and to overcome the problem of rotation with open feeders I used two short sections of 100 Ω twin screened feeder each made from two pieces of RG213 solid dielectric 50Ω coaxial cable having a velocity factor 0.66, see Fig 3 in Part One. Both sections in cascade provide quarter-wave impedance transforming action between the main 450 Ω feeder and the front, driven, element on 7MHz. On 10MHz the 4.88m section provides the same function for the centre driven element whilst on 18 and 21MHz this section also provides a half wave 1:1 transformation.

On the upper part of the 28MHz band, where losses in the dual coax might otherwise have been significant, the driven element length approaches three half waves. The antenna impedance then results in a low VSWR. The only bands where the 100Ω feeder does not help are 14 and 24MHz. You could insert a conservatively rated 4 to 1 balun at the end of the 100Ω section and use coax for the rest of the run to the ASTU if it is not too far away from the antenna. The power rating of a balun, incidentally, is generally taken to be reduced inversely as the VSWR because both voltage per turn and magnetic flux maxima increase directly as the square root of VSWR. I tried this with 50 feet (15m) of RG213 and found that, although the VSWR went up to over 4 at the radio, the built-in automatic tuner could cope on all bands except 14MHz. This arrangement will result in about 1dB more feeder loss than if 30m, say, of open line is used.

SERVO CONTROL

IN MY FIRST ATTEMPT at this type of antenna, where I used relays to switch the tuning reactance between bands, I was faced with the problem of optimising the tuning capacitor values for best directivity whilst the antenna was on the tower. My solution then was to use remotely tuned varactor diodes in place of the antenna capacitors. The tuning voltage for best reception performance on each band was logged and when the antenna was taken down the diode capacitance was measured with the logged voltages reapplied.

Fixed capacitors made from lengths of feeder were then substituted. The diode tuning system would have been adequate, even without the capacitors, as a final solution if the antenna had only been required for reception. Obviously something more substantial is required in a transmitting antenna required to handle say 1kW. In the antenna now described the tuning capacitors have to withstand about 2kV between stators. The capacitors are driven by mass produced 5 volt servo motor modules designed for the control of polarisation at domestic satellite TV antennas. These consist of DC motor, gearbox, feedback potentiometer and lightening protected electronics in a lightweight compact weather-proof housing.

A typical circuit and description of the electronics in these modules will be found in the

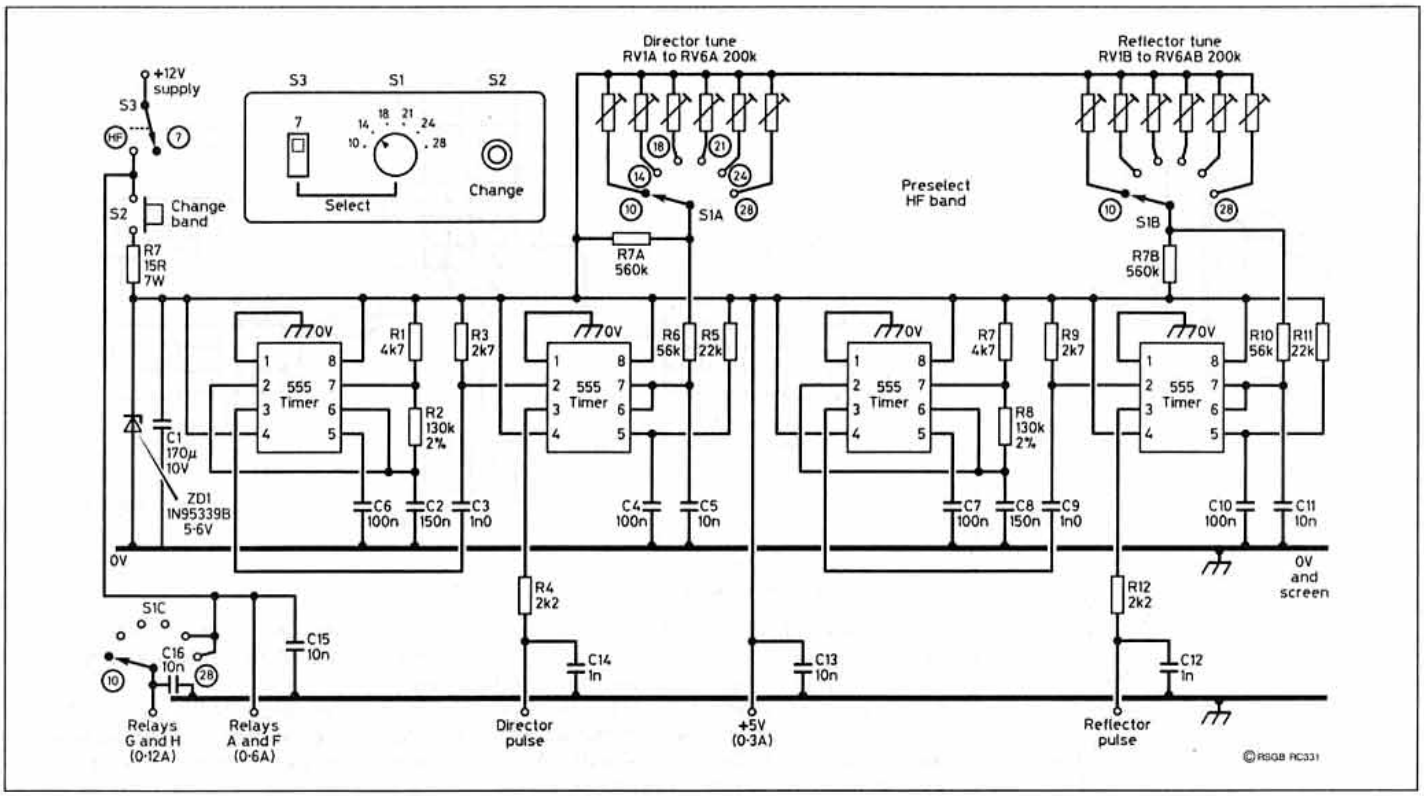


Fig 4: Circuit and panel for the band selector.

Radiospares data library, sheet 4204. In this system of tuning the servo output shaft position and hence capacitance is a function of the duration of remotely generated TTL pulses with an 18ms repetition period. In this case the pulses are produced in the band switching control unit. A feedback pot attached to the final drive causes local generation of similar pulses which are compared with those at the input. The motor is switched on by transistors which control the direction of rotation depending on the pulse length differential. When both sets of pulses have the same duration the motor stops. With a capacitance swing of 100pF and allowing for backlash in the gears the servo system has an acceptable resetting accuracy of about ±1.5pF. Time taken to tune through the bands is about 2 seconds with a 5V supply delivering less than 150mA per motor.

The band switching control circuit which was derived from the RS data sheet is shown in **Fig 4**. Switched multiturn preset resistors store tuning settings (capacitor rotation) for optimum performance on five frequencies in the 14 to 30MHz range plus 10.125MHz. If required, a pair of tuning resistors could be mounted on the front panel to provide flexibility as a general coverage directional antenna. A third pole of the HF band change switch is used to provide 12 volts for the reed relays on 24 and 28MHz.

The reflector tuning components are shown, assembled without the cover, in **Fig 5**. Note that the hairpin rods are deformed so that they can be terminated at the capacitor. A conventional relay with dust cover is shown providing the 24/28MHz tap but this was later replaced by a lower inductance high voltage reed type. All of the exposed RF connections are sealed with self amalgamating tape before erection to prevent corrosion at dissimilar metals.

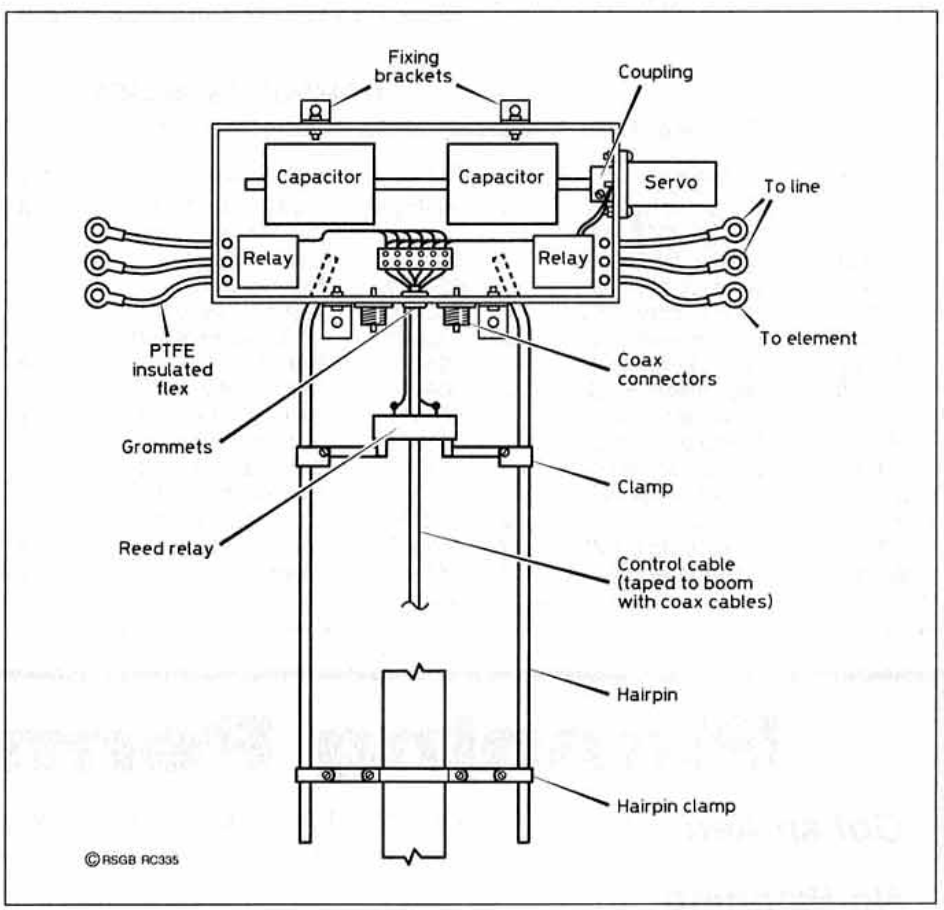


Fig 5: Element tuning assembly.

All that is required, for a split stator capacitor with grounded spindle, is a flat faced control knob of approximately 15mm diameter with bush and grub screw to fit the capacitor shaft and an accurately machined diametric slot to fit the servo coupler as shown in **Fig 6**. The coupler supplied with the servo will tolerate approximately 2mm of misalignment. Two small aluminium 'U' brackets were fabricated to mount the servo on the capacitor frame. These will not be necessary if the alternative of mounting the servo on the out-

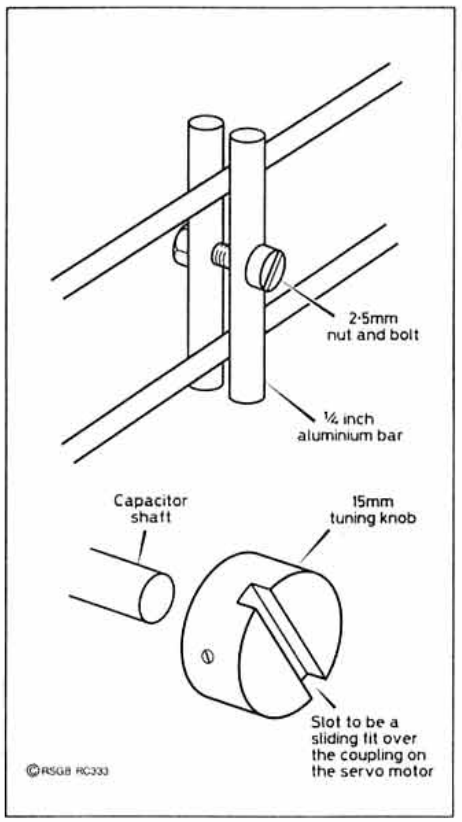


Fig 6: Linear loading and capacitor shaft drive, detail.

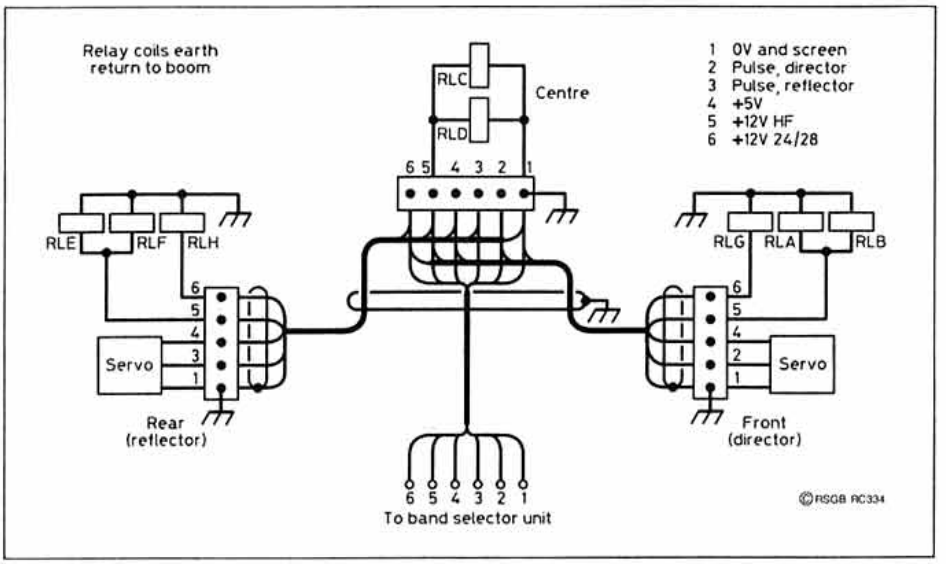


Fig 7: Antenna control wiring

side of the box is adopted. The relays are also fixed to the capacitor frame.

The capacitor and the weatherproof housing are mounted on the antenna using aluminium brackets attached with the quarter-inch bolts which fix the element centre insulator clamps. A five conductor screened cable is required for control and in a new installation this cable could be shared with the rotator. The servo units are reasonably tolerant of voltage drop on the cable, they just slow down but eventually return to the correct tune point.

However, try and select a cable with less than 5Ω loop resistance. **Fig 7** shows how the control circuit is wired at the antenna.

. . . to be continued

COMPONENTS LIST

Source of Telex Hy-gain parts: Telex Hy-gain, 9600 Aldrich Ave South, Mineapolis MN 55420, USA

Part No	Description	Qty
397S	40m 2 ele Beam (Model 402BA-S)	1
165920	Bracket No 14	2
872029	Tube element DE1	2
171252	Tube element DE2	2
190206	Tube element DE3	2
190000	Tube element R4	2
171533	Tube element R5	2
465833	Insulator for DE1	2
380413	Clamp compression	2
380420	Clamp compression	2
280421	Clamp compression	2
455644	Cap plug	2
520007	Screw 8-32 x 1/2"	2
520034	Screw 6-32 x 1/2"	4

Part No	Description	Qty
560035	Lockwasher No 8	3
504098	Bolt 1/4-20 x 1 1/2"	4
562961	Lockwasher 1/4"	14
554099	Nut 1/4-20	14
500158	Bolt 10-24 x 1/2"	6
565697	Lockwasher No 10	14
554071	Nut 10-24	9
504069	Bolt 10-24 x 1"	2
506518	Bolt 1/4-20 x 1 1/4"	2
555693	Nut square 10-24	2
551367	Nut square 1/4-20	8
505266	Bolt 1/4-20 x 3/4"	12
500156	Bolt 1/4-20 x 3/8"	2
163376	Clamp 1/4" rod	4
163371	Clamp Beta	2

Source for Servomotor units	Qty
Polarotor motor assembly complete with seal and coupling	2
Chaparral Communications	
2450 North First St	
San Jose, California	
CA 95131, USA	
Other key components	
Tuning capacitors - Light weight split stator type. Each section 300pF 1.5KV	
Relays A to F 3PCO 10 Amp contacts, 12V coil, open type. eg RS349-541	
Relays G & H 1PNO contacts, 12V coil, 8KV reed type. eg RS352-581	
Switch S1 6-way, 3 pole from kit eg RS352-187 and two RS352-200	

Technical Update

NICAD CHARGER, NOV '94

IN THE ABOVE article a warning was given about mains voltages that exist when the charger is switched on and that it should be disconnected from the mains before working on it. Peter Chadwick, G3RZP, points out that the plastic in-line fuse shown is not designed for mains use so this warning *must* be heeded.

The diode numbers in the diagram are correct with the exception of the 3v3 zener diode which should be labelled ZD1. The components list should read:

D1, D2, 1N4001. D3, D4, D5, 1N5401

An updated diagram of the solder side of the PCB, with the tracks thickened to aid production, is shown in **Fig 1**.

BURGLAR ALARM, *TT*, AUG '94

DAVID LAUDER, G0SNO, notes that TR2 collector load consists of RLY2 coil in parallel with the siren/bell, which could prevent the relay energising. A diode would overcome this problem. He also points out that the transistors used in Fig 7 are obsolete Germanium devices but that any general purpose PNP transistors should be a suitable.

Modifications and corrections to the circuit, suggested by G0SNO, are shown in **Fig 2**.

G3BIK ELECTRONIC KEYER, OCT '94

PAGE 41, Fig 1: Modifications to Mark 1.

The stripboard drawing is correct but the text of the caption has errors as follows:

First line	Cut tracks	amend R18 to read A18
Second line	Remove links	amend C35-G33 to read C39-G39
Second line	Add links	amend M14-L14 to read H14-L14, G19-K19

Page 42, Fig 2: Keyer Mk2, circuit diagram Junction R3 and R4 should connect to +V. TR1 symbol should be inverted and is a PNP type BC212.

Page 42, Components list for Mark 3 keyer Amend JH24B to read KU58N. Page 43 Transpose captions for Fig 3 and Fig 4.

Fig 3: Junction R3 and R4 should connect to +V. 100n capacitors should be C2, C3, C4.

Fig 4: links E3-F3 and D26-E26 missing.

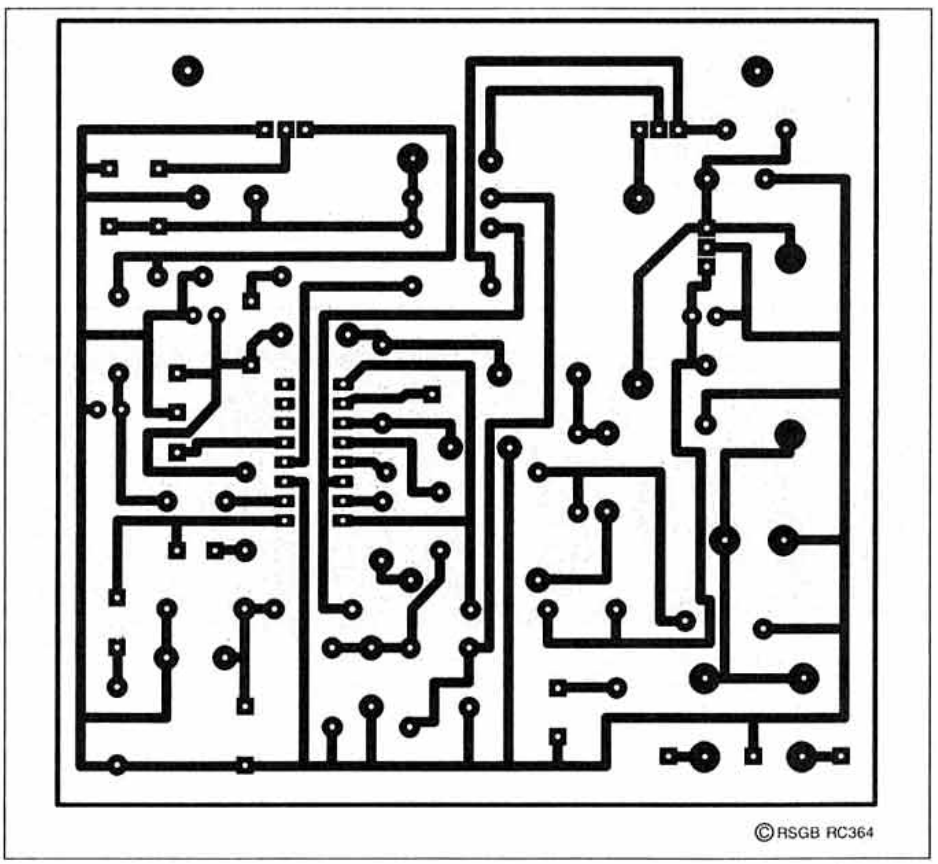


Fig 1: Automatic Nicad Charger, an updated diagram of the solder side of the PCB, with the tracks thickened to aid production.

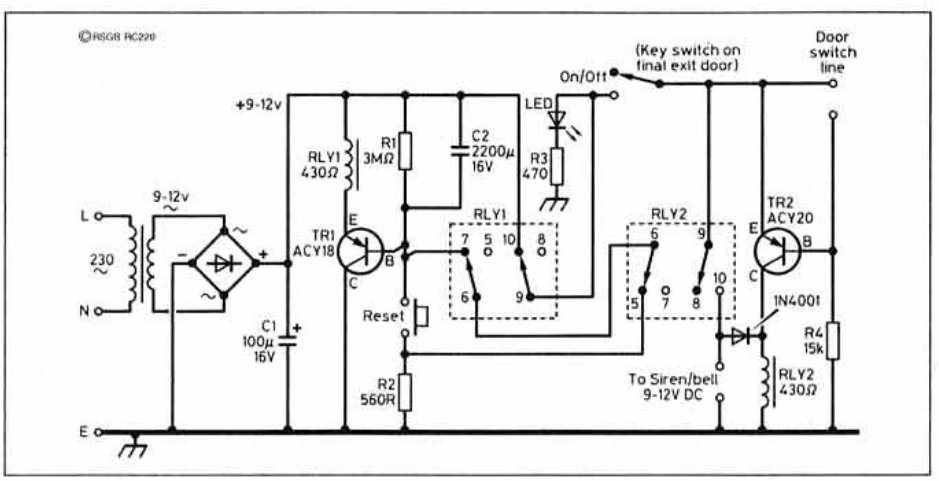


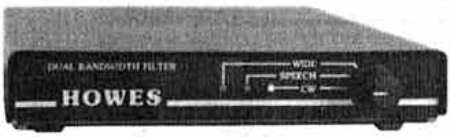
Fig 2. Home brew Burglar Alarm, modifications and corrections to the circuit.

C.M.HOWES COMMUNICATIONS

Mail Order to: Eydon, Daventry, Northants. NN11 3PT
☎ 0327 60178

GREAT PROJECTS FOR THE CHRISTMAS HOLIDAYS!

Escape to the shack and give your station a little present! If the weather's bad, and the bands aren't too hot, what could be better than a few absorbing hours spent doing some construction? You could be really ambitious and build yourself a complete portable station for next year's holiday, or more realistically for most of us, perhaps a useful station accessory. May be you have a youngster in the family who would love to be given some help building their very own receiver to get them started in the hobby? Whatever your plans, we hope you can find something in our kit range for you to enjoy over the holidays!



CLEAN UP YOUR RECEPTION with this DUAL BANDWIDTH AF FILTER for £29.80!

• Reduce noise and interference! • Sharp SSB/Speech filter with faster roll-off than IF crystal filters! • 300Hz bandwidth CW filter • Printed and punched front panel • All aluminium case • Simply connects between radio and external 'speaker or 'phones • Suits all general coverage receivers and transceivers •ASL5 Kit plus HA5OR hardware: £29.80 (plus P&P).

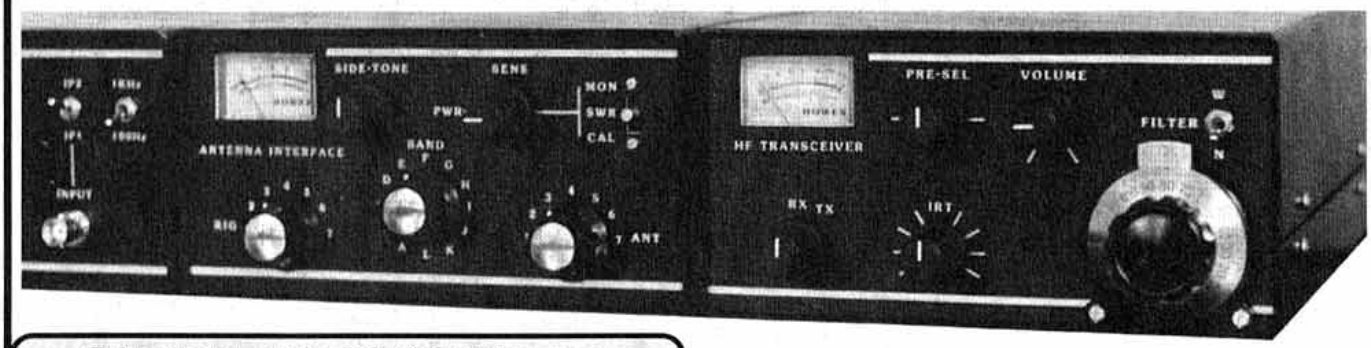
MULTI-BAND SSB/CW RECEIVER

The new **HOWES DXR20** covers 20, 40 & 80M bands plus any other HF frequency with optional plug-in modules. The photo shows the receiver built with **DXR20** and **DCS2** ("S meter") kits and **HA20R** hardware pack (case etc.). It has some great technical features and is compatible with many accessory kits (filters, digital readouts, transmitters etc.).

• 8 pole bandpass RF Filter for each band • SL6440 High performance mixer • FET VFOs• • Active AF filter • 1W audio output stage • 12 to 14V DC operation •

DXR20 electronics kit: **£39.90**. HA20R hardware pack: **£28.90**

Optional plug-in band modules for other HF amateur bands, weather fax/data transmissions etc.. Standard tunable band modules £7.90 each. Crystal controlled modules also available. Custom versions to individual quotation.



Other items in the HOWES KITS range

For more details on these kits, please send an SAE for a catalogue/data sheet or give us a ring to discuss the projects. Most kits are also available as assembled and tested modules, please 'phone for prices.

ACTIVE ANTENNA KITS

AA2	150kHz to 30MHz	£8.90
AA4	25 to 1300MHz Compact	£19.90
AB118	High Performance VHF Airband	£18.80
SPA4	Scanner Pre-amp, 4 to 1300MHz	£15.90

Active antennas are for reception only

RECEIVER KITS

DcRx	20, 40 or 80M Single Band SSB	£16.90
DXR10	10, 12 & 15M SSB/CW	£27.50
TRF3	5.7 to 17MHz TRF	£15.50

TRANSMITTER KITS

CTX40	40M QRP 3W CW inc. crystal	£15.50
CTX80	80M QRP 5W CW inc. crystal	£15.50
AT160	80 & 160M 10W PEP AM/DSB/CW	£39.90
MTX20	20M 10W CW inc. crystal	£29.90
HTX10	10 & 15M SSB Exciter 50mW	£49.90
HPA10	10 & 15M 10W PEP Power Amp	£39.90

Crystal controlled TXs can be made tunable by adding the appropriate VFO kit.

VFO KITS

CVF20	VFO for use with MTX20	£11.90
CVF40	VFO for use with CTX40	£11.90
CVF80	VFO for use with CTX80	£11.90
VF160	VFO for use with AT160	£22.80
VF10	VFO for use with HTX10	£17.90

VFOs have outputs for driving receivers as well as transmitters to give transceiver operation. IRT facilities and voltage stabilisers are included.

ATU KITS

CTU8	SWL ATU 0.5 to 30MHz inc. h/w	£29.90
CTU30	30W HF & 6M with balun	£39.90
CTU150	150W 1.8 to 30MHz	£49.90

ACCESSORY KITS

AP3	Auto Speech Processor	£16.80
MA4	Mic Amp with active filter	£6.20
CBA2	Buffer for frequency counter	£5.90
CM2	Electret Mic with VOGAD	£13.50
CSL4	SSB & CW Filter for DcRx etc.	£10.50
CV100	HF Converter for VHF scanner	£27.50
DCS2	"S Meter" for DC receivers	£10.90
DFD4	Add-on Digital Read-out	£49.90
DFD5	Digital Frequency Counter	£54.90
ST2	Side-tone/Practice Oscillator	£9.80
SWB30	SWR/Power indicator/load	£13.90
XM1	Crystal Calibrator LF to UHF	£16.90

HARDWARE PACKS

CA4M	Houses DFD4 and PMB4	£24.90
CA5M	Houses DFD5 and CBA2	£28.90
CA10M	10 & 15M Transceiver H/W	£34.90
CA30M	Houses CTU30/SWB30/ST2	£34.90
CA80M	Houses CW Transceiver	£34.90
HA10R	Houses DXR10 Receiver	£25.90
HA11R	Houses XM1 Crystal Calibrator	£11.90
HA12R	Houses ST2 Side-tone	£10.10
HA30R	Houses CTU30 ATU	£17.90
HA33R	Houses TRF3 SW Receiver	£25.90
HA80R	Houses DcRx and DCS2	£29.90
HA150R	Houses CTU150 ATU	£16.90

Hardware packs contain aluminium cases with printed and punched front panels, plus knobs, sockets etc. as appropriate. Tuning capacitors and dials are included in receiver hardware packs, but extras for transceiver packs.

The picture shows smart matching equipment in a home constructed QRP station built with HOWES kits and hardware packs. For a relatively modest sum, and some enjoyable hours of construction, you can build yourself a station you will be proud to show your friends. The same financial outlay would probably have only bought the optional CW filter and matching loudspeaker for a "black box" transceiver! You don't have to spend a lot of money to enjoy amateur radio!

A present for the "junior op."?

The **HOWES MW1** covers medium wave and "top band" amateurs. An easy to build TRF design, the kit is complete with case and everything except solder and battery (PP3). Only needs a few feet of wire antenna (supplied). We have even included a small loudspeaker, plus an extra tuning coil so that it can be modified for use on other shortwave bands. Educational, room for experimentation, technical support from us if you need it, and lots of fun!

MW1 kit: £29.90 (plus £4.00 P&P)

PLEASE ADD £4.00 P&P, or £1.50 P&P for electronics only kits.

HOWES KITS contain good quality printed circuit boards with screen printed parts locations, full, clear instructions and all board mounted components. Sales, constructional and technical advice are available by phone during office hours. Please send an SAE for our **free catalogue** and specific product data sheets. Delivery is normally within seven days.

73 and Seasons Greetings from Chris, Dave and Co.

QRP

REV GEORGE DOBBS G3RJV
St. Aidan's Vicarage, 498 Manchester Road, Rochdale OL11 3HE
E-mail: g3rjv@gqrp.demon.co.uk

TIME AND COMPUTERS wait for no man! No sooner had I announced the QRP List on Internet in the October issue of *RadCom*, than the list server changed. I can only apologise to all those who had their mail 'bounced'. The *Internet QRP List* still exists but can now be found as follows: To subscribe - send a message body 'subscribe qrp-l' (that is L not 1) to listserv@netcom.com. To unsubscribe - send a message 'unsubscribe QRP-L' to listserv@netcom.com.

Shortly it is hoped that a QRP List will begin in the UK. Tests are taking place now and this will be announced soon. Those planning the group hope to keep it rather more tidy than the over-prolific USA based netcom group.

QRP ALONG THE PACIFIC CREST BICYCLE TRAIL

AS ANNOUNCED IN this column last year, the Bicycle Mobile Hams of America took part in their Pacific Crest Tour in late August 1994. The weather was perfect for the trip as the cyclists used paved and unpaved roads to cross from Crescent Lake, Oregon, to Weed/ Mount Shasta, California, a total of some 330 miles in one week.

Four radio amateurs, along with six other riders took part with several firsts: the first two women to take part, the first overseas cyclists (two Germans) and the first recumbent bike. There were also two strong cyclists in their sixties.

The radio amateurs taking part were Dan Arbogast, N0DA, of Oregon, who operated packet and FM on 2 metres; Russell Dwarshuis, KB8U, of Michigan, who operated on 40 and 2 metres; Gottfried Kloyer, DL2MFJ/AA1JQ, of Wessling, Germany, who operated on 40 and 2 metres and the trip organiser Bil Paul, KD6JUI, of California who operated on 20, 40 and 2 metres. All except KB8U used solar panels for power.

The collection of QRP HF transceivers available for the trip was varied. KB8U used an amateur radio fitted recumbent bicycle fitted with a 2m handheld and the handheld-size Tokyo HT-750 which runs 2-3W on 7, 21 and 50MHz. He used this in conjunction with a 40m Hamstick antenna fitted to the bicycle. KD6JUI took a prototype of the Northern California QRP Club Sierra Transceiver. This is a multiband superhet transceiver, sold as a kit, which uses plug-in modules for each band.

Gottfried Kloyer, DL2MFJ, had a fine homebrew 40 metre QRP transceiver running 5 watts into a half-wavelength 40m vertical. With the bottom end tuned by a variable inductor and the top end in trees he managed to work Japan, Alaska, Canada and Hawaii. DL2MFJ is a member of the G QRP Club and heard of the trip via the pages of the club journal, *SPRAT*.

The trip organiser, Bil Paul, said the journey went pretty much as planned and that ten people seemed a good number, so he intends to limit next year's party to ten. Anyone interested in taking part should get on the mailing list as soon as possible by contacting him at 337 Estrella Way, San Mateo, CA 94403-2940 USA.

Gottfried Kloyer, DL2MFJ / AA1JQ operating his home built 40 metre station at an altitude of 7,000 feet from a tent in Klamath National Forest on the Oregon/California border during the Pacific Crest Bicycle Trail.

QRP OPERATING EVENTS

THE G QRP CLUB WINTER SPORTS

THIS ANNUAL EVENT is probably the most popular in the QRP Calendar and is open to everyone. It runs from 26 December 1994 to 1 January 1995 inclusive. All you have to do is limit the maximum output of your transmitter to 5 watts and call 'CQ QRP' on the International QRP Calling Frequencies: 1843, 3560, 7030, 10106, 14060, 21060 and 28060kHz on CW. There is also some activity on SSB on 3690, 7090, 14285 and 28885kHz.

It is not a contest but rather a 'QSO Party'. The idea is simply to work as many other QRP stations as possible. There is one award, the G4DQP Trophy, given to the person thought to have contributed the most to the event. Logs and informal notes can be sent to the G-QRP Club Communications Manager, Gerald Stancey, G3MCK, 14 Cherry Orchard, Staines TW18 2DF.

AGCW-DL WINTER QRP CONTEST

THIS WELL KNOWN German QRP Contest takes place in the first complete weekend in the new year. In 1995 this is 7 and 8 January.

RULES

Times: 1500 UTC Saturday to 1500 UTC Sunday. Nine hours minimum rest time, in one or two blocks, are obligatory.

Participants: Single operator in the CW mode on the 3.5, 7, 14, 21 and 28MHz bands. Only one transmitter, receiver or transceiver may be operated at the same time. Reception of RST is sufficient from non-contest stations. Contest stations should exchange RST plus serial number/Category.

Categories: VLP - very low power - up to 1 watt output or 2 watts input; QRP - 'classic QRP' - up to 5 watts output or 10 watts input; MP - moderate power - up to 25 watts output or 50 watts input; QRO - above 25 watts output or 50 watts input. QSOs between high powered stations are not allowed.

Points: Every QSO with a station on the same continent counts one point, with DX stations two points. The contest manager will calculate four points for QSOs with VLP, QRP or MP stations having sent a log.

Multipliers: Each DXCC country counts one multiplier per band. The contest manager will calculate two multiplier points for each DXCC country worked with VLP, QRP or MP station sending a log.

Final Score: Total QSO points multiplied by total multiplier points. The final calculation will be done by the contest manager.

Submitting Logs: Please list QSOs separately for every band and mark your claimed multipliers. The rest times(s) and output(s) of all operated transmitters must be mentioned. More station details are appreciated. Please do not forget your full address and an IRC if the contest results are required. Your QSO partners will get a full account of their points only if you send in your log! The deadline for logs is 1 March 1995. Send to Dr Hartmut Weber, DL7ST, Schlesierweg 13, D-38228 Salzgitter, Germany.

Active on 80 and 40m with 1 watt and with 20m 3/5W, Victor Brand's, G3JNB, CW only station is based on the G-QRP Club's 'ONER' Tx and a variety of Howes kits, including Tx and DC receivers, ATU, SWR/ dummy load/side tone and audio filters, plus a Lowe HF-225. With a 285ft multiband dipole that has one arm out over a lake, he finds that his modest 1W CQ on 3560kHz usually generates a prompt reply!

EMC

HILARY CLAYTONSMITH, G4JKS
115 Marshalswick Lane, St Albans,
Herts AL1 4UU

FROM 1 JANUARY 1996 almost all new electronic equipment placed on the market in EU countries will have to be CE marked to show that it meets the relevant EMC standards for both RF emissions and immunity. In the UK, immunity standards for domestic equipment have never been compulsory before and there is much interest in the levels of immunity which may be expected.

It may be worthwhile at this point mentioning how to find the theoretical feild strength at a certain distance from a transmitter. Take the Effective Radiated Power (ERP) in watts and find the square root. Multiplying this by seven and dividing the result by the distance in metres gives the field strength in volts per metre (V/m). With a lossless dipole aerial and no feeder loss, the ERP is equal to the transmitter power. Otherwise, convert the transmitter power to dBW, subtract the feeder loss in dB and add the aerial gain in dBd (dB relative to a dipole) to find the ERP in dBW. This should then be converted back to watts. EMC standards often express field strengths in dB relative to 1 microvolt per metre (μV/m) so that 1V/m corresponds to +120 dB(μV/m).

Until recently, little work had been done by standards organisations on defining the field strengths found in practice near an amateur radio station. Committee SC77B of the IEC (International Electrotechnical Commission) is currently working on a draft document to be issued as *IEC 1000-2-5: Electromagnetic Compatibility (EMC) - Part 2: Environment - Section 5: Classification of Electromagnetic Environments.* This lists sources of RF, including amateur radio, which may exist in various locations including residential (urban), residential (rural), commercial, industrial, etc. It also specifies the field strengths which may be expected, although the exact figures are not yet finalised.

Radio and television are covered by the EN 55020 standard. This requires immunity to a radiated field strength of 1.78 V/m or +125dB(μV/m) for the frequency range 150kHz - 150MHz apart from certain frequencies including IFs. This level only takes account of the field strengths from *broadcast* transmitters in the majority of locations. The level of +125dB(μV/m) is exceeded at isolated points in residential areas. Near the Sutton Coldfield VHF/FM broadcast transmitter, the field strength reaches +129dB(μV/m) at certain points. Some houses at Brookmans Park in Hertfordshire are within 300 metres of the Radio 5 AM transmitter with an EMRP (Effective Mean Radiated Power) of 150 kW on 909kHz. This gives a theoretical field strength of 9V/m or +139dB(μV/m).

For residential, commercial and light industrial premises, the Generic immunity standard EN 50082, applies to products not covered by a product-specific standard. It specifies a radiated immunity level of 3 V/m from 80 to 1000MHz, 80% modulated with 1kHz AM. The Peak Envelope Voltage (which is the like PEP but expressed in voltage) is therefore 5.4V/m.

The Scope section of EN 50082 states: "The immunity requirements have been selected so as to ensure an adequate level of immunity for apparatus at the locations described. The levels do not however cover extreme cases which may occur in any location, but with an extremely low probability of occurrence. Situations may arise where the level of disturbances may exceed the levels specified in this standard, eg a hand-held transmitter held in close proximity to apparatus. In these instances special mitigating measures may have to be employed."

It is normally argued that setting an immunity level high enough for every possible case is uneconomic if it is only required for a very small percentage of products sold. It therefore appears that 'special mitigating measures' such as fitting filters will still be required in some cases. There appears to be little prospect of immunity standards for consumer electronics being increased to a level such as 10V/m in the foreseeable future. However, we have received encouraging reports that some new CE marked TVs and video recorders achieve levels of RF immunity which are much better than the standards require.

In critical applications such as Weights and Measures equipment and some industrial equipment, immunity to 10 V/m is required. In another critical application, alarm PIR immunity, the generally accepted standard is 10V/m although some of the best achieve well over 30V/m. We understand that IEC Technical Committee TC79 is working on a product-specific European standard for intruder alarms but the *immunity* levels are not yet finalised.

TEST METHODS

An EMC immunity standard defines a test procedure which can be performed in a laboratory. RF immunity depends on two separate factors which can interact in a complex way. These are RF picked up directly in the equipment and conducted currents caused by cables such as coaxial feeder or loudspeaker cables acting as receiving aerials. Standards therefore treat radiated and conducted immunity separately although the conducted current effect is not yet adequately covered by standards.

The EN55020 specification, tests radiated immunity in a TEM (Transverse Electro-Magnetic) Cell which is a parallel plate transmission line as shown in **Fig 1.** Aerial cable, mains cable, etc within the cell are shielded by a continuous line of ferrite rings to minimise conducted currents during the radiated test.

The conducted tests inject an RF signal onto cables such as power cables and interconnecting cables. The Generic standard uses a 3V RMS amplitude modulated signal from 150kHz to 80MHz. The Radio and TV standard, EN 55020 specifies 2V RMS injected onto the braid of the aerial coax but only from 26 to 30MHz. Unlike the generic standard, this does not test for immunity to conducted currents in any amateur band except 28MHz. In any case, when a TV is connected to a video recorder or even just to an aerial, it becomes part of a system and EN 55020 only applies to individual items of equipment, not to systems.

The conducted immunity levels appear to be based on the belief that 1V/m radiated field, typically induces 1V on an interconnecting cable. We consider that this is a dubious assumption, particularly if a cable has a resonant length in one amateur band or another. For example, the QTH of Dave Lauder, G0SNO, is three kilometres from the 1548kHz Capital Gold transmitter with an EMRP of 97.5kW using a directional aerial. The theoretical field strength would be up to 0.73V/m, depending on the direction. In a TV distribution system at a nearby block of flats where the coax braid is earthed at the amplifier, G0SNO measured 10V RMS at 1548kHz between the coax braid and mains earth in a flat 30 metres from the amplifier.

Conducted current problems are also illustrated by a number of HF alarm cases which we have dealt with. Some alarm PIRs mounted on a wall and connected to a cable have malfunctioned in field strengths much lower than their specification, although we do not know whether they have been actually tested for conducted immunity. Concern is also being expressed in commercial circles that existing standards do not adequately address immunity to conducted currents.

In practice, the real life situation is complex and no two cases are likely to be the same, so that trying to relate immunity tests under laboratory test conditions to a real life situation can be something of a minefield. For example, we have found that equipment connected to a vertical cable is less immune to vertically polarised signals than to horizon-

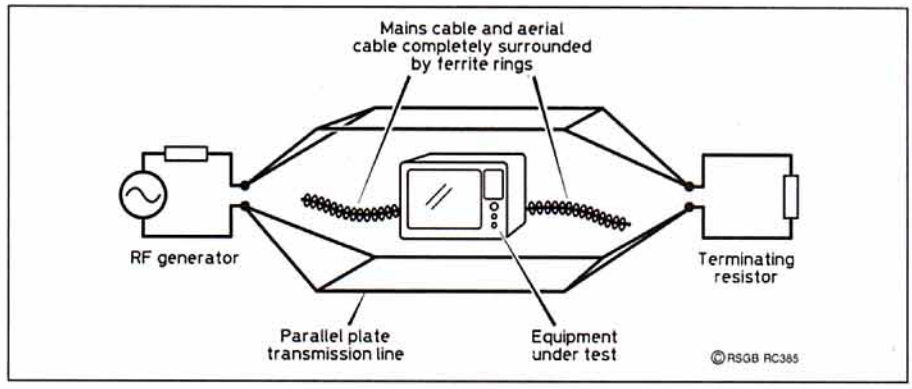


Fig 1: Radiated immunity testing in a Transverse Electro-Magnetic (TEM) Cell.

tally polarised signals. RF signals picked up on cables and fed into electronic equipment create a field between the electronics and nearby conducting objects. Even placing equipment against a wall can have some effect if the wall is lossy at RF. Anything conductive in the wall increases the effect and this not only includes wires and pipes but also any reinforced concrete such as a lintel above a door or window. Signals can also be picked up and re-radiated by cables not connected to the equipment in question, for example overhead telephone or electricity cables. This can cause a 50% increase in the distance at which immunity problems occur.

Immunity standards for domestic equipment are something new and will need further development if they do not reflect the real life situation adequately. Existing standards do not take sufficient account of some RF sources such as amateur radio stations, which are long established by custom and practice as part of the residential electromagnetic environment. In the EMC Committee's opinion, it is unreasonable for anyone to suggest that the residential electromagnetic environment should be regulated to suit shortcomings in existing standards. To do so, would be a case of the tail trying to wag the dog!

ALARM HEADACHES (PART 1)

JUST WHEN WE thought we had heard the last of intruder alarm EMC, we had a rude awakening and there are more cases 'in the pipeline'! Some of these raise the much wider issue of the adequacy of immunity standards, particularly in respect of conducted currents.

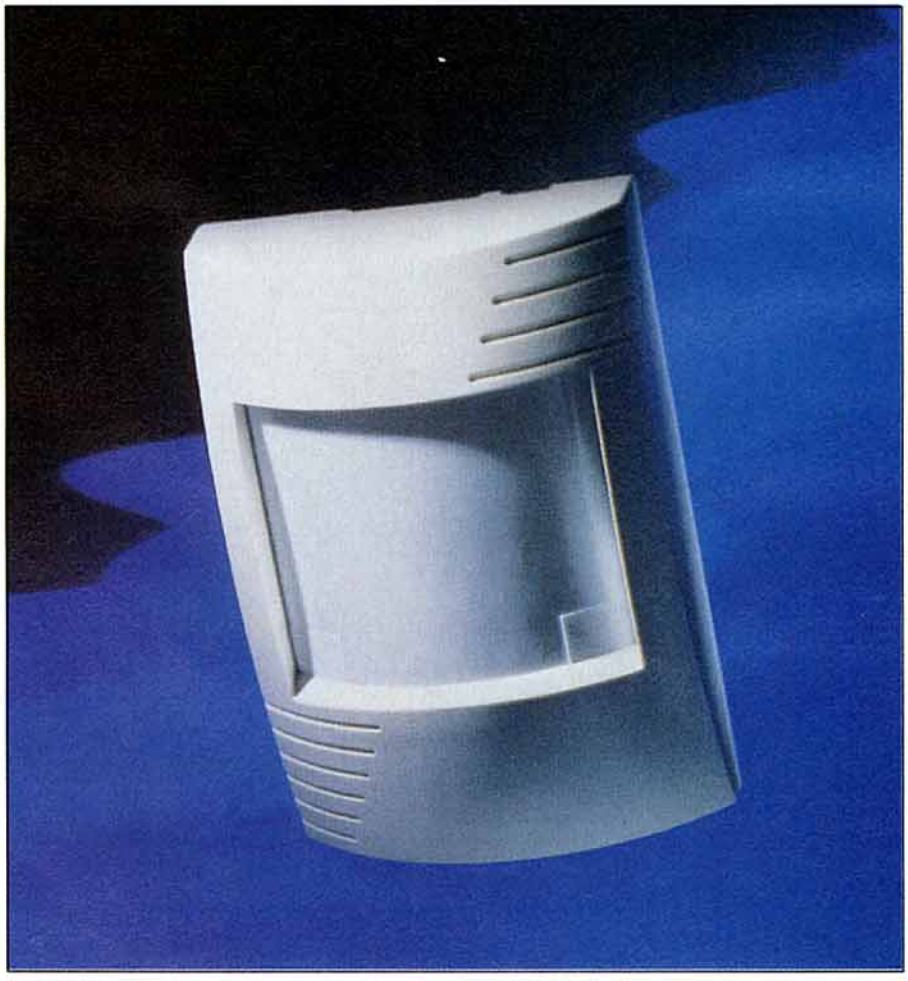
A few years ago, only a small proportion of homes in the UK had intruder alarms, and alarm EMC problems were rare. Now there are some areas with high burglary rates where almost every home has an alarm, some of which are cut-price or do-it-yourself installations. In 1994, we have seen a sharp increase in the number of reported cases of RF 'breaking in' to alarm systems, sometimes with only a few watts. RF pickup in long cables, particularly on the HF bands, can contribute to triggering the PIR (Passive Infra Red) sensors and sometimes the control panel itself. Cables can also radiate noise from the digital electronics in the control panel onto HF and VHF amateur bands, but that's another story.

The problem with alarm PIRs, as with those in security lights, is that the electronics are highly sensitive and unlike other electronic equipment, the immunity cannot normally be improved much by means of external measures. Many alarm PIRs have no name on them and sometimes only the installer knows what type they are but refuses to tell anyone. RF triggering is just one of many possible causes of false alarms but if it does happen, it disturbs the whole neighbourhood and requires effective action to prevent a recurrence.

A PIR should be desighed to detect infrared radiation, not radio signals. The EMC Committee has established that if an intruder alarm system meets BS 4737, it should be adequately immune to RF triggering. Fortunately, reputable companies are usually prepared to tackle any RF immunity problems once the technical issues have been explained.

We are very concerned about the free-for-all situation which exists at the moment where anyone can start up a business installing cut-price alarms which do not claim to meet BS 4737. Some cut-price installers have no technical knowledge and refuse to deal with RF immunity problems. Reputable PIR manufacturers have known about the need for RF immunity for years but many cut price PIRs are being sold with little immunity to RF triggering by fixed, mobile or portable radio transmitters nearby. In a typical installation with three PIRs, using the absolute cheapest may only save a total of about £12.

All this should change when the European EMC Directive finally comes into force. In the meantime, a British manufacturer of low cost alarm PIRs has informed us that the extra cost of a double-sided PCB with a ground plane to improve RF immunity would make their product uncompetitive with imports from China, so they are now thinking of withdrawing from this market.



The Texecom 'Reflex' alarm PIR sensor. This carries the CE mark and claims to have the best RF immunity in its price range - see 'Advice to Members'.

LEGAL MATTERS

New neighbours next door to a radio amateur in St Helens added extra PIR sensors of an unknown type to an existing system. This resulted in false alarms when the amateur went on HF and also when transmitters were operated in passing vehicles. The radio amateur advised his neighbour to replace them with the Pirotec 'Paradox' model but the neighbour was not prepared to buy these. Then a letter arrived from a local solicitor strongly advising the amateur to refrain from transmitting in such a way as to activate the infra-red sensors on their client's security alarm system. They threatened to commence court proceedings for nuisance saying that if an order were made and he breached it, this could result in imprisonment!

The amateur involved contacted EMC Committee Chairman Robin Page-Jones, G3JWI, who told him not to reply and to send him a copy of the solicitors letter. The Society's solicitor's were then instructed to write a suitable reply. Meanwhile, the EMC Committee had a technical submission and an expert witness ready for any court hearing. We considered that the threatened legal action was totally unsound on technical grounds but in the end, the neighbour decided not to pursue it and got his alarm system sorted out instead. Perhaps he discovered that good quality PIRs are cheaper than solicitors' letters!

SOUNDS FINE ON PAPER

Neighbours of Lionel Parker, G5LP, of Wellingborough, Northants had an alarm installed by Lynx Security of Wellingborough, a company approved by NACOSS (The National Approval Council for Security Systems). The PIRs were model MPC-4040-T made by a US company and supplied by C&K Systems of Kettering. Lionel operates on all HF bands 3.5 - 28MHz, apart from the WARC Bands, with a maximum of 200 watts into a dipole aerial. This caused RF triggering of one PIR

at a distance of at least 15 metres. After the installers had replaced the affected PIR with a Canadian Pirotec 'Paradox' model, the problem was solved until Lionel moved his aerials a few months later when one of the other original PIRs suffered RF triggering.

The EMC Committee advised Lionel to insist that the installers should replace *all* the remaining MPC-4040-T PIRs but the RF immunity specification of this model, which appears very good on paper, led to a dispute over whether the system was already sufficiently immune. The MPC-4040-T claims to be immune to 100 watts at 5 ft (1.5m) from all mobile bands 10 - 1000MHz but we do not have any details of the test method, which may not necessarily represent the real-life situation. The installers eventually agreed to replace all the remaining PIRs with the Pirotec 'Paradox' type and the problem was completely cured.

STANDARDS AND GUIDELINES

British Standard 4737 mentions "electrical interference" in general terms under the "environmental" requirements for alarm systems but does not mention any specific levels of RF immunity. We wrote to the Chief Alarm Inspector of NACOSS asking for the NACOSS view of an alarm system which suffers false triggering from a licensed radio transmitter operating nearby. He replied, "Any alarm system which suffers false triggering from radio signals emitted from a licensed radio transmitter would be considered to have failed to meet the environmental requirements of: (a) BS 4737: Pt 1: 1986, Clause 3.2.3, (b) BS 4737: Section 4.1: 1987, Clause 3.3.2."

Checking the area around G0RKA's QTH for interference. See '10 metre DF Loop'.

The BSIA (British Security Industry Association, tel 01905 21464) is an alarm trade association which produces an 18 page booklet *EMC Guidelines for Installers of Security Systems*. This is available from BSIA, reference No 195, price £6.25 including postage.

A section on selecting equipment recommends products which carry the CE mark. A section on interference problems states that radio transmissions may be identified by observing the surrounding areas for aerials or by making a note of the types of business operating in the area, eg taxi firms.

HF CASES

When Michael Davenport, G0AXE, of Wilmslow Cheshire transmits using 60 watts on 18MHz, it sets off an alarm across the road. The system is about 14 metres from his aerial and uses G-Tron 40NL PIRs made by Glazertron of Rochester. The EMC Committee is already advising Glazertron on improving immunity of this model in another case. On Michael's own alarm system, the bell-box itself is susceptible to RF but it sounds only for as long as the carrier is present. Dale Chadwick, G3VMK, of Nottingham has reported the same effect where the siren on a neighbour's alarm system reproduces his 7MHz CW at 120dBa sound level whether or not the system is switched on and armed. Could this be the world's loudest CW sidetone?

An amateur in Keighley reports that after his neighbours had several burglaries, their insurance company insisted on an alarm. They got a cut-price installation which does not meet BS 4737, the insurance company refused to accept it, then the neighbours moved leaving the new owners with a system that is triggered by only 5-10 watts on 7MHz! The amateur tried to trace the source of the

PIRs which are called Scorpion Stings. They appear to have been imported from the Far East by a company which has gone out of business. He considers that there is little chance of persuading the installer or anyone else to pay for new ones.

John Hey, G3TDZ, of Leeds reports that his neighbour's alarm is triggered by anything over 15 watts on 3.5MHz. The installer will not reveal the source of the PIRs, admits to having no electrical knowledge and does not know what to do.

MOBILE AND PACKET

Amateur HF and VHF mobile operators and drivers of emergency vehicles sometimes notice that house or car alarms go off as they drive past while transmitting. As the owner of the alarm is probably out or asleep when it goes off, it can be very difficult for them to find out the cause. Many non-technical people and even some installers find it difficult to believe that radio transmissions from a vehicle or any other source could be the cause.

The EMC Committee is investigating a case where a radio amateur's own alarm system was triggered by his 144MHz packet radio station while he was out and on another occasion by the radio of a taxi in the street outside. We cannot publish details yet but I would like to hear from you by 7 December if you have experienced alarm triggering by amateur packet transmissions or by any type of mobile or portable transmitters.

ADVICE TO MEMBERS

We have completely revised the November 1993 edition of the RSGB information sheet *Radio Transmitters and Home Security Systems* which members have found useful for showing to neighbours and alarm installers. It now includes a separate part for radio amateurs which gives information on doing tests, finding solutions and dealing with alarm installers. Please send an SAE to me, QTHR for a copy.

In cases of RF triggering, filters, screened cable or chokes seldom give more than a slight improvement. Our advice is to insist that *all* the PIRs in an affected system are replaced with a more immune model. There are many RF immune types on the market but we know of one whose immunity is guaranteed. ACT Meters Ltd, of St Helens (tel: 01744 886660) who sell the Canadian Pirotec 'Paradox' PIR (see Dec 1993 *RadCom* p74) now offer a money back guarantee against RF triggering. This is subject to proof being given that it has failed to stop false alarms caused specifically by RFI signals alone and provided it is returned post paid and unmarked in its original packaging. The stock number is ACT/111S, price £29.95 + VAT trade or £39.95 + VAT retail.

The new Texecom 'Reflex' PIR (see photo) is CE marked and claims to offer the best RF immunity in its price range. Trade suppliers sell these from £12 + VAT, or less in quantity. It also retails at £21.99 including VAT from Maplin Electronics (Stock No AG81C). We have found that at 144MHz, the immunity appears to be well above the specificaton of 30 V/m and have already used it to solve one VHF case. It should be sufficiently immune for virtually any situation in the vicinity of a VHF amateur radio station. Texecom inform us that this model has also been tested for conducted immunity from 150kHz - 80MHz using the IEC 801-6 test method at severity level three which corresponds to a severe electromagnetic environment. We are currently evaluating it in several HF cases.

A rough test for PIR immunity at VHF can be done with a 144MHz hand-held but do not transmit with the aerial closer than necesary for RF triggering to occur. The transmitter should be keyed on for one second and off for one second, several times for an adequate test of PIRs with pulse counting. With 1.5 watts into a helical aerial, the worst we have found trigger at 1.5 metres or more. We consider that closer than 30cm is fair and closer than 10cm is very good. With the Texecom Reflex, even touching the case with the tip the helical aerial may not trigger it.

TELEPHONE INFORMATION WANTED

WE KNOW THAT RF breakthrough in telephones is a common problem and would like to hear from members about telephone immunity, whether good or bad. We would particularly like to hear about Mercury compatible telephones. Please write to me QTHR.

LOW ENERGY LIGHTING

THE EMC COMMITTEE has obtained advance information on the 'Genura'™R80 Induction Reflector Lamp. This is made by GE Lighting (affiliated to General Electric Company USA). The Genura is an RF energised fluorescent lamp in a compact form which can replace a standard R80 reflector lamp. It has been designed by GE's Centre of Excellence in Hungary but is not yet in production. GE Lighting has informed us that the proposed operating frequency is around 1.7MHz and that it conforms to EN55015. The EMC Committee will be evaluating these as soon as we can lay hands on one.

EC EMC WG

THE EUROPEAN COMISSION'S EMC Working Group met in Brussels on 16 May. They discussed among other things, the CE Marking Directive 93/68/EEC which must be implemented by the beginning of next year. Some confusion existed over CE marking, as the EMC Directive requires that a date code is displayed along with the CE mark whereas other Directives don't require this. If a product displays a CE mark at all, it implies that it meets all appropriate Directives, therefore a common marking requirement was vital. As a result, the EMC Directive will be amended from 1 January 1995 so that only the 'CE' letters are required. The transitional period for the marking will be until 1 January 1997.

Regulations relating to educational apparatus assembled by students which may cause electromagnetic disturbance will be amended by the DTI later this year to clarify the position and requirements. In future, this type of equipment will be permitted as long as it does not create a disturbance outside its immediate environment. Documentation should be provided with the equipment stating that the assembled apparatus should not be used outside the educational environment.

It was also reported at this meeting that only four European Union countries have not as yet implemented the EC EMC Directive, these being Ireland, Greece, Belgium and The Netherlands.

10 METRE DF LOOP

Otto, G0RKA, told us of a received interference problem on 28MHz. On his cubical quad antenna, there were signals at intervals of 35.33kHz across the 15, 12 and 10 metre bands which were there 24 hours a day. They could also be heard on a portable HF receiver in his upstairs shack but not down at ground level. He built the 6 inch diameter shielded 28MHz DF loop from the *ARRL Handbook* but still couldn't hear the interference.

We suggested that he needed a much larger DF loop to give greater sensitivity so he made a well-engineered loop one metre in diameter with a smaller coupling loop and a slow motion cord drive for the tuning capacitor. Even using this loop at ground level, Otto couldn't hear anything at the front of the house so with an assistant holding the loop out of the sun roof (see photo opposite), he drove around the neighbourhood to search for a detectable signal. He got some very strange looks but still found no interference.

Eventually, the answer turned out to be at the bottom of the garden where there were clear signals from 21 to 50MHz and beyond. These were coming from a neighbouring tropical plant nursery and a visit to the nursery with a portable HF receiver showed that there were signals all over the place. These seemed to be coming from the alarm system, although this has not been proved conclusively because the supply to the control panel cannot be switched off without sounding the alarm. We have asked the installer to find who manufactured the panel but he has chosen not to reply to our letter.

CONTEST CLASSIFIED

All rules should be read in conjunction with the General Rules published in *Contest News* January 1993

HF RULES

AFFILIATED SOCIETIES TEAM CONTEST 1995

NB: This year's events are timed to start at 1400, ie one hour later. This should give better propagation to northerly and south-westerly stations at the beginning of the contest. Hard copy is not required when logs are submitted on disk.

CW SECTION

1. Rules: The General Rules for RSGB HF Contests as published in the January issue of Radio Communication will apply. The top 20KHz of the allocated band are dedicated as the 'QRS CORRAL' - it is intended that operators less experienced in CW and contest techniques should be able to make contacts here in a more relaxed environment. Experienced contesters using the segment are required to keep their speed down.

2. When: 1400UTC to 1800UTC on Sunday 8 January, 1995.

3. Teams: Teams comprise up to FIVE stations. Each team represents a society or group which is affiliated to the RSGB, and each society may enter as many teams as they wish. Which stations make up which team is determined by the society entering the event. Team placings will be determined by the total of the scores made by each station in the team after checking.

4. Eligible Entrants: (a) Each entering society must be affiliated to the RSGB. (b) Each operator of a team station must be a member of the club he or she represents. The operator is not required to be a member of RSGB. (c) All stations representing a club must be located within a radius of 50 miles of the normal meeting-place of the club. Where a society has 'branches', eg RNARS, it may define separate 'branch' meeting-places, and the team(s) entered by each branch will be considered to be entirely separate from those entered by other branches, except in respect of affiliation. (d) Each station may be single or multi-operator, but no station or operator may represent more than one affiliated society or branch.

5. Contacts: CW (A1A) only in the band 3510 - 3590KHz, with 3570 to 3590KHz reserved for slower-speed contacts (the QRS CORRAL). Any stations, including overseas, may be worked for points.

6. Contest Exchange: RS(T) and serial number commencing with 001.

7. Scoring: Each completed contact scores 10 points.

8. Entries: (a) Each team entry must be accompanied by a Team Summary Sheet, which must contain the following information, and be signed by an officer of the affiliated society: Name of team, Callsign of each station in the team, Individual claimed score for each station in the team, Claimed score for the whole team. The normal meeting-place of the club/branch, Declaration that each operator is a member of the affiliated society. Each log within the entry should include a completed Summary Sheet. (f) All the entries from each competing team are to be sent in one package to RSGB HF Contests Committee (AFS), c/o J C Burbanks G3SJJ, 16 Cotgrave Road, Plumtree, Nottingham NG12 5NX. Packages must be postmarked no later than 30 January 1995.

As adjudication will be undertaken using a computerised cross-checking system, entrants are encouraged to submit logs on disk. One disk per team is acceptable providing it contains separate log files. Acceptable data formats are RSGB Standard, CT .Bin, EI5DI Super Duper or G3WGV Log(Call).LOG file. Paper logs are equally welcome and data will be entered manually.

9. Awards: (a) The Edgware Trophy will be awarded to the leading team. (b) The Marconi TrophA will be awarded to the leading individual station. A particular operator will be eligible for the award only once in any period of five years; if the leader is ineligible they will receive a certificate of merit, the trophy passing on to the next highest scoring entrant who is eligible. (c) Certificates of merit will be awarded to the three leading teams, the leading individual station and the highest placed Scottish team.

SSB SECTION

The rules for this event are the same as those of CW AFS, except as detailed below:

1. **There is no QRS Corral.**

2. When. 1400UTC to 1800UTC on Saturday 14 January, 1995.

3. Teams. Teams comprise up to three stations.

5. Contacts. SSB only in the band 3600 - 3750KHz. Any stations,

including overseas, may be worked for points.

9. Awards. (a) The Flight Refuelling ARS Trophy will be awarded to the leading team. (b) The RSGB Lichfield will be awarded to the leading individual station. (c) Certificates of merit will be awarded to the three leading teams, the leading individual station and the highest placed Scottish team.

LF CUMULATIVE CONTESTS 1995

The number of sessions in this event have been reduced, making it less of a marathon and enabling those with busy schedules to participate. There is also more encouragemnt for newcomers.

1. The General Rules for RSGB Contests as published in the January edition of Radio Communication will apply. The contest is single or multi operator.

2. Dates and Times: There are three sessions of two hours each per band :

1.8MHz - Tuesday 17 January, Wednesday 25 January, Thursday 2 February, 2000 - 2200UTC.

3.5MHz - Sunday 22 January, Saturday 28 January, Sunday 5 February. 1600 - 1800UTC.

7.0MHz - Saturday 21 January, Sunday 29 January, Saturday 4 February. 1000 - 1200UTC.

3. Frequencies and Mode: 1830 - 870 and 1950 -1960, 3530 -3580 and 7015 - 7040kHz, CW only. There is a speed limit of 12 WPM. A maximum in the subbands 3550 - 3580 and 1950 - 1960.

4. Contest Exchange: RST + Serial Number, commencing with 001 FOR EACH SESSION. Any station may be worked once in each session.

5. Scoring: 3 points per contact, except contacts with Novices score 20 points. The final score for each contest is the sum of the best two sessions on that band.

6. Logs: Only one cover sheet is required for each band. Entrants should submit logs for every session that they are active. Send logs to L Mason G4HTD, 22 St Georges Road, Aldershot, Hants GU12 4LD, postmarked no later than 20 February 1995. As adjudication will be undertaken using a computerised cross-checking system, entrants are encouraged to submit logs on disk without hard copy. Acceptable data formats are RSGB Standard, CT Bin, EI5DI Super Duper or G3WGV Log (Call).LOG files. Paper logs are equally welcome and data will be entered manually.

8. Awards: (a) The 1989 HF Contests Committee Trophy and a Certificate of Merit will be awarded to the entrant with the highest aggregate score from all three contests combined. (b) Certificates of Merit will be awarded to the leading station in each contest, band leaders and the highest placed Novice station entrant and station licensed during 1994 or 1995.

HF RESULTS

LOW POWER FIXED CONTEST APRIL 94

Poor conditions and long skip on 40 made it hard going this year, this may have been the reason for a reduction in participating stations and overall scores compared with the 1993 event. Congratulations to G4BWP who takes the 1930 Committee Cup, and certificates to G3HEJ, G4OGB and to G3NEO for the 1 Watt section. The certificate for the highest placed station with Home Made equipment goes to G4CZB. Thanks to GW0KZW who although admitted that his PA could run 100W, had reduced the power to 1W with additional circuitry complied with the spirit of the contest and entered a check log. Comments: "Hard going - nil on 40, running two ATU'S (80/40) connected together" (G3HEJ); "Pretty Awful conditions - worse than last year" (G2HLU); "High noise levels on 80 and no one on 40" (G0KZO); "Depressing conditions marring a usually enjoyable contest "(G4PZQ); "Poor conditions and high noise levels made it hard for 1 Watters" (G3KZR); "Enjoyed the contest very much" (2E0ACY). Note has been made of the comments regarding the frequency bands to include Novices and passed to the HFCC. **G3RXP**

Posn	Callsign	3.5	7.0	TOTAL	Equipment
1*	G4BWP	760	50	810	TS130V
2*	G3HEJ	640	105	745	TS130V
3*	G4OGB	630	-	630	TS430 + HM PA
4	G4ARI	610	15	625	Sugiyama F850
5	G3YAJ	605	-	605	Ten Tec
6	G3JKS	560	35	595	Omni + HM PA
7*	G3NEO	590	-	590	FT101+ HM PA 1W
8=	G3VIP	525	15	540	FT301S
8=	G3KZR	525	15	540	TS735+ HM PA 1W
10*	G4CZB	515	5	520	Homemade 1W
11=	G4ATH	475	25	500	Homemade
11=	G4PZQ	480	20	500	Argonaut
13	G2HLU	490	-	490	Homemade
14	G3IGU	460	-	460	Homemade 1W
15	2E0ACY	430	-	430	FT747 Modified
16	G0KZO	355	-	355	TS120
17	GW3SB	350	-	350	HW8
18	G3LHJ	345	-	345	Homemade 1W
19	G3JKY	310	-	310	FR100B
20	G3KDP	305	-	305	Homemade
21	G3GMS	175	-	175	IC735 Modified

* = Certificate winners

SUMMER 1.8MHZ CONTEST JUNE 1994

It was generally agreed that this year's contest was marred by the heavy thunderstorm static which is always a potential hazard in summer contests. This was undoubtedly responsible for a reduced entry and lower scores. Nevertheless, it was pleasing to see "good fun" and "most enjoyable" mentioned in many of the logs. Some interesting DX, including JY, VE and W was worked by several entrants. Congratulations go to Dave Lawley, G4BUO who takes first place in the UK section (having been runner-up last year) and to Michael McLoughlin, EI6GF who once again heads up the Overseas section. Mention must also be made of OM3TJY who battled with the QRN using an output power of 1 watt achieving 7 QSOs with UK stations. There are obviously some good pairs of ears out there too! My thanks and those of the HF Contests Committee go to Evan Heaton-Jones, G3CJ who very kindly agreed to adjudicate this contest. **G4VXE**

UK SECTION

Posn	Callsign	Score
1	G4BUO	611
2	G3TBK	595
3	GM3POI	567
4	G4IFB	556
5	G3HEJ	525
6	G3XTT	508
7	G3PDL	490
8	G4OOC	457
9	G4OGB	436
10	G0JQN	412
11	G0ORH	410
12	G3SQX	369
13	G3KNU	343
14	G2HLU	342
15	G3RSD	338
16	G0ADH	320
17	G4HSD	251
18	GW3JI	233
19	GM3UM	211
20	G3GMS	184
21	G4JSN	174
22	G3GMM	171
23	G3ZGC	131

OVERSEAS SECTION

1	EI6GF	299
2	DL0HRO	224
3	DL0EH/P	220
4	YL3FW	213
5	9A1CAO	154
6	UA2FT	153
7	UX1VT	110
8	SM/EA8CN	102
9	DK7FP	103
10	LA1IE	94
11	PA3ALP	80
12	OM3TJY	71

Checklog gratefully received from GB25OU

ROPOCO 2 1994

Well done Fraser Robertson, G4BJM who completed the double by winning both 1994 Ropoco Contests by a fairly substantial margin; thus winning the G5MY Trophy for the highest aggregate score. The G3XTJ Memorial Trophy for the leading accurate log in Ropoco 2 was won by Dave Lawley, G4BUO. Both the number of entries and scores were down on this occasion. However, it was good to see a few new entrants, one of these Walter Jones, G0TYV, produced a perfect log in his first ever contest. In general, the standard of log keeping was good but a number of logging errors appeared to have occurred during copying out and one unmarked dupe appeared. The prize for the best hand written log must go to Jack Walker, G0JQN, such logs bring a gleam to an adjudicator's eye! Check logs are gratefully acknowledged from GM3UM and G0PNU. **G4DUS**

Pos	Call	Pts	Code
1+	G4BJM	711	4C7
2+	G3TBK	678	4C7
3+*	G4BUO	670	4C4
4	G3VYI	635	4W3
5*	G3RSD	630	3C3
6	G5LP	629	3C2
7	G4ARI	628	4C4
8*	G3HEJ	600	4C3
9	G3KNU	598	3C?
10	G4OGB	577	3C5
11=	G4TLS	574	4C2
11=	GW3WWN	574	3C2
13	G0JQN	568	3C3
14	G4WYG	564	3C?
15	GOOPB	561	3C2
16	G4CZB	560	4C2
17	G2HLU	557	3C2
18	G2AFV	554	4C4
19	G4KGG	547	3C3
20	G0ORH	538	3C5
21	G4RCG	516	4G
22=	G3GC	497	3C3
22=	G3GLL	497	3G/W
24	G3JJG	487	4C1
25	GM4TMS	480	3C/G
26	G3TXF	477	4W4
27	G3MA	455	3C?
28	G3LHJ	454	3W
29	G4OAY	416	3W
30	GW3JI	408	3C?
31	G4XPE	407	3C1
32	G4BJQ	398	3C3
33	G4RLS	397	3C1
34	G3BPM	388	4G
35	G3CQR	364	3C3
36	G4PTE	358	3G
37	G5MY	355	3G
38	G3RTU/P	347	3G
39	G3ISL	344	3Q0
40	GW3SB	338	3W1
41	G4KTI	315	1C2
42	G3SQX	304	3C3
43*	G0TYV	280	3W?
44	G4KDL	271	3C2
45	G4IZB	258	3C1
46	G4JSN	235	3C2
47	GM3CFS	234	3C?
48	G0ROT	183	2W3
49	GW0KZW	173	1C2

+ = Certificate Winner. * = Perfect Log

VHF RULES

WINTER CUMULATIVES (1994/95)

Dates: 27 November, 18 December, 29 January 1995, 26 February 1995, 26 March 1995.

Times: 0900-2100UTC

Bands: All bands from 2.3GHz up.

Awards: Whilst results will be tabulated there are no awards for the Winter Cumulatives.

Entries: Logs should be submitted to Steve Davies, G4KNZ, 14 Herondale, Birch Hill, Bracknell, Berkshire RG12 7ZT, who will pass them to the adjudicator.

NOTES FOR CONTESTERS:

All entries must be postmarked at the latest by the 16th day after the end of the contest, ie if contest ends on a Sunday (say 1 October) then the entry must be postmarked on or before the third Tuesday after that Sunday (17 October). For VHF Field Day an extra week is allowed, ie the fourth Tuesday. Any late entries can only be accepted at the discretion of the adjudicator.

No recorded delivery or registered post. Entrants can obtain a proof of posting certificate from the Post Office which we will honour if an entry has been delayed in the post.

QTH information to be exchanged on 70MHz only. However not all 70MHz contests require this information, see individual rules and General Rule 24 (1994).

General rules: 1 through to 9, 11,12,13,15 to 23,25,26, apply to all contests. Any changes will be noted in individual contest rules.

Adjudicators will not normally enter contests which they are adjudicating. However if the adjudicator does wish to enter then his entry will be vetted by a subcommittee before final adjudicated list is published.

Every contest is open to foreign entrants who will be listed separately from UK stations, certificates will be issued to section winners (and runners-up, if enough entries).

VHF NATIONAL FIELD DAY JULY 1994 RESULTS

OPEN SECTION

Pos	Group Name	Loc	70	144	432	1296	Total
1	Windbreakers & Hadrabs CG	01PU	406	1000	1000	1000	3406
2	Martlesham RS	02PA	537	991	937	502	2967
3	Flight Refuelling ARS	80WP	675	876	615	424	2591
4	Aberdeen VHF Group & North of Scotland CG	86RW	1000	739	613	168	2519
5	Clifton ARS	01DH	461	563	558	473	2055
6	Parallel Lines CG	03BF	523	759	499	221	2003
7	Crawley & Reigate	01OC	407	601	586	270	1864
8	Surrey Radio Contact Club	91XH	423	780	323	134	1660
9	De Montfort University ARS	92NP	440	849	140	207	1636
10	11th Hour CG	91XG	377	614	390	90	1471
11	Yeovil ARC	80LV	0	489	368	0	858
12	Thornton Cleveleys ARS	84VB	455	234	80	0	769
13	East Sussex CG	01EW	0	747	0	0	747
14	Newquay ARC	70PP	575	122	42	0	740
15	Welwyn Hatfield ARC	91UT	273	394	36	0	702
16	Famborough & Dist. RS	91OF	423	0	277	0	699
17	Hornsea ARC	93VW	263	181	84	135	664
18	South Devon RC	80FJ	441	121	46	0	608
19	Highland CG	75DH	0	261	126	0	388
20	Andover Radio AC	91FH	0	314	43	0	357
21	Three Spires CG	01KJ	0	0	0	312	312
22	East London Exile	02QV	0	310	0	0	310
23	TMC ARC	92IK	0	198	24	0	222
24	The Bredhurst Rx & TX Soc.	01GH	0	152	20	0	172
25	Stevenage & Dist. ARS	92WA	0	138	0	0	138

RESTRICTED SECTION

Pos	Group Name	Loc	70	144	432	1296	Total
1	Windmill Contest group	01LD	915	1000	1000	968	3883
2	Splinters Contest group	91GI	841	983	551	1000	3374
3	A1 Contest Group	94WC	1000	863	603	427	2893
4	Scunthorpe VHF CG	94SB	839	716	465	794	2814
5	Bracknell ARC	80ST	643	598	549	773	2563
6	Telford & Dist. ARC	82NN	766	429	727	539	2461
7	Reading and District ARC	91IH	627	810	262	574	2274
8	Leicester RS	92MO	616	340	212	518	1687
9	Weston Super Mare ARS CG	81PH	600	746	331	0	1677
10	Swale ARC CG	01JG	312	752	119	388	1570
11	Queens University Belfast RC	64XC	810	513	176	2	1500
12	Goole Radio & Electronics S.	93PW	625	400	219	73	1318
13	Rochdale and District ARS	83VP	703	300	133	0	1136
14	HI Contest Group	94HH	594	318	128	75	1115
15	Lowestoft RC	02UM	0	464	151	437	1052
16	Birmingham University ARS	82LB	0	584	300	0	884
17	Melton Mowbray ARS	92MT	440	345	62	0	848
18	Carscog "Gearboxers"	92HE	491	91	75	81	739
19	Harwich ARG	01OW	0	331	97	0	428
20	Lagan Valley ARS	74AI	0	333	16	0	349
21	Carrickfergus ARG	74BU	0	267	67	0	334
22	Dorking & Dist. RS	91TG	0	142	114	0	256

LOW POWER SECTION

Pos	Group Name	Loc	70	144	432	1296	Total
1	Sutton & Cheam RS	93AC	1000	741	1000	954	3695
2	South Birmingham RS	82XJ	604	847	522	1000	2974
3	Basingstoke ARC	91KG	763	605	547	552	2467
4	Mid Sussex ARS	90WV	0	1000	947	0	1947
5	Torbay ARS	80FP	966	599	380	0	1944
6	Nunsfield House AR Group	93BA	490	329	361	707	1886
7	Wythall Radio Club	92BJ	535	489	350	248	1623
8	Shefford & Dist. ARS	92XA	807	455	296	0	1558
9	Maidenhead & Dist. ARC	91OS	690	375	415	0	1480
10	Aylesbury Vale RC	91NV	548	262	283	240	1332
11	North Kent RS	01BH	698	269	186	157	1310
12	Cockenzie & Port Seton ARC	85RU	324	393	406	178	1301
13	Cambridge & Dist. ARC	02AD	496	572	0	220	1287
14	Doncaster ARS	93JK	530	227	254	271	1282
15	Mexborough ARS	93HO	680	161	245	0	1087
16	Dacorum AR & Transmitting S.	91RR	518	343	103	79	1043
17	Edgware & District RS	91VO	514	198	72	0	784
18	Arcon & GPT Contest Group	93KA	0	345	246	0	591
19	Mid Cheshire ARS	83PF	0	215	106	4	326
20	Bishop's Stortford ARS	01DW	0	323	0	0	323
21	GM0TQK & GM7OUV Contest Group	85OO	0	284	0	0	284
22	Dengie Hundred ARS	01KP	0	224	0	0	224
23	West Bromwich Central RC	92BN	0	38	95	0	134

SWL SECTION

Pos	Group Name	Loc	70	144	432	1296	Total
1	BRS 25249	93FX	0	1000	1000	0	2000

Checklogs gratefully received from G4IDF, G0ADH, G7ITU, G6YTZ, 2E1AQS/P, G3NKS, G5RS/P, G8VOI/P & GM3TAL/P.

70MHZ OPEN SECTION

Pos	Callsign/P	Loc	Score CW	Score SSB	Total Pts	QSO CW	QSO SSB	Pwr	Ant	Best DX	km
1	GM0FRT	86RW	792	1288	2080	38	70	140	12Y	G4ADV/P	713
2	G3PFM	80WP	546	858	1404	57	98	150	2 x 12ZL	GM0FRT/P	700
3	G4ADV	70PP	387	810	1197	36	70	50	2 x 7Y	GM0FRT/P	713
4	G4MRS	02PA	445	671	1116	53	78	150	8Y	GM0FRT/P	600
5	G4THB	03BF	430	657	1087	54	81	100	12Y	EI7M/P	477
6	G3GHN	01DH	379	579	958	50	73	100	5Y	GM0FRT/P	652
7	G0GDA	84VB	240	706	946	26	76	15	2 x 4Y	G4ADV/P	415
8	G7FDC	80FJ	116	801	917	13	77	25	9Y	GM0FRT/P	689
9	G3ORY	92NP	303	612	915	56	101	160	2 x 3Y	G3KAU/P	491
10	G4FUU	91XH	335	544	879	46	73	25	2 x 6Y	GM0FRT/P	645
11	G4FRS	91OF	280	599	879	43	81	50	2Y	GM0FRT/P	645
12	G3KAU	01OC	341	505	846	42	54	100	9Y	GM0FRT/P	383
13	G4JAR	01PU	212	632	844	34	72	80	10Y	GM0FRT/P	617
14	G3NAT	91XG	285	499	784	41	67	160	5Y	GM0FRT/P	651
15	G3LXP	91UT	134	433	567	33	73	100	6Y	GM0FRT/P	530
16	G4IGY	93VW		547	547		59	70	10Y	G4ADV/P	477

70MHZ RESTRICTED SECTION

Pos	Callsign/P	Loc	Score CW	Score SSB	Total Pts	QSO CW	QSO SSB	Pwr	Ant	Best DX	km
1	G4VVZ	94WC	524	837	1361	56	90	160	6Y	GJ7AOG/P	555
2	G3GRS	01LD	457	788	1245	51	87	160	6Y	GM0FRT/P	684
3	G4CIZ	91GI	382	762	1144	56	108	160	5Y	GM0FRT/P	624
4	G3VIP	94SB	485	657	1142	54	70	125	6Y	GJ7AOG/P	545
5	GI4SJB	64XC	265	837	1102	20	60	25	12ZL	G3KAU/P	592
6	G3UKV	82NN	382	660	1042	57	93	80	8Y	GM0FRT/P	487
7	G0ROC	83VP	290	667	957	37	80	25	6Y	GJ7AOG/P	488
8	G4BRA	80ST	327	548	875	39	66	2.5	6Y	GM0FRT/P	681
9	G0RSR	91IH	300	554	854	52	89	80	9Y	GM0FRT/P	631
10	G4DBN	93PW	335	516	851	40	60	25	5Y	G7FDC/P	438
11	G3HYH	92MO	317	522	839	52	87	120	9Y	GM0FRT/P	492
12	G4WSM	81PH	294	523	817	44	66	20	5Y	GM0FRT/P	625
13	G1HIC	94HH	288	521	809	31	58	25	4Y	G4ADV/P	466
14	G4DFN	92HE	271	397	668	44	68	10	Turnstile	GM0FRT/P	533
15	G4PZQ	92MT	177	422	599	46	70	20	5Y	GM0FRT/P	469
16	G6SRC	01JG	1	423	424	1	50	80	5Y	EI7M/P	543

70MHZ LOW POWER SECTION

Pos	Callsign/P	Loc	Score CW	Score SSB	Total Pts	QSO CW	QSO SSB	Pwr	Ant	Best DX	km
1	G2XP	93AC	390	598	988	60	90	25	5Y	GM0FRT/P	428
2	G3LHJ	80FP	319	635	954	36	63	10	5Y	GM0FRT/P	703
3	G2DPQ	92XA	257	540	797	43	75	25	6Y	GM0FRT/P	570
4	G3ZOI	91KG	279	475	754	45	77	20	6Y	GM0FRT/P	636
5	G4CW	01BH	304	386	690	44	50	20	6Y	GM0FRT/P	649
6	G3TWG	91OS	240	442	682	47	73	25	4Y	GM0FRT/P	586
7	G0UAD	93HO	203	469	672	33	64	10	4Y	G4ADV/P	400
8	G4OHM	82XJ	162	435	597	32	77	22	6Y	GM0FRT/P	506
9	G0MHZ	91NV	190	351	541	34	58	25	5Y	GM0FRT/P	570
10	G4WAC	92BJ	188	341	529	35	59	8	4Y	GM0FRT/P	507
11	G1XTN	93JK	133	391	524	23	58	15	5Y	GM0FRT/P	398
12	G0TCD	91RR	145	367	512	32	57	25	HB9CV	GM0FRT/P	593
13	G4IUZ	91VO	209	299	508	39	53	25	5Q	GM0FRT/P	613
14	G2XV	02AD	145	345	490	28	57	25	5Y	GM0FRT/P	558
15	G3EEO	93BA	44	440	484	10	72	10	6Y	GM0FRT/P	438
16	GM0CLN	85RU	115	326	441	10	26	23	5Y	G3PFM/P	579

VHF NATIONAL FIELD DAY RESULTS CONTINUED

DIRECTION FINDING

SOUTH MANCHESTER TOP BAND QUALIFYING EVENT - JULY '94

Eleven teams assembled at the start, Pennington Flash Country Park, on 24 July. During the previous week the weather had been glorious, however, as the contest start time approached, dark clouds began to gather. Undaunted, competitors took the requisite bearings on the hidden stations at 1320 hours (satisfactory signals being received from both stations). All but one team chose transmitter 'A' as their first station.

Station 'A', G3FVA/P, operated by John McNeill and Mike Duckworth, was located 20km north of the start on the top of a small hill festooned with aerials both real and 'dummy'. There were several other possible sites nearby which made it difficult to decide on the correct one without a number of bearings. By 1430 however, the area was awash with competitors searching the woods on the hill with several teams getting in at 1447. At this point the weather deteriorated with thunder, lightning and heavy rain which speeded competitors back to their cars!

Station 'B', G3UHF/P, was located at Rochdale about 25km NE of the start, in an area of waste land by the river Roch. The operators were Dave Holland and Richard Brewer who had hidden themselves in some foundations of a long vanished building. An adequate supply of nettles, pylons and aerial wire kept the competitors searching for a long time. During the afternoon, the rain had commenced gently at first, then steadily and, towards the end of the event, a deluge accompanied by overhead thunder. The operator wondered if the aerial might get singed! Just before 1630 two teams appeared looking like 'drowned rats' and demanded to have their forms signed which was somewhat difficult as they resembled papier mache!

After the event, competitors were revived with an excellent tea prepared by Mary Holland and her helpers. The results were then announced - Chris Plummer won the event and the South Manchester DF Trophy. The South Manchester Radio Club would like to thank all who took part.

Pos	Name	Club	Transmitter A	Transmitter B
1	C Plummer	S Manchester	1447	1627
2	G Foster	Mid Thames	1448	1629
3	P Cunningham	Colchester	1447	
=	T Gage	Mid Thames	1447	-
5	G Whenham	Coventry	1447.30	-
6	G Nicholls	Banbury	1447.45	-
7	C Metcalfe	S Manchester	1447.50	-
8	J Hall	Ripon	1507	-
9	R Summers	Shrewsbury	1507.30	-
10	D Yorke	S Manchester	1507.40	-
11	A Simmons	Mid Thames	-	1554

C Metcalfe and J Hall qualify for the National Final

HF CONTESTS CALENDAR

3/4 Dec	*ARRL160m* (DEC 94)
11 Dec	*ARRL 10m* (DEC 94)
	1995
8 Jan	AFS (CW) (DEC 94)
14 Jan	AFS (SSB) (DEC 94)
14/15 Jan	*HA DX CW*
14/15 Jan	*AGCW-DL QRP*
17 Jan	LF Cums 1.8MHz (DEC 94)
21 Jan	LF Cums 7.0MHz (DEC 94)
22 Jan	LF Cums 3.5mhz (DEC 94)
25 Jan	LF Cums 1.8MHz (DEC 94)

VHF/UHF CONTESTS CALENDAR

4 Dec	144MHz AFS/Fixed/SWL (NOV/DEC 94)
5 Dec	1.3 & 2.3GHz Cum (JUL94)
13 Dec	432MHz Cum (JUL 94)
26/27/28/ 29 Dec	70, 144 & 432MHz Fixed CFC (NOV 94)

CORRECTION

The top photo on page 82 of November *RadCom* should have referred to Norfolk AR Society not Manfield

VHF National Field Day

144MHZ OPEN SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G4JAR	01PU	14597	767	400	2 x 15Y + 2 x 9Y	RX6YAC	2845
2	G4MRS	02PA	14471	872	400	2 x 18Y + 2 x 17Y	UA3XEH/P	2212
3	G4RFR	80WP	12791	743	400	2 x 19Y	SM6JMZ	1184
4	G3SDC	92NP	12393	902	400	4 x 17Y + 2 x 9Y	YO3JW	2190
5	G6LX	91XH	11380	743	400	2 x 19Y	RA3YCR	2322
6	G4LIP	03BF	11086	717	400	4 x 17Y + 2 x 17Y	US5UES	2126
7	G0MSA	01EW	10908	690	100	2 X 17Y	EA1FES	1047
8	GM4ZUK	86RW	10791	483	400	4 X 17Y + 17Y	UR4EZO	2691
9	G6CTU	91XG	8968	581	400	2 x 17Y	OE3XVA	1207
10	G3WSC	01OC	8776	594	400	18Y+HB9CV	SM7WT	952
11	G0PPO	01DH	8218	561	400	2 x 18Y	EA1BCB	1064
12	G4JBH	80LV	7142	456	300	4 x 13Y	OZ4EDR/P	1280
13	G3WGC	91UT	5748	481	400	4 x 14Y	EA1BLA	1098
14	G0ARC	91FH	4580	364	80	9Y	F6GCW	922
15	G8DWD	02QV	4528	297	300	17Y	SM6JMZ	840
16	GM0FRG	75DH	3816	232	200	17Y	HB9JNX	1372
17	G4ATH	84VB	3413	275	150	17Y	HB9JNX	1112
18	G4CAA	92IK	2891	279	400	7ZL	HB9JNX	970
19	G4EKT	93VW	2648	232	200	2 x 17Y	F2EE/P	1030
20	G0BRC	01GH	2218	202	100	2 x 12ZL	DK9CR	900
21	G3SAD	92WA	2015	235	100	4 x 9Y	HB9JNX	862
22	G0HXO	70PP	1775	141	80	8/8 Slot	HB9MM/P	924
23	G4SSD	80FJ	1772	152	300	4 x 7Y	F6FZS	846

144MHZ RESTRICTED SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G0AFH	01LD	8633	565	400	17Y	EB1EVP	1165
2	G3WOI	91GI	8487	564	400	19Y	F6KBR/P	1025
3	G4ZAP	94WC	7450	505	400	17Y	F2EE/P	1045
4	G0CCC	91IH	6997	491	250	17Y	OZ1CLL	1034
5	G6SRC	01JG	6495	440	250	11Y	SM6UMO	1073
6	G8WSM	81PH	6444	441	170	17Y	OZ1CLL	1116
7	G4ERG	94SB	6181	402	350	15Y	F6HRE/P	1227
8	G4BRA	80ST	5164	375	400	17Y	SM7WT	1181
9	G8IUB	82LB	5041	348	80	16Y	SM7WT	1146
10	GI8FQB	64XC	4426	281	100	13Y	F2EE/P	1219
11	G4KDL	02UM	4008	281	100	17Y	UR3QR	2502
12	G3ZME	82NN	3706	312	200	14Y	F1IBU	1030
13	G0OLE	93PW	3450	278	150	17Y	F6KIM/P	1271
14	G4FOX	92MT	2981	289	180	16Y	F6IPQ	939
15	G8FCQ	92MO	2936	311	100	17Y	F6HRE/P	1066
16	GI4GTY	74AI	2873	165	200	17Y	F1SVF/P	1187
17	G0RGH	01OW	2858	266	100	17Y	DK0OG	899
18	G8ESB	94HH	2741	276	150	9Y	F2EE/P	1092
19	G0ROC	83VP	2589	233	100	14Y	F6HRE/P	1184
20	GI0LIX	74BU	2309	100	25	9Y	F1SVF/P	1227
21	G3CZU	91TG	1223	137	30	13Y	OZ5QF	760
22	G2ASF	92HE	789	84	25	14LPY	F2EE/P	873

144MHZ LOW POWER SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G3ZMS	90WV	5478	362	25	13Y	EB1DNK	964
2	G1OHM	82XJ	4642	373	25	17Y	DK0BN/P	1045
3	G4FKA	93AC	4059	381	25	17Y	F/G3JHM/P	1128
4	G3TCR	91KG	3314	283	25	17Y	F6KBR/P	1009
5	G3NJA	80FP	3280	207	25	17Y	F6KBR/P	1012
6	G8EVY	02AD	3131	258	25	17Y	HB9JNX	862
7	G1WAC	92BJ	2681	215	25	17Y	F2EE/P	910
8	G3FJE	92XA	2493	219	15	12Y	F6KBR/P	1073
9	GM4UYZ	85RU	2153	156	25	14Y	SM7WT	993
10	G3WKX	91OS	2055	231	25	16Y	F6HRE/P	976
11	G6CW	93KA	1890	196	25	17Y	HB9DGX/P	975
12	G7RIH	91RR	1877	201	25	8/8 Slot	F6HRE/P	969
13	G3ZBI	93BA	1801	153	10	14Y	DK0BN/P	1067
14	G5ZG	01DW	1767	171	10	13Y	HB9JNX	834
15	GM0TQK	85OQ	1557	120	22	6Q	F6KFV/P	1077
16	G3WMR	01BH	1471	135	10	17Y	OZ1SDB/P	752
17	G4VRS	91NV	1434	143	25	13Y	HB9AJ	791
18	G0ITW	93JK	1242	124	25	13Y	F2EE/P	997
19	G7SDH	01KP	1228	130	25	6Q	F2EE/P	763
20	G3ZTT	83PF	1179	115	10	17Y	LX/PE1HUS/P	948
21	G3ASR	91VO	1083	107	25	17Y	F2EE/P	782
22	G4BTS	93HO	884	102	10	19Y	F6HRE/P	1176
23	G4WBC	92BN	210	34	2.5	HB9CV	PA3ETM	502

432MHZ OPEN SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G4JAR	01PU	7161	442	400	4 x 21Y + 2 x 21Y	EB1DNK	1105
2	G4MRS	02PA	6707	437	400	8 x 17Y + 4 x 19Y	EB1DNK	1121
3	G0FRR	80WP	4404	271	400	2 x 24QLY	OZ9FW	1100
4	GM3ZBE	86RW	4387	173	400	4 x 21Y	UT5DL/P	1917
5	G5LK	01OC	4195	291	400	4 x 21Y + 1 x 48Y	EA1FH/P	1033
6	G0NTP	01DH	3994	284	150	2 x 18Y	EA1FH/P	1018
7	G4CLA	03BF	3575	242	300	8 x 21Y + 4 x 21Y	EA1BLA	1243
8	G8MNY	91XG	2793	234	400	27QLY	OZ9FW	942
9	G7AIC	80LV	2638	165	150	4 x 21Y	OZ9FW	1138
10	G3ZPB	91XH	2315	199	400	4 X 21Y	OZ9EDR/P	931
11	G6FRS	91OF	1982	188	100	4 x 21Y	DF9UV/P	767
12	G7FCF	92NP	1003	118	20	8 x 17Y + 2 x 17Y	DK9VD/A	640
13	GM0FRG	75DH	905	47	100	21Y	DL4VCG/P	1089
14	G4YTV	93VW	600	63	400	4 x 21Y	F6KPQ/P	698
15	G6GMW	84VB	576	52	100	88Y	DK9VD/A	803
16	G0CDB	80FJ	329	37	60	12Y	DL4VCG/P	743
17	G6GFO	91FH	308	30	20	18Y	F1IDQ/P	1026
18	G8XNH	70PP	304	22	25	88Y	HB9STY/P	924
19	G6YIQ	91UT	256	37	10	21Y	HB9STY/P	740
20	G4CAA	92IK	169	27	10	13Y	DK9VD/A	660
21	G7BRC	01GH	144	27	70	2 x 16Y	F5GYA/P	667

144MHZ SWL SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	BRS25249	93FX	1690	116		8Y	HB9JNX/P	1155

432MHZ LOW POWER SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G7SAC	93AC	2667	201	25	30Y	DF1NP/A	1031
2	G1ZMS	90WV	2526	203	25	Slot	EB1DNK	964
3	G1WKK	91KG	1459	137	25	21Y	OZ6OL	1024
4	G8OHM	82XJ	1393	128	22	21Y	DF1NP/A	1010
5	G1RDX	91OS	1106	129	25	27Y	DL0UL/P	828
6	GM6VIU	85RU	1082	50	25	18Y	SP1JVG/1	1253
7	G8NJA	80FP	1013	69	10	23Y	HB9ADJ/P	905
8	G0NHR	93BA	962	90	10	88Y	DK9VD/A	722
9	G4TVR	92BJ	933	84	25	21Y	OZ9EDR/P	990
10	G1GSN	92XA	790	95	10	19Y	DL0UL/P	789
11	G7OLH	91NV	755	79	25	8/8 Slot	HB9STY/P	775
12	G8JJR	93JK	677	69	25	21Y	DK9VD/A	707
13	G8ZK	93KA	655	80	25	19Y	DK9VD/A	679
14	G7MEX	93HO	654	67	10	46Y	F5GYA/P	954
15	G8TNK	01BH	495	55	25	19Y	DL0HU/P	717
16	G8ZTT	83PF	283	36	10	21Y	DK9VD/A	783
17	G0TIW	91RR	275	45	25	12Y	DK9VD/A	583
18	G4WBC	92BN	254	34	1	13Y	DK9VD/A	701
19	G4RMD	91VO	192	36	10	21Y	DK9VD/A	556

432MHZ RESTRICTED SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G4FAM	01LD	5152	330	350	21Y	EA1FH/P	1026
2	G6ZME	82NN	3748	244	250	24Y	DF1NP/A	1069
3	G6APZ	94WC	3107	215	400	28Y	OZ4EDR/P	965
4	G4UHF	91GI	2837	221	400	88Y	F6AYE	1066
5	G4BRA	80ST	2827	198	400	21Y	F6KBR/P	995
6	G0JRB	94SB	2396	154	300	28Y	F5GYA/P	979
7	G1KHX	81PH	1704	126	120	17Y	DL0UL/P	936
8	G8IUB	82LB	1546	101	50	21Y	DF0IMH	862
9	G0ULT	91IH	1348	175	100	19Y	EA1FH/P	970
10	G8HSG	93PW	1130	1130	100	48Y	F5GYA/P	972
11	G3LRS	92MO	1092	124	100	12Y	DK9VD/A	647
12	GI3LLQ	64XC	906	50	45	19Y	DK9VD/A	1024
13	G3JRM	02UM	780	63	50	23Y	OZ6OL	762
14	G0ROC	83VP	685	79	50	18Y	DK9VD/A	776
15	G6HIE	94HH	660	62	50	19Y	DK9VD/A	772
16	G6SRC	01JG	611	58	30	24Y	DL0HU/P	663
17	G7DOR	91TG	588	76	80	23Y	HB9STY/P	680
18	G0RGH	01OW	500	61	30	19Y	DK9VD/A	484
19	G7ASF	92HE	386	53	30	17Y	DL4VCG/P	967
20	GI0NMV	74BU	343	26	25	17Y	PA3ETM	802
21	G7FOX	92MT	320	32	10	18Y	DK9VD/A	658
22	GI4GTY	74AI	82	8	10	21Y	PA3BPC/P	721

1296MHZ LOW POWER SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G3OHM	82XJ	1423	110	23	55Y	DB1DI/P	730
2	G4WGE	93AC	1358	112	25	49QLY	F5GYA/P	923
3	G8KGC	93BA	1006	77	15	55Y	HB9MIN/P	914
4	G4BEZ	91KG	785	73	10	55Y	HB9MIN/P	755
5	G4CYA	93JK	386	46	10	Double Quad	PI4GN	535
6	G0EYO	92BJ	353	33	11	56Y	DL0PJ	624
7	G8SPE	91NV	341	43	10	48QLY	DJ3FI	498
8	G6KWA	02AD	313	43	2	55Y	EI6AS	451
9	GM4IKU	85RU	253	15	3	28QLY	OZ9EDR/P	954
10	G8BHD	01BH	224	37	10	54Y	PA0WMX	376
11	G6YLV	91RR	112	24	10	23Y	G4NXO/P	265
12	G6ZTT	83PF	6	3	0.5	23Y	GW0ALW/P	69

1296MHZ RESTRICTED SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G3UAX	91GI	1583	126	150	2m Dish	F6KBR/P	1025
2	G0FDZ	01LD	1532	132	120	1.5m Dish	SM6ESG	986
3	G4CCH	94SB	1257	92	400	47QLY	HB9MIN/P	935
4	G4BRA	80ST	1224	86	125	2m Dish	DK7LJ	937
5	G3ULT	91IH	909	77	200	2m Dish	EB1DMS	908
6	G4NKC	82NN	853	57	12	38QLY	F5GYA/P	903
7	G3TQF	92MO	820	78	100	2m Dish	HB9MIN/P	839
8	G0JDL	02UM	691	65	15	23Y	HB9AHD	801
9	G4NXO	94WC	676	64	40	55Y	DL0HU/P	606
10	G6SRC	01JG	614	54	10	23Y	DL0HU/P	663
11	G1ORG	92HE	129	22	10	37Y	PA0WMX	486
12	G6JQV	94HH	118	16	120	34QLY	F5KKD/P	508
13	G0SWL	93PW	116	16	1.6	24Y	DL0PJ	519
14	GI6ISQ	64XC	3	1	2	23Y	EI2DNB	90

1296MHZ OPEN SECTION

Pos	Callsign	Loc	Pts	QSO	Pwr	Ant	Best DX	km
1	G4JAR	01PU	5301	312	300	4 x 55Y	OM3R/P	1365
2	G4MRS	02PA	2663	210	200	12 x 23Y	HB9AHD	785
3	G0ALE	01DH	2509	185	400	2.0m Dish	F6HTJ/P	991
4	G6SFR	80WP	2249	143	200	8 x 37Y	OZ9EDR/P	1094
5	G4IEV	01KJ	1654	152	400	2.5m+1.8m Dishes	OK5VHF/P	1037
6	G3GRO	01OC	1433	117	100	4 x 55Y	F6HRE/P	914
7	G4HWA	03BF	1173	109	400	16 x 23Y + 2.4m	HB9AHD	932
8	G4OQR	92NP	1099	106	50	1.8m Dish	F5GYA/P	840
9	GM6MGS	86RW	888	40	150	4 x 55Y	SM7CEM	973
10	G8EQZ	93VW	718	70	200	48QLY	OZ6HY	664
11	G8TB	91XH	711	81	40	1.8m Dish	DL7LJ	759
12	G4WGZ	91XG	476	61	50	64QLY	F1GPL	613

432MHZ SWL SECTION

Pos	Callsign	Loc	Pts	QSO	Ant	Best DX	km
1	BRS25429	83LT	158	18	8Y (2m)	DK9VD/A	701

SOMETHING went wrong with the planning of VHF NFD this year - surely it wasn't the intent to hold field-day on a weekend when, in general, both the weather and the propagation were excellent! 1994 brought the best propagation in the event for several years, with some remarkable sporadic-E contacts being made on 2m, and good quality tropo on all four bands. However, the Aberdeen VHF Group and North of Scotland Contest Group up the Cairn O' Mount sometimes found it difficult to see the antennas through the fog, even while standing directly underneath them! Even the sunny south did not escape the murk, with the Reigate Amateur Transmitting Society (RATS!) spending the contest engulfed in a rather unpleasant mix of mist, fog and smog.

The main tropo opening started on the Saturday afternoon, with stations along the south coast working down into the South of France and Spain, with east-coast stations having a small opening to Denmark. By morning, the whole of the UK was able to work some excellent DX into Germany, Switzerland and southern France. Also for those closer to the east coast the bands were open across into OK and OE. Many stations took advantage of the water path down to the north coast of Spain to cover some of the longest distances worked. As often happens in these circumstances, those sites that are traditionally good for VHF contests under flat band conditions are sometimes surpassed by more remote stations who can score more points per QSO, and it is excellent to see good results from the Aberdeen VHF Group / North of Scotland Contest Group whose site, near Aberdeen, is normally too far from the centre of the action to be really competitive.

Adjudication was pretty straightforward this year - the winners and runners-up in each section were well separated, and close scrutiny was only needed on some of the band leaders' logs. Also, life was much simplified by the preparatory work carried out by Shirley and Mandy Llewellyn, G0ESO, our thanks are extended to them for all their hard work. Many thanks to all of you who submitted your logs on disk. In terms of closeness of scrutiny, the 'soft-logs' were not treated any differently to those on paper, but were used as an aid to checkingothers' logs. The electronic logs were all read into Microsoft Excel to extract the data and as such, plain ASCII files with no special control characters and one contact per line are much preferred. The files from LOG by G3WGV or SDV by EI5DI are perfectly acceptable, as is anything in the standard RSGB format.

Sunrise over Walton-on-the-Naze with the Windbreakers & Hadrabs in residence.

Unmarked duplicates once again raised their heads. On 70cm, one station worked F5GKA/P twice, F5GKA once and F6GKA/P, all in the same locator; For one F5GKA/P QSO and the F5GKA QSO they lost 10 times the claimed score each QSO, and for F6GKA/P only the claimed score - this made a big dent in their score! Interestingly enough, this group also had a Novice as one of their operators, and he was quite their most accurate logger - well done!

There were problems with inspectors finding sites this year - those stations which could not be found had 10% deducted from their score. Please make sure that your directions are adequate to find the site in the dark as well as in daylight. This year, only one group tried to enter a different section to that in which they registered - they also lost 10% and were restored to the Restricted section from the Low-Power.

Winners

THIS YEAR'S OPEN Section winners, the **Windbreakers & Hadrabs Contest Group** are the same group of people that won last year, only hiding under a different name. They cling onto their Surrey Trophy, as a result of another outstanding 23cm score along with very good scores on 2m and 70cm. **The Windmill Contest Group** entered the Restricted Section instead of having to put up the big antenna systems required to compete at the top of the Open Section. This enabled them to win the Martlesham Trophy. **The Sutton & Cheam Radio Society** won the Low Power Section by a large margin to get their name on the Authur Watts Trophy for the third consecutive year. There is no change in the ownership of the two trophies awarded North of the Border, with the **Aberdeen VHF Group & North of Scotland CG** taking the Tartan Trophy again, and **Cockenzie & Port Seton ARC** retaining the Scottish Trophy. Congratulations go to **David Whitaker, BRS 25429** for winning the SWL Section. Congratulations to all winners and ruuners up who will be sent certificates.

Band Reports

70MHz

The superb conditions on the higher bands somewhat eclipsed 4m this year, although the enhanced tropo must have helped GM0FRT/P to generate a big score by working almost all the portables on the band, and becoming the best DX for a huge number of people. However, the sporadic-E which brought much excitement on 2m, also brought many clenched teeth on 4m, with FM broadcast stations from Poland giving a tremendous noise floor for much of the CW session, which made it impossible to make QSOs for long periods. Some people didn't realise what the QRM source was and at least one group spent an hour or more building coax stubs to keep 2m

out of the transverter front end since they believed this to be the source of the noise! Just remember, next time you have what sounds like bad splatter all over 4m, switch the rig to FM and see if you hear over-deviated marching music!

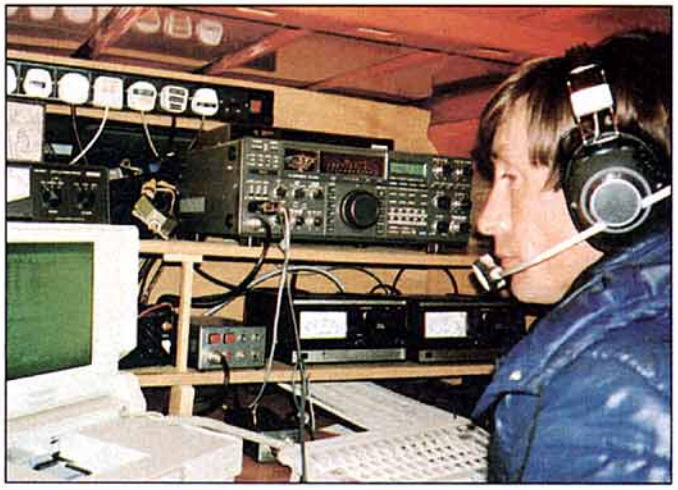
As usual, there were a few disasters with equipment. Several groups had their linears fail, including G4BRA/P who ran all but the first hour on 2.5W, but still managed to amass a good score, including working GM0FRT/P over a 681 km path. The CW section caused a few headaches to some people, including the Nunsfield House group who forgot to bring a key, and G6SRC/P who said "a shame my CW is so bad - but one QSO is better than none!" Long yagis seem to be becoming more prominent with several groups using at least one yagi with 9, 10 or 12 elements. GM3TAL/P who submitted a check log broke with convention by using a 10λ wire V-beam providing contacts down into Cornwall. Several groups commented that activity seemed to be down once again on 4m, and wondered whether, following the 'deregulation' of 6m, could 4m be replaced with 6m for next year's event?

144MHz

2m was an exciting band, with lots of QSOs, although no one got near to breaking the magic 1000 QSO barrier. The band leader's positions in both the Restricted and Open Sections were close, but careful checking of the logs could do nothing to change the ordering. Tropo was reasonable on the Saturday, although it was sporadic-E that really set the adrenaline running. During Saturday afternoon, there was a massive sporadic-E opening from Germany into the former Soviet Union. UK stations on the eastern side of the country were just on the edge of this opening, most making just one or two QSOs, confined to the high ERP open section stations. Some excellent DX was worked in a rather marginal opening.

The exception to this marginal opening was G4JAR/P, at Walton-on-the-Naze whose site, perhaps by tropo ducting across the North Sea, enabled them to be the only UK station who was in the opening proper. By a combination of speaking Russian, using CW, sitting in the right part of the band etc they worked 25 stations on sporadic-E. Most QSOs were made in the main opening from 1600-1630 to the Ukraine, a few more around 1730 to the Ukraine and Moldavia (ER, formerly UO5), and another gaggle at around 1900 to LZ. However, their prize catch was RX6YAC in LN06 at 2845 km - this is a long way for what I presume to be single-hop Es, and I don't recall ever hearing of LN field having been worked before from the UK. There was also an opening to UA3 for G4MRS/P and G6LX/P, although only for one QSO each. It was interesting to see that everyone who caught the Es worked different stations. GM0FRT/P commented on the one down side of the Es contacts - none of the logging programs that they tried could properly cope with QSOs scoring more than 99 points!

By comparison to the Es, the tropo was less spectacular, but much more widespread and long lived - so many stations having their best DX over 1000km is testimony to this. Saturday's opening to Scandinavia gave many people good DX into OZ and SM7, but Sunday morning brought some big signals from Germany and France to the whole of the UK, along with a smattering of OE, OK, HB9, EA. GM4ZUK/P also worked SM2CEW in KP15 on ionoscatter once again. For me, the opening was summed up when, on the Sunday morning while I was operating on 70cm, Richard, G4WFR, walked into the tent and when asked how 2m was going, he said - "Pretty good - Bob (the 2m operator) hasn't spoken a word of English for the last three hours!"



Stewart Cooper, GM4AFF, operating the Aberdeen VHF Group & North of Scotland Contest Group's 2m station, GM4ZUK/P.

432MHz

In general, the tropo on 70cm followed very much the same pattern as that on 2m. The exception was GM3ZBE/P who were called by UT5DL/P in KN18 at 1917 km and who was 59. Throughout the event, propagation was good for the Scottish group into Germany out to over 1000 km, but there were no other QSOs to come close to this freak which was presumably a high level duct. Indeed, two evenings before NFD, UT5DL/P had been worked on 2m by stations in the north of England, with no sign of his signal elsewhere, or of any intermediate stations. They tried a QSY to 23cm where UT5DL/P apparently had 1kW and a good antenna, but heard nothing. Other interesting stations worked were F6AYE in JN33 (a rare corner of France) by G4UHF/P, and IW4AOT/3 in JN56 (an unusual one on tropo because of the topography) by G4MRS/P.

1296MHz

G4JAR/P set the pace on this band, and no one could even come close to keeping up with them. Last year they used a big 2.6m dish, but this year they showed that the much more manageable 4 x 55 element yagi array is at least as effective. Undoubtedly their site gives them a significant edge, but good operating must also play an important part in generating a 23cm log which looks good compared to most of the 70cm logs we see. The 23cm specialists, G4IEV/P staged a single band entry to give their dishes an airing, and G4HWA/P had an impressive array with a 2.4m dish and 16 x 23 element yagis. The top spot in the Restricted Section was hotly contested, but after checking, G3UAX/P remained on top. Congratulations go to G6SFR/P for an impressive score from the west of the country using 8 x DL6WU yagis.

Members' Advertisements

RSGB Members wishing to place an advertisement in this section must use the official form incorporated on the label carrier of Radio Communication. This will prove membership and must be for the current month. No acknowledgment will be sent. Ads not clearly worded, or which do not comply with these conditions will be returned. If an ad is cancelled no refund will be due. An advertisement longer than 60 words will be charged pro rata. Trade or business ads, even from members, will not be accepted. Traders who wish to use this facility must send a signed declaration that the items for sale are part of, or intended for, their own personal amateur station. The RSGB reserves the right to refuse ads, and accepts no responsibility for errors or omissions, or for the quality of goods for sale or exchange. Ads for CB equipment will not be accepted. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain. Please note that because this is a subsidised service to members, no correspondence can be entered into. Licensed members are asked to use their callsign and QTHR, provided their address in the current edition of the RSGB Amateur Callbook is correct. RS members will have to provide their name and address or telephone number. Please include your town and phone number in the free boxes provided to assist readers. Advertisements will be placed in the first available edition of *RadCom*.

Warning: *Members are advised to ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The 'purchase' of goods legally owned by a finance company could result in the 'purchaser' losing both the goods and the cash paid.*

FOR SALE

ANTENNA ANALYSER MFJ-247: £115. Microlog ATR-6800 Terminal with S/ware (cost $2,500): £150. Ten-Tec Paragon Tcvr with PS and Filters, as new: £750. Microwave Modules 2m Masthead Amp: £25. TS130S Tcvr with WARC bands, 100w pep, Mic: £550. DFC230 Remote VFO and Control Head for TS130S: £100. Mirage D1010 100w 430-450MHz Linear: £300. BNOS LPM144 10-180w 2m Linear: £200. Palomar R-X Noise Bridge: £40. Kenpro KR-400 Rotator/KR-400RC Controller: £160. Kenpro KR-500 Elevator/KR500 Controller: £170. AEA Morsematic Keyer: £100. Yaesu SP-980 Spkr (with filters): £45. SEM QRM Eliminator: £28. Ferrograph seven series stereo Reel to Reel Recorder: £250. SMC Polarphaser 2: £20. 2m 2-way power splitter: £20. Superscaf Audio Filter: £100. All items in as new condx. Buyers must inspect and collect from SW London after making appointment to visit. (Richmond) 0181 940 8246.

ATARI ST 3.5in Ext D/drive, boxed: £45 post paid. Technical Manual with circuit diagrams for Epson MX-80 Printer: £20 p/paid. 40m HF 4ele Beam split Boom with heavy duty pole mounting bracket, gd condx, not corroded: £20 buyer collects. Maldol HS-WX2 2m/70cm Base Colinear: £65 buyer collects, would consider EXCHANGE for Diamond X-50 or equivalent of similar make. (Ormskirk) 01704 892088.

BARGAINS. TRIO TS780 2m/70cm FM/SSB Base station, gd rig: £550. Kantronics KPC4, dual port Packet TNC V5.0, 64K Ram: £225. (Bristol) 0117 924 7112.

COMMODORE 8096 Computer. Choice of Two. Also lots of technical information and other Commodore Peripherials. What Offers? Mike, G3RWV. (Tring) 01442 825587.

CUSHCRAFT R7 HF Vertical Antenna, exc condx, genuine reason for sale, open to offers. Please phone after 6pm. (Sedgley) 01902 664482.

DELL NL25 Notebook Computer 365/25MHz, 6Mb Ram, complete with Colour Monitor, PSU and Mouse. All handbooks and carry case, also new battery: £800 ono. KW1000 HF Linear, gd condx: £200. GW3YKZ, QTHR. (Newport, Gwent) 01633 821411.

DRAKE R4C, T4XC, MN2000 2KW ATU: £550. Yaesu FL2100Z Linear, mint, boxed, little used: £475. FT470, spare battery, charger, boxed: £275. FT4700RH Remote Panel, boxed: £350. KW109 1KW ATU: £150. 60ft Versatower, Create 3 ele HF Beam, HAM2 Rotator, UHF/VHF Colinear, coax, etc: £450 takes ALL. Exchanges early wireless gear: Jim Taylor, G4ERU, 5 Luther Road, Winton, Bournemouth, BH9 1LH. (Bournemouth) 0202 510400.

ICOM 765 HF All Band Tcvr for the serious HF enthusiast. This unit features Fully Automatic High Speed Antenna Tuner. Complete System for CW operators. High speed CW Break-in + many other features. Complete with Hand and Desk Mics. This unit has only been used for one hour since new, and is still in original box with manuals: £1,750 ovno. Contact Peter, G0LVG after 6pm. (Swinton) 0161 736 0667.

ICOM IC-R9000 the ultimate Rx, All Modes with built in Scope and Speech Synthesiser: £2,200. (Northampton) 01604 891222.

KENTISH QTH for Sale. Again due to chain collapse. Planning permission for 1.8m Satellite Dish, Antenna Mast, Multi-band Vertical. 630ft ASL fabulous VHF/UHF site crest of North Downs. Four bedrooms, one en-suite. Dining room, kitchen, 24ft lounge. Drive to double garage. Downland walks from your door! Superb value at: £87,000. Mainline stations/ motorways nearby. G4UGV. Phone. (Meopham) 01732 823662.

KENWOOD TS450SAT, immaculate condx, one year old. GM3WYL, QTHR. (Glasgow) 0141 776 6098.

KENWOOD TS680S with Auto ATU, PSU, Spkr, Mic and 6m Antenna, vgc: £800. G4ITS. (Gloucester) 01452 617725.

SHACK CLEAROUT Mutek 144E Masthead Pre-Amp, never used, mint condx: £40. MM 50MHz Rx Converter 28-30MHz IF: £5. Microset 70cm Amp with Pre-Amp 0.5-5W i/p, 20W o/p, boxed: £50. Zetagi 2m Amp 10-15W in, 100W out: £30. Datong DS60 Morse Tutor: £10. Carriage on All items extra. Graham, G8WVI, QTHR. Or phone. (Nottingham) 0115 963 2841.

SIX METRE Transverter, Microwave Modules M/mode MMT50/144 25w o/p, 144/5MHz in 50MHz out! with manual and circuit diagrams: £100 Post Paid. (Ormskirk, Lancs) 01704 892088.

SPECTRUM COMMUNICATIONS Transverter 2m to 6m, 25w Amp, LPF, cased: £100. Amstrad PC1512 DD 5.25 and 3.5 Drives, Mono: £70. Kent Brass Morse Key: £25. 4CX250B, ITT, unused: £50. Star LC10 Printer: £60. LMW Electronics 23cm Transverter Module: £"phone". Paul, G7GUC. (Huntingdon) 01480 454577.

STANDARD C5800 2m M/mode, 25w Mobile, used as Base station only: £200. MM 2m Linear Amp 144/100-S, 10/25w i/p, 100w o/p: £125. Commodore C64 Computer with Disk Drive and Recorder: £45. Graham, G3ISL, QTHR. (Scarborough) 0723 369127.

YAESU FT-902DM fitted all options. AM/FM/CW Filters. Plus spare set of new valves: £450. FC-902 ATU with four switched terminals. Twin meters 0.5KW: £150. FV-901 three speed scanning VFO. Forty memories + auto scan: £150. YO-901 Monitor Scope. Automatically shows Tx/Rx wave forms. Band scope - cross hatch etc: £250. SP-901 matching Spkr: £25. Clean operator and service manuals - all original packaging and accessories. Datong RF Speech Processor: £45. Auto Notch filter: £40. Stackrack frame and all connecting cables. All purchased new by current owner and used as standby rig only for last five years. Mint condx. Tono 5000E stand alone Terminal Unit with Keyboard and built-in screen for RTTY CW ASCII etc. Ideal caravan or portable use. DC or mains: £200. Tel: Lew, G4HKY, QTHR. (Huddersfield) 01484 862773.

AEA PAKRATT PK64 M/mode for Com 64 (includes HF/Amtor): £95. FT209RH 2m H/held, nearly new nicads: £125. Yupiteru MVT6000 Scanner: £185. Discone V1300: £35. Sony AIR-7: £125. All exc condx. Also Videonics Direct-ED Plus video Editor/Titler: £275. Sid. (Ellesmere Port) 0151 355 2833.

AEA PK232, mint, boxed, manual, S/ware and cables. Icom U101 70cm 12 chan, 20w, brand new, warranty. Must Sell!. Philip, G6DMQ. (Birmingham) 0121 707 7572.

AEL3030 2-16MHz LSB/USB Xtal HF Tcvr, 12/240v 150w: £100 including spares. UHF PMR PF85 and BE600: £25 each. PC mini tower case: £35. Other items; PF2UB, M296, MF5U UHF PMR also available. Martin, G4VZO NOT QTHR. (Kingswinford) 01384 287454.

ALINCO DJ120 H/held + charger, Home made case, Hand Mic, + Home made 12v lead with manual: £150 ono. Sandpiper 10el 2m Beam: £30 ono. Rotator + Controller: £30 ono. Mast Head Changeover Unit (new), never used, N-type Connectors (around £70 new): £ 50 ono. PSU 13.8v 2A: £10 ono. PSU 13.8v 3a: £10 ono. SWR Meter 3.5-150MHz: £10 ono. BNOS 2m Linear FM/SSB, 10w i/p, 100w o/p with Pre-Amp: £95 ono. Set large Headphones stereo/mono, seperate Volume controls: £5. Phone Alan (Co Fermanagh) 01365 328681 evenings.

ALINCO DJ560E D/band H/held 2m/70cm, CTCSS, DTMF with two Nicad packs, charger, boxed with manual: £225. G0UON. (Hythe, Kent) 01303 268710.

ALINCO DJF1E Handy Tcvr, little used, boxed, with Spkr/Mic and Filtered cigar lighter cable, bargain, collected: £200. G4FOT. (Horncastle) 01507 578251.

ALINCO DR410 70cm 5/35W Mobile, immac condx: £200. Pye MX294 2m and Pye 296 70cm Mobiles, both with Toneburst fitted, 25w o/p: £75 each. G7SQY. (Peterborough) 01733 574725.

ALLOY POLE, seven Sections, 35ft. 0.16inch wall. Also Transformers 2500 to 2 volts. Variacs, Audio, chokes. SAE for list. G2TA, QTHR. (Watford) 0181 950 1762.

ALTRON TILTOVER Tower, 35ft, socket mounted, twin winches. Recent new wire cables and brake pads: £250 plus carriage. G0ASV, QTHR. (Redcar) 01642 471154.

AMERITRON AL-811, 600 watt HF Linear, new in box from USA, why pay £839. Sale price: £725 NO OFFERS. Collect or carriage extra. GM0VCN, QTH, Milnathort, Tayside. (Tayside) 01577 865090.

AMSTRAD PC1640DD, Mono Monitor, Mouse, GEM S/ware, plus lots more, ideal starter with fifty blank 5.25 disks: £90 ono. Amstrad CPC6128, Mono Monitor, joystick, manual, some S/ware, games: £45 ono. BBC B, 64k, manual: £40. Spectrum 128K +3, D/drive, RTTY 1.4, 50 games, Datacorder, Joystick: £40. Sony Betamax C6 Mk 2, Offers?. FDK Multi 700E 2m FM (144.750-145MHz) 25w o/p: £80. Microwave Modules 144-28MHz All/mode Transverter, Offers?. Mike, G0GZM. (Croydon) 0181 660 8692.

ANTENNA ALALYZER MFJ 247: £125. ERM 3B Squeeze Keyer: £25. Commodore 128 PC: £40. RadComs; late 50's to date. Offers? G4CJY, QTHR. (High Wycombe) 0494 530018.

ANTENNA DX33 Triband Beam by Western, 20/15/10, rated 2kW, excel condx, buyer collects: £125. IC22A 2m Tcvr 10W, 22 chan Xtalled R1-R9, Simplex 19-24, gwo: £100. IC2E 2m H/held, thumbwheel Freq change, Rptr shift, c/with 2 spare battery cases, excel condx: £100. G3MCF, QTHR. (Bridlington) 01262 677331.

ANTENNAS. Two 2m Collinears, one 70cm Collinear: £20 each or £55 the LOT. (Bewdley) 0299 401558.

AOR AR2000 wide range scanning Rx 0.5-1,200MHz, charger etc: £195 plus postage. Len, G0DLR, QTHR. (Meopham) 01732 823483.

AR3000 Receiver: £550. KAM V6.1 A/mode TNC: £260. Microwave Modules MMT1296/144 Transverter with 10w Amp: £225. TH77E D/band H/held with many accessories: £360. Welz SP300 SWR Meter 1.8-500MHz: £70. Yaesu SP102 Ext Spkr: £40. Please ring evenings or weekends. (Nr Cambridge) 01954 211521.

AR3000 SCANNER 0.1-2,036MHz All Mode. Supplied with service manual, Spectrum coordinator Searchlight programs. NO Offers: £600. Tel after 6pm. (Sandbach) 01270 761978.

ATARI ST 4Mb CAD Multi role Programme for CAD, Graphic stock control, Filing Cabinet etc. Unique: £109. Also RTTY and Morse for any 520+: £10. Mr V McClure, 43 Roman Way, Seaton, Devon EX12 2NT. (Seaton) 01297 23421.

ATU, High Power, Heathkit SA2040, rated 2kW PEP S/B and 1kW CW. Matches 50 Ohm Tcvrs to various Antennas fro 3.5- 30MHz. Contains large capacitors, roller Inductor with Rev counter and 4:1 Balun. SO239 Coax Connectors and terminals for Single Wire or balanced Antennas, + handbook: £95 prefer buyer collects. G4OYB, QTHR. (Plymouth) 01752 404108.

BP60 VERSATOWER, new cables: £300 ono. PC XT, 20M HD, Hercules graphics, Monitor, Multi I/O, Packet S/ware: £110 ono. Phone Brian. (Bradford) 01274 682945.

BUYER COLLECTS. Carton Vintage Valves. 42, PEN A4, MX40, 35L6GT etc. 16 x 11 x 11 inches, brand new. Leak Trough Line Stereo Tuner, complete, gwo. Offers to G3VGN, QTHR. (N Yorks) 01947 602332.

CAPCO MAGNETIC LOOPS, pair 80-10m plus WARC Bands, incl control box: £250. Buyer collects. Norman, G0UNR. 01922 51950.

CDE HAM 2 Rotator and Control, vgc, regularly serviced, OK for TA34 TH3: £100. Buyer collects or carriage extra. G3MVZ. (Chichester) 01243 576007.

CLARK 40 FOOT, 4 section, Pneumatic Mast, bottom section 125mm Diameter: £225. Homebrew Tilt over, bolt down Base with winch: £40. Autobrake Winch 0.65 tonne: £35. Standard Winch 1000 lbs: £15. Cue-Dee 10el 2m Yagi: £35. Maldol 2el 10m Beam: £40. Diamond X50 Colinear: £40. Phone evenings/weekend. (Colchester) 01206 240700.

COLLINS 7553B 32S3 312B4 515F2 MM1 75S3C 32S3 312B4 516F2 MM1 75S1. Eddystone 958 solid state Gen.Cov. Rx: £350. All Manual. G4LW. (Trowbridge) 01225 753166.

COMPLETE STATIONS KW2000A with AC/DC Power: £100. KW Viceroy and Eddystone 888A: £180. All immaculate. G3IDC, QTHR. (Sturminster Newton) 01258 472816.

COMPUTER AMSTRAD 1640 40Mb HDD, 3.5 DD, perfect data terminal, gwo: £120. Phone after 6pm. (Macclesfield) 0625 615187.

COMPUTER IBM/XT, HDD, 5.25 Floppy, CGA Monitor, gwo: £100 ono. (Cambridge) 01223 263994.

CUBICAL QUAD Two Element Antenna 10/15/20m Loops with Fibreglass Rods, No Boom, Mast Clamp: £110. G4GBM. (Staines) (Staines) 01784 482371.

CUSHCRAFT A3 Triband Beam, complete with manual: £160. Yaesu G-400RC Beam Rotator, complete: £160. Clarke. (Guildford) 01483 275461.

CUSHCRAFT AP8 nearly new in box: £100. G3LBA, QTHR. (Woking) 01483 740577.

DRAKE C-LINE R4C T4XC MS4 and W4, fitted with all Filters and NB4. Fully crystalled for WARC bands. Spare new PA and other valves. Exc physical and electrical condx: £600. Ham 4 Rotator, gd condx: £165 ono. (Gwent) 01633 880146.

DRAKE MN-2000 ATU, mint: £250. HAM 4 Rotator: £200. B36 Tuner Amp, OFFERS. Atari 1040ST with second Disk Drive. Philips CM11342 14inch Monitor. RC Aerochopper Flight Simulation System: £300. 01953 788376.

DRAKE T4XC c/w PSU, leads, manual, vgc: £250. G4JBH. (Yeovil) 01935 28341.

EDDYSTONE 680X with manual, gd order: £75 plus £8.50 P&P. Phone anytime or Fax 01372 454381. (Great Bookham) 01374 128170.

EDDYSTONE 840E Receiver for sale: £40 ono. Suit SWL. (Birmingham) 0121 770 3054.

ERA MICROREADER Mk 2, Rev 4.1 Decoder, CW/RTTY/AMTOR/NavTex, etc. Bargain: £75, post paid. Reason for sale, upgrade. G7JAI, QTHR. (Kenilworth) 0926 54556.

ERA MICROREADER Mk2 version 4.1T: £90. Ring G6TPQ, QTHR any time. (Oldham) 0161 633 3895.

EX-MARCONI 100w Tx modified for 160/80m, could cover other bands. Phone/CW. Comprehensive manual, spare TT100's: £90. Needs PSU, can assist with parts/circuit. Digital VT100 VDU, working, comprehensive manual: £10. Digital Decwriter 4 Typewriter Terminal, working order: £10. Prefer buyer collects. GW8ZNR. (Nr Abergavenny) 01495 290652.

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FLUKE 8000A Digital Multimeter: £75 ono. (Nottingham) 0115 960 9345.

FOR HRO5T, 6K7M, 6J7M, 6B8M, 6V6GT also "S" Meter. Kent Keyer and Twin Paddle,

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FT ONE Gen Coverage, All Mode, Solid State, HF Tcvr, all options, manuals, Desk Mic, boxed, vgc: £695. Roger, GW3UEP, QTHR. (Llandysul, Dyfed) 01559 362632.

FT101ZD Fm, fan, Mic and H/book: £330 ono. Heathkit HW101 Power supply HP23B. Lots of valves. Daystrom Valve Voltmeter as new. **(Mustang CB Tranc modified for 10FM: £30) HW101** HW101 above: £120. G4BZQ, QTHR. (Much Wenlock) 01952 727024.

FT101ZD MK3, FV101DM, FC902ATU, SP901 boxed + manuals: £600. NO SPLIT and NO OFFERS. FC102 ATU, 4 Ant Select: £180. FL2000B Amp (new tubes 12 mts ago): £350. 1.5kW Dummy Load: £40. MD1 Mic: £40. RF Datong Proc: £25. Dawa All Mode Filter: £30. Icom SP20 with Filters: £50. Icom 255E 2m: £65. All vgc, most boxed with manuals. (Hereford) 01432 352396.

FT101ZD Mk3, WARC, FM, fan, plus FC902 ATU, PWR/SWR Meter. All mint condx with manuals: £480. Contact Mike, G4NSN, QTHR. (Denham) 01895 835076.

FT101ZD WARC, Filter, fan, Mic, manual, boxed, excl condx: £345. Also 40 Mem FV901DM VFO: £125 ono. (Coventry) 01203 450476.

FT200 with Power Pack, Tuner, SWR Meter and manual: £180. G0UPD. (Felixstowe) 01394 270853.

FT200 with PSU, working: £150 ono. Call Bernard (Purley) 0181 660 7517.

FT23 Handy 2m Tcvr CTCSS fitted, extended Rx/Tx. Boxed, FNB1D, NC-28C, PA-6, MH-12/A2B MH-18/A2B Mics. Gd clean condx: £175. (Uxbridge) 01895 234126.

FT290R MK2 mint condx, carrying case, charger, original box, instruction book: £250. G0VFX. (Bromsgrove) 0527 821458.

FT690R2 6m M/mode, new condx, with RN690-25w Linear and homebrew Control Unit: £400 ono. TH45E 70cm H/held, gd condx, charger, DC adaptor: £160. Star Masterkey Memory Keyer: £65. Cobwebb Antenna, 20-10m, gd condx: £95 ono. Call Tony, G4IPR, QTHR. (Brighton) 01273 565699.

FT690R2, boxed as new: £290. TR9130, boxed: £290. TW4000A 70cm/2m Mobile: £250. KW207 ATU: £80. Consider Shimizu SS105S part Exchange. (Castleford) 01977 552862.

FT757GX Mk2 HF Tcvr: £500. EBB432 Eggbeater Antenna, great for Pacsats: £45. G4WXJ. (Grantham) 01476 66923.

FT7B HF Tcvr 80-10, digital readout, ATU, manuals for SALE or EXCHANGE for 70cm M/mode. (Ormskirk) 01704 880345.

GET ON-TO HF Cheaply - Mutek TVHF2300C 2m to HF Transverter: £200. BNOS Electronics 2m 100w Linear Amp 144-100: £80. Tatty FT2700 70cm/2m in gd working order: £175. Yaesu FP700 PSU: £70. Capco VHF ATU: £25. 2m 35w Linear: £20. Plus other bits & pieces and books. Two Tennamasts, full details from John, G0JBW. Fax 01562 864771. (Kidderminster) 01562 824740.

GOULD ADVANCE D/trace Oscilloscope plus Probes: £90. Maplin 1GHz Frequency Counter: £90. Lowe FX1 Antenna Meter: £50. Phone John. (Clydebank) 0141 941 2802.

HAMMARLUND SP-600 0.55-54MHz Gen Cov Rx, c/w handbook: £85 ono. Heathkit Amateur Band Rx HR10B: £25 ono. Ian, G4CLR. (Gloucester) 01452 520546.

HEATHKIT SB220 Linear 2kW, new 3-500's, A1 condx: £600 ono. FT101 Mk2 All Bands: £200 ono. Wanted 2M2CX? Amp etc. Homebrew, working/incomplete. Simon, G6IYX. (London) 0181 802 4334.

HIGH POWER Linears. Tokyo HL180V: £300 and HL130U: £375. See SMC advert for prices, boxed as new. 4Mb Simms, two 9 chip 30pin 70ns simms. Bought the wrong one's, new, unused: £200. Thor RLC-100A 2-Port BBS/Node PC-Card, new unused: £100. (Uxbridge) 01895 234126.

HITACHI COLOUR Camera GP-5AE/K with mains PSU: £60. Atari PC3 Computer, 30Mb H/D, 640k Ram, two 720k F/D, one external EGA Colour Monitor: £325. 44Mb IDE HD with Controller Card and connectors with double spacing Program: £65. (Dereham) 01362 696993.

HY-GAIN 14AVQ Vertical 10-40m 1kW, exc DX'er, gd condx, boxed, all documents. G3ETK. (Manchester) 0161 792 9144.

Hy-GAIN 204BA 20m 4 ele Beam complete with BN86 Balun, gd condx: £200 plus carriage. G3OGQ, QTHR. (Warrington) 01925 267553.

IC202S, exc: £150. FT726 2m, 70, 6m Satellite: £800. FT911 23cm Handie: £150. AOR 1000: £140. IC251E, IC451E: £700 the Pair. All above with manuals, boxes, accessories. Also Heath SB104: £150. FT101EE, vgc, WARC kit, FM kit: £300. Collection of Headphones, mostly high impedence, Offers. Collection of 60's portable BC Rx's, offers. Spectrum Analyser HP581B/5881B, Offers. Network Analyser GR to 500MHz, Offers. (Towcester) 01327 353522.

ICOM 229 FM mobile Tcvr, one year old, used twice only, Base use only, immac condx, boxed, complete: £195, NO Offers. Mutek 6m Transverter 28MHz IF, complete with all leads and interface, vgc: £100, NO Offers. GW1MCD. Phone evenings only. (Cwmbran) 01633 870791.

ICOM AH2A: £150. Magnetic Loops, Capco 80-10m, no gaps: £250. Cobwebb 20-10m all bands: £75. Buyer collects or pays carriage. G0KRX. (E. London) 0181 505 1457.

ICOM IC-04E 70cm H/held, gd condx, includes Nicads, charger, spare battery box, case, original packing, manual: £185 inc p/p. G0EWC, QTHR. (Bristol) 0117 977 6891.

ICOM IC-R100 Wide-band Receiver, 0.5 - 1,800MHz. AM/NFM, WFM/SSB (offical mod), 100 memories with AD-15E PSU. Complete, boxed: £325. Richard, G8ITB. (Orpington) 01689 852177.

ICOM IC24ET D/band H/held Tcvr 2m/70cm, built in rechargeable battery, spare battery and charger. Alternate plug-in Micophone, Magmount, D/band Antenna for Mobile operation. All as new, boxed with instruction manual: £225. (Bath) 0761 434224.

ICOM IC701 / PS701 HF Tx/Rx 100w 160-10m: £275. IC-EX2 Marker Ext Term: £25. Collins Blanker 136B-2: £35. Eddystone Plug-in 'S' Meter (Silver grey): £15. Comdel Speech Processor: £25. G3GGK, QTHR. (Cambs) 01954 210374.

ICOM IC735 Gen Cov Tx/Rx, 500Hz CW Filter, Internal Keyer, Mic, Manual, excl condx: £650. Yaesu FP700 20A PSU, excl condx: £125. Kenwood Desk Mic MC60: £40. HF Dummy Load, cont 300W, 3 minutes 1KW: £35. Single Paddle Key G4ZPY: £25. HiMound HK704 Key: £15. Test and collect. Alan, G3DAC, QTHR. (Crewe) 0270 581460.

ICOM IC735 with CW Filter, boxed etc: £700. Heathkit SB201 1kW HF Amp: £375. JMA 25A PSU: £70. All ono. (Watford Area) 01923 854172.

JRC NRD535 Receiver, mint cond, boxed: £850 ono. Dewsbury DM1000 Decoder RTTY/CW/AMTOR/FEC/REQ with Monitor: £175. G7TPK. (Shrewsbury) 01743 874791.

KENWOOD 440S, late model, Auto ATU, CW SSB Filters, PSU: £800. Yaesu FRG7: £75. Heathkit HW7: £40. Icom 740 SSB/CW Filters in both IF's, integral Power Supply: £430. HyGain TH2 Mk3S, brand new: £230. Prefer buyers inspect, collect. G3IZJ, QTHR. (Farnborough) 01252 548561.

KENWOOD SPARES, New. DS-2 (TS830): £40, DCK-1 (R1000/2000): £5, CK-18 WARC Band Coil Kit: £15, Filters (TS930/940) AM YK-88A-1: £30, 270Hz YG-455-CN: £80, 500HZ YK-88C-1: £20. (Llandudno) 01754 610331.

KENWOOD SW200A SWR/PWR Meter, boxed: £40. 50MHz Tonna, boxed, used one week only: £25. 5 ete XY Jaybeam 137MHz: £20. SSB Electronics 5 Band Converter: £100. Zenith Superport 286 Laptop, case, charger, Mouse, S/ware, vgc: £200. G4JBH. (Yeovil) 01935 28341.

KENWOOD TM-241E 2m, 5/10/50w: £240. Icom IC-U101 70cm, 15w: £140. Both exc condx. Yaesu G-250 Rotator: £50. 70cm Beam Antenna 10ele: £20. Postage extra on all. Ring Pascal, GI0SFT after 5pm. (Londonderry) 0504 352804.

KENWOOD TM702E D/bander, ex cond: £400. FT411 H/held, ex cond: £145 or would part exchange all for complete Packet Setup, WHY. (Aston Clinton) 0296 630484.

KENWOOD TS140S in mint condx, only used as Rx, boxed with Mic, manuals, power lead: £550 ono. Colin, GW7PPJ. (Merthyr Tydfil) 01443 690608.

KENWOOD TS440 SAT with VS1 Voice Synthesizer, IC10 Interface Kit and all usual features in exc condx, but No Mic: £750 ovno. (Nr Cardiff) 01443 838127.

KENWOOD TS50 with matching AT50: £900 NO OFFERS. PSU 30A, with Volt and Ammeter: £80. TR Dip Meter DM4061: £50. All boxed and manuals. (Sheffield) 0114 232 0008.

KENWOOD TS930S as new: £900. Kenwood Hand Mic: £10. 3KW ATU with LP Filter: £50. Trio Monitor Scope: £175. Atlas 210X Tcvr with 30A PSU (3-15v): £375. SEM Z Match: £60. 200W ATU: £40. 30ft Trellis Mast: £40. (Windermere) 015394 42548.

KW E-ZEE Match ATU, immaculate condx: £50. Vibroplex Bug original De-Luxe model superb condx, instructions: £100 packing free postage extra. (Brecon) 01874 730373.

KW600 LINEAR, gd condx: £175. Eddystone EA12: £95. YAESU FT102, CW filter, FM Board, excl condx: £425. Prefer buyer collects. G4NKT, QTHR. (Bristol) 0117 967 2124.

LEADER PROGRAMMABLE D/Trace Oscilloscope LBO-5810A with Memory Unit: £125. Offers for the following:- PSU, PN12A with 4, 523 by Bendix. Caption Round Triock Valve, circus 1913. Philips Dictation Machine EL3581. Spectruscope Spark coil by Apps London, circus 1880. WD Trans/Receiver C42 No 1, 6 metres. Astro Compass Mk 2. WD 4inch Liquid Compass in sprung Box, Type P8. No 19 Set Variometer Mk 2. Heathkit Q Meter. Lenco GL85 Transcription Turntable. (East Molesey) 0181 398 3603.

LINEAR AMP Pye A200 'M' will convert for 2/4/6 metres. Each £12 + postage. G3AOS. (Macclesfield) 01260 252287.

LT2S 28/144MHz Transverter: £350. Icom IC-471E: £450. Yaesu FT225: £250. Contact Tim, GI4OPH. (Co Down) 01247 468442.

MITAC 286, 42Mb HDD, 5.25 Floppy. S/ware suitable Amateur use. VGA Colour Monitor. Bargain at: £150. Buyer collects. G0FQX, QTHR. (Milton Keynes) 01908 677250.

MUTEK TVHF 230C HF Transverter, 2m to 9 HF Bands, Offers. G0FOF. (Bedford) 01234 711904.

NOTEBOOK COMPUTER Ambra Max (IBM) 386SL 25MHz 80Mb/2Mb, VGA Mono, Mouse, battery charger PSU, 15 months old, DOS, Windows: £600 ono. G3VPH, QTHR. (Droitwich) 01905 773089.

OSCILLOSCOPE 35MHz ADVANCE, D/trace, full manuals, can be seen working, exc condx, no screen burn: £135 ono. (Coventry) 01203 450476.

PACKET STATION; C64, D/drive, Monitor, Modem with Digicom (packet), TIF1 Interface with TX3 (RTTY), Loads other accessories: £140 ono. (Gloucester) 01452 385911.

PHILIPS VCR VR231/05, brand new; £100. Unwanted gift. G3EFK, QTHR. (Dorchester) 0305 852134.

PK-88 with ROM for BBC-B: £85. AMT-2, all Mode Terminal with ROM for BBC-B: £50. NASA Navtex Video: £55. **Gemini FM Tcvr 10m: £20**. Kenwood VFO-520 Remote VFO: £55. Doug, G4BEQ, QTHR. Require Handbook/circuit for Scopex 14D-15 Scope. (Locks Heath) 01489 582423.

RACAL RA17 Mk2, 0.5-30MHz Rx, vgc, operating/maintenance manual: £150. G4ATU. (Ormskirk, Lancs) 01695 421020.

RADAR FURUNO 24 mile range finder 30 inch Dome, 12 years old, can be seen working: £300. New Samsung Colour Monitor PC Commodore Amiga: £50. Archimedes A3000 4Mb Ram, Stereo colour Monitor, advanced operating System: £475 ono. Will split or WHY HF Linear, Beam, Rig etc. G0KRH. (New Romney) 01797 364139.

RADCOM:- Oct 69 to Oct 94. All in gd condx. Space needed. Make me an offer. Buyer collects. Tel: (Derby) 01332 556005.

RECEIVER R1947 (CR150), 2-60MHz: £50. Receiver RL224A 1-10MHz: £30. VTVM CT54: £12. Buyer collects. Wanted HRO Dial. (Chester) 01244 381051.

RPCB 736 Replacement Front End kit, complete with all boards and instructions. Kit was fitted to Tcvr. Genuine reason for sale: £120. EI5PZ. (Tralee, Eire) 01035366 23758.

SEM QRM Eliminator Mk2 version with full instructions: £45, OR Exchange for High Gain 2m Colinear or VHF SWR/Power Meter. (Redhill) 0737 762753.

SHACK CLEARANCE. FT101: £95. Heathkit DX100U+ SSB adaptor: £25. AR88: £100. B40: £110. B41: £110. Pye Base Rx/Tx 70cm: £50. Storno Base Rx/Tx 70cm GQF 664-20: £120. Telequipment D53: £50. Three RS232 Terminals + Keyboards: £15 each. Most very Heavy. (Ladybank) 01337 830477.

SILENT KEY G4KTN. Welz SWR/PWR model SP200: £50. MFJ1272 Switch: £25. Datong Tutor D70: £40. SEM QRM Eliminator Mk1: £35. Heathkit GDO HD1250: £35. Hameg Scope HM203-5: £150. PK232, Not MBX: £150. Dentron ATU AT-1K: £100. All ono, plus carriage. (Romford) 01708 748146.

SILENT KEY SALE G8FAY. FT One: £625. FDK Mobile Tcvr: £110. Belcom 180w 2m Linear: £55. MM-432/100: £70. R-537S Airband Rx: £45. Braun Multimode 2m Tcvr: £70. Kenwood PS30 PSU: £50. Daiwa HF ATU: £50. Daiwa VHF/UHF SWR Meter: £40. Datong FL2: £55. Datong Morse Tutor: £30. RTTY, SSTV Systems, Katsumi, Hi-Mound Keys, CW Monitor, 50ft Lattice Tower - OFFERS. (West Sussex) 0193 892391.

SILENT KEY SALE GM4TSI. Kenwood TS830S, new condx, checked by Lowe Electronics. With handbook and Hand Mic: £500 ono. Phone GM2BWF, QTHR. (Dunblane) 01786 824207.

SILENT KEY SALE. Yaesu FT221R: £250. Yaesu FT208R c/w charger, needs Battery Pack: £100. 2m/6m Linear Transverter: £75. (Worcester) 01905 641733.

SILENT KEY SALE. Yaesu FT9010M, spare PA Valves, Adonis Desk Mic, Morse Key all for: £375 ono. Yasesu FC301 ATU 0.5kW: £100 ono. AOR 1000 Handheld Scanner: £185 ono. Epson RX80F/T Printer c/w spare ribbon: £40 ono. Buyer inspects and collects or pays carriage. (Chippenham, Wilts) 01249 651471 early evenings.

SILENT KEY SALE: Capco Loop Antenna AMA3, loft use only: £150 (new £375). BNOS Linear 3/100W: £130 (new: £275) FRT7700 Tuner for FRG: £40. All gd condx. (Ex G0GNB) G0OIG. (Maidenhead) 01628 25435.

SMALL COLLECTION of WW2 Radio for disposal including WS19 Set, Marconi T1154/R1155. For further details please phone. (Yorkshire) 0845 567519.

SONY ICF-SW100 Short Wave Rx, as new, few minutes use only: £145. Kenwood TH77E 2m/70cm H/held Tcvr, case, S/battery, charger, manual etc, very little use, immaculare: £270 ono. Phone Ken. (Dunstable) 0582 605693.

SSB S-BAND down Converter for Oscar 13: £100. Timestep P-Hempt Wx Satellite 1.7GHz Pre-Amp: £100. WANTED; Drake R4C, SWC2/SWC4 Couplers for Trio SWR/PWR Meter, UT10 23cm Unit for TS790. G4JBH. (Yeovil) 01935 28341.

TEN-TEC DELTA Tx/Rx, outboard 2nd VFO, all bands 160-10, 100w, sophisticated Filters, listen two freq similtaneously. Reason for sale, new Omni 6: £350. GW3GRY. (Newport) 01633 400836.

TENTEC SCOUT 555, 50w HF TCVR plus 20m Module and Hand Mic: £425 ono inc carriage and insurance. G0GPO, QTHR. (Canterbury) 01227 711261.

TET HB33SP 3 el Tri-Bander Yagi, 10/15/20m, 13ft 6in Boom, perfectly super performer, with manual: £150. Belongs GM4KLO, buyer arranges collection. Dismantled. Phone Bill, GM3AWW, QTHR. (Glasgow) 0141 639 2370.

TR751E 2m M/mode, mobile bracket, used only as Base Station, manuals, boxed as new: £525. TM75E 2m/70cm H/held with accessories, manual, boxed, v/gd condx: £220. MMS2 Advanced Morse Trainer, synthesised Speech as new: £75. GW1JPF, QTHR. (Tywyn) 01654 711403.

TRIO 830S, 500Hz CW Filter, excl condx, plus Trio MC50 Desk Mic: £520. G4GLC. (Settle) 01729 822299.

TRIO R600 Comms Receiver. Deceased Estate. Mint condx, boxed with manual: £150 ono. Phone anytime (Kingston, Surrey) 0181 547 3074.

TRIO TS530S, new PA's last year, Narrow SSB Filter, exc condx, MC50 Desk Mic included at: £475. Buyer must collect! Datong PC1 General Coverage Receive Converter: £60 + M/Modules 2m/10m Converter: £20 (used together). Yaesu FRG7700, memory, FRT7700: £325. (All + P&P). (Stockport) 0161 477 5303.

TRIO TS820 HF Tcvr, inc Mic, CW Filter and spare valves: £250. Tokyo 2m to HF Transverter, as new: £175. Kenpro KT44 70cms basic H/held, with spare battery case and six Nicads: £90. KDK 2m Mobile Tcvr 5/25w: £75. G4MH Minibeam, unused: £80. Prefer buyers inspect and collect, otherwise carriage at cost. G3ZOG. (Sunderland) 0191 528 0080.

TS430S HF Tcvr, FM Board, filters fitted, 100w, DC leads, original box, manuals etc, gd condx: £550 ono. Kenwood AT250 Auto ATU 160-10m with leads, original box and manuals, gd condx: £135 ono. Both items in perfect working order. Contact Steve, G0KIK, QTHR after 5pm. (Plymouth) 01752 784892.

TS430S, Narrow SSB, CW Filters, FM board, Gen Coverage, inc PSU: £400. AT250 Matching Auto ATU: £150. PK232: £180. DX2000 80-10m Vertical: £90. Junker Morse Key, precision adjustment, the Classic: £35. Please write Terry, 7 Cavendish Drive, Clowne, Chesterfield, Derbys.

TUNER UNIT TM1000/B 1kW PEP, boxed new never used Roller Coaster 1kW 4:1 Balun: £135 plus carriage. (Bideford) 01237 470359.

VALVES; 6146B RCA: £25 pair. 6DQ5: £5 each. ICOM Filter FL53A: £60. SM5 Mic: £30. G3GGK, QTHR. (Cambs) 01954 210374.

VHF/UHF RECEIVER - Nems Clarke 1302B, REU300 Range Extender, Spectrum Display Adaptor, covers 55-905MHz continous, AM/FM. Gd working order complete with service manuals and tidy cabinet: £250. RTTY System comprising T199/4A Computer, Interface and Terminal Unit, Kantronics S/ware, also many cartridges including extended Basic, Joystick, Cassette Recorder, much amateur radio S/ware and documentation, user group magazines etc: £40. (Oxford) 01865 890066.

WEATHER SATELLITE SYSTEM Meteosat; One Metre Dish, feed, Pre-Amp and Rx. NOAA crossed Dipoles, Pre-Amp, and Scanning Rx. Prosat 2 Card and S/ware. All electronics by Timestep: £550 complete. May split. G6RHL, QTHR. Evenings and weekends please. (Shefford) 01462 812739.

YAESU 747GX Tcvr: £500. Zetagi 13V 25A Pwr Sply: £75. VSWR Bridge: £30. Sadelta

Desk Mic: £25. Television Engineering Handbook (Fink): £5. Radio Engineering (Terman): £5. (Fareham) 01329 843219.

YAESU CLASSIC twosome, FR100B Rx and matching FL200B Tx in gd condx: £185 the pair, NO split. AMT3 AMTOR/RTTY Terminal: £85. Bencher Twin Paddle Key with built on Curtiss Keyer: £47. 4CX250B with Base: £20. 4CX250B: £10. Pye Reporters: £7.50 each. Also two Pye Base stations for disposal. All inspect/collect or carriage extra. Call Dave, G0MJK, QTHR. (Northampton) 01604 711647.

YAESU FT-101ZD Mk3, FV-101DM, FC-902, SP-901, Datong FL3 Filter with PSU. All with Instruction Manuals: £845. Inspection preferred before purchase. G0MPR. (Walsall) 01902 632672.

YAESU FT101 160-10, inc 11, 13, 15, 18 and 21m, fan, PSU: £250 ono, OR possible P/X, Dual/Triple Bander, 2m/70cm,6m. WHY. Shaun, G7TGY. (Lewes) 01273 477998.

YAESU FT101Z, WARC bands, CW Filter, Mic, fan, handbook, spare PA valves, excel condx, boxed: £350. (Stockport) 0625 850088.

YAESU FT101ZD FM MK 3, recent revalved and realigned, little used, exc order: £395. Roy. (Bournemouth) 01202 548469.

YAESU FT101ZD, gd condx, manual, fan, Mic: £250. Low price owing to station closing down. (Woodbridge) 01728 688123.

YAESU FT107M HF Tcvr with DMS107 Digital Memory, FV107 Ext VFO, FC107 ATU, FP107E AC PSU, YM38 Mic, all leads, operator manuals, all mint, little used: £750. Trio 2300 2m Portable Tcvr with nicads and charger, additional 10w Power Amp, ideal for new amateur: £175. G4SQP, QTHR. (Wolverhampton) 0902 845636.

YAESU FT2200, 5/25/50w Mobile or Base, 6 months old: £280. EP-925 PSU, 30A: £80. Revex SWR/PWR Meter: £25. Buyer collects. Call 6pm. (Clapton Common) 0181 806 4470 evening.

YAESU FT225RD, Mutek, boxed: £575. **Signal R535 AirBand: £200**. Icom ICR71 Gen Coverage HF Rx. Possible swop, WHY. Dave, G3RCQ. (Romford) 01708 374043.

YAESU FT480R 2m M/mode, with Mic, handbook, excel condx: £225. Antenna Rotator AR-40, unused, boxed, c/w Control and cables: £60. Buyer collects. (Newbury) 01635 34971.

YAESU FT707 Tcvr: £210. Kenwood VFO-120: £40. Lake DTR3 80m QRP Tcvr: £25. Peter, G0JWV. (Truro) 01872 501656.

YAESU FTDX400 (new PA Valves): £100. Drake T4X-C: £150. CDE Autorotor 16 metres cable: £50. 8el Cross Yagi: £10. SWM's 1946/1976, old books, meters, valves, Broadcast Radios. (Offers?). Buyer collects. G2FIX. (Wilton, Salisbury) 0722 743837.

WANTED

ALL EARLY Wireless and Television Items, Crystal Sets, Receivers, Transmitters, Horn Speakers, Pre-1925 Valves, Early Hi-Fi, Pre-War Television. Spy Sets, any Clandestine Equipment, early Radio, Television Books. Pay cash and collect. G4ERU. 5 Luther Road, Winton, Bournemouth, Dorset BH9 1LH. (Bournemouth) 01202 510400.

ANTIQUE WIRELESS Equipment, Crystal Sets, Horn Speakers, Valves, Pre-war Television, Valve Hi-Fi, Books. G4ERU, 5 Luther Road, Winton, Bournemouth BH9 1LH. (Bournemouth) 01202 510400.

AP1086 ISSUE 1 (RAF Radio Stores Ref No's) Also Air Publications relating to Radio, Radar equipment, exc price offered. Would purchase Post-War to current Magnetrons, Klystrons, T/R cells, Photo Multipliers, Thyratrons, Ignitrons, Planar- Ceramic, Microwave and special CV types. Required Rx Type R1355 10D/13032, unmodified. Also R3002-3, R3120-1, ABK-ABKI, SCR 695A, SCR 695AZ, Control Unit Type 17 or 18. Phone anytime. (London) 071 511 4786 or 071 790 2846 or FAX 071 511 4786.

DIGITAL SIGNAL Processor for CW and SSB in full working order please. G0POS. (Gillingham, Kent) 01634 379140.

EDDYSTONE 888A and EA12 in gd condx. Cash waiting, will collect. G4JQN. (Westbury, Wilts) 01373 864478.

70CMS LINEAR Amp, about 25-30 watts o/p. Prefer Microwave Modules. (Shetland) 01950 (4)60472.

A CRYSTAL for 1923 Revophone Crystal Set. Clarke. (Surrey) 0483 275461.

A TWO Metre Converter Unit, Printed Circuit Board No 1306 for Yaesu FR101 Receiver. T Plummer, 33 East Street, Sudbury, Suffolk. (Sudbury) 01787 311985.

CIRCUIT OF SONY Trinitron Viewdata Terminal KTX9000UB or conversion details to RGB Monitor. G3XLF, NOT QTHR. (Runcorn) 01928 560009.

CIRCUITS for DC Oscilloscope Testgear (Acton) Ltd. Jason Audio sin/sq Gen A610. Nombrex Trans Power Unit type 61. G0IPT. (London) 0181 883 3474.

CODAR AT5 mains PSU. T28 Rx Labgear 160 twin mains PSU and information. Cleartone CH900 UHF H/held Manual or circuit. (Rugeley, Staffs) 01543 685694.

COLLINS 180S-1 Tuner and Heath GD1U Dip Meter and coils. G0SIU, QTHR. (Nr Brighton) 01273 887821.

COLLINS EQUIPMENT Wanted for cash or possible exchange. Preferably gd cond but all equipment considered. Call with details, G3GBB (Suffolk). Day 01284 753049. Evenings & w/e 01379 783657.

COLLINS KWM 380. Also 'S' Line + any Collins Literature. GI4RYP. Phone after 6pm. (Armagh) 01861 524267.

CT212 SIGNAL GENERATOR. R216. R209. R109. Cat Rx. Type 618 HF Tx. (AP100333) B40 SSB Unit. G4FUY, QTHR. (Wokingham) 01734 733633.

EDDYSTONE 960 Wanted. Consider other "Slide Rule" Dial model. Eddystone Speaker also wanted, Round or Oblong (not plinth type). GW4RYK. (Montgomery) 01686 630255.

HAMMARLUND HQ215 Rx. Require Manual to Copy. Intersted in another Rx and/or matching Tx. WHY? Stuart, G4MIB, QTHR. (S. London) 0181 674 6452.

HUNTS Capacitor Analyser and Resistance Bridge Type CRB3. Circuit and Information required. Please contact G4UJE, QTHR. (Stockton on Tees) 0642 674074.

HY-GAIN 3,4 or 5 ele 10m Monoband Yagi. Philip, G4ZOW. Phone Fax anytime. (Potters Bar) 01707 660760.

ICOM AH3 ATU and AH2B Mobile Whip with Mounting. G0LZT, QTHR. (Knares Borough) 01423 863073.

KENWOOD AT250 ATU, second hand. Also 70cm Mobile Tcvr required, S/H. But not too expensive. (Harrow) 0181 204 8254.

LABGEAR LG300 Tx in gd condx with or without Matching PSU. Possible another Transmitter Unit for Spares. G3JFC. (Sleaford, Lincs) 01529 413547.

MAINS TRANSFORMER for UNICA UNR30 Rx or similar. Primary 240v, Secondary 150v and 6.3v. Scrap Rx if Transformer OK. John, G3YJD. (Bletchley, Bucks) 01908 379250.

PHILIPS PR710 H/held Tx/Rx UHF or highband. Also charger and batteries or any parts for above. ie. cases, aerials etc. (March, Cambs) 01354 741168.

POWER SUPPLY UNIT for BC221. Old fashioned 5 watt Neon bulb. WS48, W/S21, W/S62. Any B2 Units or hopefully Complete set!. Morriss, G4GEN, QTHR. (Nutley) 01825 712205.

PRESENT ADDRESSES of:- VK0KH, FO8AK, T3LA, H44WH, H44PT, H44CB, H44BH, H44JE, A35JL, VP8AHS, ZK1DR, ZK1AC, FW8SC, FO8FW, AX9NYG and 3D2WR. Active 1980/81. Postal expenses reimbursed. Mike, 35 Elliot Avenue, Reydon, Suffolk IP18 6QX.

QUAD, Leak, Radford etc:- Valve Hi-Fi Equipment, working or NOT. Will pay cash and collect. (Chelmsford) 0245 266027.

RACAL SPEEDRACE Equipment; MA228 Exciter, RTA191 Receiver, TA349 Linear. RA17L Receiver in "as new" condx, RA63 SSB Adaptor. Parts for TA127 Transmitter. Creed 75 Teleprinter, Tape Reader and Perforator Attachments, Silent Covers, Synchronous Motors 120/240v 50/60Hz. Marconi Instruments; Oscilloscope TF2210, MF Oscillator TF2101, RF Millivoltmeter TF2603, AF Power Meter TF2500. Nigel, G0UGD, 2 Church Close, Eastbourne, East Sussex BN20 9QY.

RACAL SPEEDRACE Equipment; MA228 Exciter, RTA191 Receiver, TA349 Linear. RA17L Rx in as new condx. RA63 SSB Adaptor. Parts for TA127 Transmitter. Creed 75 Teleprinters; Tape Reader and Perforator Attachments; Silence Covers; Synchronous Motors 120/240v 50/60Hz. Marconi Instruments; Oscilloscope TF2210, MF Oscillator TF2101, RF Millivoltmeter TF2603, AF Power Meter TF2500. Nigel, G0UGD, 2 Church Close, Eastbourne, East Sussex BN20 9QY.

TENNAMAST Type Tower, must be Winch up Tiltover in gd condx, approx 45 ft. Don't delay, phone today. (Bransgore) 01425 672927.

WANTED Circuit diagram of PRD815 HV Klystron PU. HP 694A or 691 to 694 Series, Sweeper. Stoddart NM20B RF 1 Meter. Also two APN1 Antennas. All costs refunded. Des Clift, VK5ZO PO Box 274, Mount Barker South Australia 5251. +61 8 3911092.

YAESU FP757 Switched mode PSU or similar lightweight power supply. Brendan, G0UCT, QTHR. (Croydon) 0181 651 1424.

YAESU FR50B Rx. Pref gd condx, must be working. G4DFQ, NOT QTHR. Phone (Cambridge) 01223 242766 or Fax 01223 513113

EXCHANGE

YAESU FT-77 3.5-30MHz HF Amateur Band Tcvr with FC-700 ATU, boxed with Mic, leads, manuals - EXCHANGE for Icom D/band VHF/UHF Mobile or Base. Also Trio All Mode TR9130 2m Tcvr with extended Rx/Tx, Mic, manuals, leads, boxed plus two Mobile mounts for ICOM 6m M/mode. Contact G4XPP, QTHR or phone after 6pm. (Willington) 01388 745787.

KENWOOD TM742E 50w FM Mobile Tri-Bander, fitted 6m and extended Rx/Tx. Kenwood TM255E two metre M/mode, 40w, 100 chan memory. Both current models and boxed like new. BNOS 15A metered PSU. EXCHANGE (straight swap only) All above items for:- Kenwood TS790E fitted with 23cm. Must be in perfect working order and mint cond. (Can travel) G7OFR. (Bradford) 01274 880895.

NTED RA17 or AR88 Exchange for Scanner PRO35 or will pay cash or cash adjustment either way. (Burnley) 01282 39275.

YAESU FT890AT, six months old, never used FOR:- Yaesu FT736R with 6m. Must be in gd cond. (Worcester) 01905 421312.

CLUB NEWS

DEADLINE - Items for inclusion in the February 1995 issue must be sent to HQ marked 'Club News - DIARY', to be received by 20 December latest. If news is received by the published deadline, it should appear in the listing. It is your responsibility to ensure that items are sent DIRECT to HQ in good time. News items should be sent in writing, preferably typed or written legibly, and be signed by the club secretary or the person responsible for publicity.

NOTE: This is primarily a service for clubs affiliated to the RSGB, to whom priority will be given.

AVON

RSGB CITY OF BRISTOL GROUP - 13, Christmas Social. Now meets last Tuesday in every month at New Friends Hall, Purdown, Bell Hill, Stapleton, Bristol. Details 0117 967 2124.

SOUTH BRISTOL ARC - 7, 20m DX Rx evening; 14, Christmas social; 21, 'Hair of the Dog'; 29, Greetings to old friends. Meets every Wednesday at 7.30pm. Details 01275 834282.

WESTON-SUPER-MARE - 5, 'Home Brew' Evening; 19, Workshop; Jan 9, AGM. Details 01934 415700.

BEDFORDSHIRE

SHEFFORD & DARS - 1, Members Activity night; 8, The G4JLP Challenge; 15, Chairmans mince pie night; 22 & 29, Christmas break. Details 01462 700618.

BERKSHIRE

BRACKNELL ARC - 14, Cheese and Wine Party; Jan 11, AGM. Details 01344 420577.

NEWBURY & DARS - 14, Social plus lecture. Details 01635 863310.

READING & DARC - 8, Annual General Meeting and G5KV award. Details 01734 698274 eve.

READING & WEST BERKSHIRE RAYNET G - The club is urgently seeking new members. Net every Monday evening on 144.775MHz at 7.30pm. Details Denis, G4KWT 01734 698526.

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 7, IBM Computers (part 2). Details 01296 81097.

CHESHAM & DARS - 7, General meeting; 14, Christmas Lecture; 21, Christmas Social Evening. Details 01494 676391.

MILTON KEYNES & DARS - ***NEW *** All meetings now in Room 202, Falkener House, Bletchley Park on 2nd and 4th Monday each month at 7.30 for 8pm. Novice Class every Wednesday 7pm. RAE Classes Thursday at G4NJU QTH. Details 01908 672920.

CENTRAL

STIRLING & DARS - Meets every Thursday at 7.30pm in the Clubrooms, Bandeath Industrial Estate, Throsk, Nr Stirling. Morse instruction available when requested. Club station GS4TMS on air Club nights. Details 01324 636235.

DOLLAR ACADEMY ARC - Meets most afternoons at the Academy after 3.30pm. Details Geoff GM0LOD 01259 742126.

CHESHIRE

CHESTER & DARS - 13, Christmas Social. Details 0151 608 3229.

STOCKPORT RS - 14, Annual General Meeting; 21, Christmas Party. Details 0161 439 4952.

CLEVELAND

EAST CLEVELAND ARC - 2, Night on the Air; 9, Planning night; 16, Pool Competition. Details Alistair on 01642 475671.

CLWYD

RHYL & DARC - Meets every 2nd Monday in the month, Wellington Community Centre, Wellington Road, Rhyl at 8pm. Details (GW3UTG) 01745 351362.

NORTH WALES R Rally C - Activities include Novice courses, Morse instruction, Club Station on Air and a City & Guilds Approved Examination Centre. All radio enthusiasts are welcomed to visit. Practical Construction Course being arranged for the Autumn and Winter periods. Meets each Thursday at 7.30pm, YMCA Building, Colwyn Bay, Clwyd. Details 01492 513246.

WREXHAM AR - 6, tba; 13, Christmas Buffet. Details from David, GW1MVL 0978 845858.

CO ANTRIM

CARRICKFERGUS ARG -Club meets every Tuesday at 7pm in Downshire Secondary School. Details 01960 351807.

CO ARMAGH

ARMAGH & DARC - Meets 2nd and 4th Wednesday of the month at County Armagh Golf Club, Newry Road, Armagh at 8pm. Details 01762 870423.

CO DOWN

BANGOR & DARS - Details 01247 883315.

CORNWALL

CORNISH RAC - 1, Talk 'A good day in VK' by Les. Details Robin 01209 820118.

PENZANCE RAC - Regular meetings on Mondays, also 2nd Morse Test centre, via RSGB only. Details Brian, 01736 61427.

POLDHU ARC GB2GM, GX0PZE - Regular meetings Tuesdays and Fridays, 7.30pm. Visitors welcome. HF net Wednesdays 7.30pm, around 3.75MHz. All welcome. Details 01326 290638.

St AUSTELL ARC - Meetings 1st & 3rd Mondays, 7.30pm at Poltair School during term-time other wise at Skywave. Visitors most welcome. Details G4TRV 01726 72961 or G1DDK 01726 70220.

DERBYSHIRE

BUXTON RA - 13, Social Evening. Details G4IHO 01298 25506.

DERBY & DARS - 5, Amateur TV Group meeting; 7, Junk Sale; 14, Constructors Contest; 21, Christmas Party - in club room. Details G7PXA 01773 856904.

<DEVON

APPLEDORE & DARC - 19, Christmas Party. Details 01237 477301.

EXMOUTH ARC - Meetings held at the Scout Hut, Marpool Road, Exmouth on Mondays at 7.30pm. Details 01395 279574.

PLYMOUTH RC - 6, Business & natter night; 13, Mince pie and sherry night; 16, Christmas Party with Kwiz Kup Competition; Next meeting Jan 10, Talk. Details 01752 563222.

SOUTH DEVON RC - Meets every Wednesdays 7.30pm. Details 01803 522995.

TORBAY ARS - 16, Christmas Party. Club nights every Friday at the ECC Social Club, Highweek, Newton Abbot. Details 01803 526762.

DORSET

BLACKMORE VALE ARS - ***NEW VENUE*** Now meets at Shaftesbury School, Dorset on 2nd and 4th Tuesday of each month. Details Stuart, G7JIF 01963 362766.

DORSET POLICE ARS - 1, Club Project update; 15, Christmas Do. Club meets at Dorset Police HQ. Details from: c/o Pc 915 Richard Newton, Eastern Control Room, Bournemouth Central Police Station, Madera Road, Bournemouth, Dorset. Tel: 01202 552099 x2031.

FLIGHT REFUELLING ARS - Nov 27, Annual General Meeting, Table Tennis room, 8pm; Dec 4, Hi-Fi & Visual 'State of the Art' Demo's at Holmans, Wimborne by G4WRT; 11, Progressing with 'A' Licence by G4CVX; 14, Christmas Dinner at the FR Social Club; 18, A Talk about wildlife 'Fur & Feathers'; 25, CLOSED! next meeting Jan 8th 1995. A Merry Christmas to all our friends and 'Hamfesters'. Details John on 01425 653404.

POOLE RS - 9, Social Evening. Usually meets on the 2nd Friday of each month at The College of FE, Lady Russell Cotes House, (just behind the Jellicoe Theatre), Constitution Hill Road, Parkstone, Poole. Details 01202 762110.

DYFED

ABERYSTWYTH & DARS - 8, Mince pies and Morse night. Details 01545 580675.

EAST SUSSEX

CROWBOROUGH ARS - Jan 26, AGM. Details 01892 653782.

CROWBOROUGH & DARS -Meets every 4th Thursday at the Plough & Horses, Crowborough at 8pm. Details 01892 661807.

HASTINGS E & RC - Dec meeting, Christmas Social. Details 01424 830454.

SOUTHDOWN ARS - 5, Talk on Radio Site Management by Mr PDC Baxter, Functional Specialist, Radio & Microwave Seeboard Transmission; Jan 7, AGM. Meets on 1st Monday of each month at Chaseley Home for Disabled Ex-

CONTINUES ON PAGE 88

SMC, A.R.E. & .....R

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CREATE

ANTENNAS

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714X-3	3-4 ele Yagi 15-20-40m 3Kw PEP..	£1369 E
CD218	3 ele Yagi 10-15 1.5Kw PEP	£289 D
CD318JR	4 ele Yagi 10-15-20m 750w PEP ...	£439 D
CD318	4 ele Yagi 10-15-20m 2Kw PEP	£539 D
CD318B	5 ele Yagi 10-15-20m 2Kw PEP	£589 D
CD318C	6 ele Yagi 10-15-20m 2Kw PEP	£899 D
CL10	5 ele Yagi 10m 2Kw PEP.....	£299 D
CL15	5 ele Yagi 15m 3Kw PEP.....	£450 D
CL4B-4	3 ele Yagi 40m 4Kw PEP.....	£1375 E
CV730V-1	V-Dipole 10-15-20-40m 1Kw PEP ..	£199 D
CY103	3 ele Yagi 10m 2Kw PEP.....	£179 D
CY104	4 ele Yagi 10m 2Kw PEP.....	£239 D
CV48	40m Vertical 2Kw PEP	£275 D
AD385	40/80m Switch box for CV48	£69 B

VHF Antennas		
CLP 5130-1	Log P 50-1300MHz 25 ele	£259 C
CLP 5130-2	Log P 105-1300MHz 20 ele	£169 C
CLP 5130-3	Log P 90-220MHz 12 ele	£139 C
CL6 DX	6m 6 ele Yagi 13dbi	£187 D
CL6 DXX	6m 7 ele Yagi 14dbi	£195 D
CL6 DX2	6m 8 ele Yagi 14.5dbi.....	£269 D

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AP8A	8 Band Vertical	£199.00
APR18A	Radial Kit	£49.00
40-2CD	2-ele 40m Yagi	£439.00
A3S	14-21-28MHz Yagi	£349.00
A3WS	12/17m 3-ele Yagi	£275.00
A103	30m Extension A3WS	£115.00
204CD	4 ele 20m Yagi	£439.00
154CD	4 ele 15m Yagi	£249.00
D4	Dipole 10/15/20/40m.	£229.00
D3W	Dipole 12/17/30m	£169.00
A4S	3-4 ele Yagi 10/15/20m	£425.00

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AR-270b	2/70 Dual Band Vertical 2.3m long	£89.00
AR2	2m Vertical 1.2m long	£35.00
AR6	6m Vertical 3.1m long	£48.00
A148-10S	2m 10-ele Yagi 13.2 dBd	£59.00
A144-20T	2m 10-ele Cross Yagi 12.2 dBd.	£99.00
13B2	13-ele 2m Yagi	£99.95
17B2	17-ele 2m Yagi	£169.00
A50-3S	3-ele 6m Yagi	£75.95
424B	24-ele 70cms Yagi	£115.00
22XB 2M9	22-ele Yagi c/w polarization switching	£199.00
738XB	70cms 38 ele c/w polarization switching	£199.00

TOKYO HY-POWER

LINEARS

		£	Carr
HL100B/10	10M Linear, 10W in 100W out PEP Suitable for 21/24/28MHz	210	C
HL100B/20	20M Linear, 10W in 100W out PEP	210	C
HL100B/80	80M Linear, 10W in 100W out PEP	210	C
HL66V	6M Linear, 10W in 50-60W out Rx Preamp	169	C
HL166V	6M Linear, 3/10W in Auto select 80/160W out Rx Preamp	299	C
HL37VSX	2M Linear, 0.5-5W in 20-35W out variable gain preamp	109	B
HL62VSX	2M Linear, 5/10/25W in 50W out preamp	235	C
HL36U	70cm Linear, 6/10W in 25/30W GaAs FET Preamp	155	B
HL63U	70cms Linear, 10/25W in 50W out GaAs FET Preamp	259	C
HL180V	2M Linear, 3/10/25W i/p auto select 170W out Rx Preamp	389	C
HL130U	70cms Linear, 3/10/25W i/p auto select 120W out Rx Preamp	485	C

TRANSVERTORS

HX240	2M to HF 80,40,20,15,10M 2.5/10W Drive 30-40W o/p	299	B
HX640	6M to HF Specs as above	299	B
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B1016G	2m, 10W input, 160W output preamp	299.00	C
B2516G	2m, 25W input, 160W output preamp	269.00	C
B5016G	2m, 50W input, 160W output preamp	269.00	C
D1010N	70cm, 10W input, 100W output	349.00	C
D3010N	70cm, 25W input, 100W output	329.00	C
RC1	Remote switching unit for Mirage amps c/w 18ft cable run	38.00	B

MAST HEAD PREAMPS

		CARR.
KP2/2M	2m GaAs fet 0.6dB NF 20-25dB gain or 10-15dB adjustable 165W through power. 149.95	B
KP2/440	70cm GaAs fet 0.6dB NF 20-25dB gain or 10-15dB adjustable 165W through power. 149.95	B

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		CARR.
MP2	50-200MHz, 50-500-1500W average and PEP reading + SWR 9-13.6VDC internal battery. 189.00	B
MP4	1260-1300MHz, 1-10-100W average and PEP reading + SWR9-13.6VDC internal battery. 229.00	B

CARRIAGE: Base Antennas £9.00 Mobile Antennas £5.00 Station Accessories £5.00

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COMET ANTENNA

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CA-50HR	6M MOBILE Whip	£38.00
CA2X4KG	2M/70CM Mobile Whip	£45.00
Z4	2m/70cm M. whip w/locking collar	£33.00
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CF-520	2M/6M Duplexer	£24.50

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CONTINUES FROM PAGE 85

Servicemen, Southcliff, Bolsover Road, Eastbourne. Please enquire about RAE and Morse Classes. Details 01323 484282 or G0UOI @ GB7HAS.
MID-SUSSEX ARS - 16, Christmas Dinner, Sergisons Arms. Formal meetings 1st and 3rd Fridays each month, Club shack open all other Friday evenings. Details 01444 831400.
WORTHING & DARC - 7, Christmas Party; 14, Talk/slides 'Tarawa' by G0KAG; 21 & 28, NO Meeting; Jan 4, Discussion evening. Details Roy, G4GPX 01903 753893.

ESSEX

BRAINTREE & DARS - 5, Cheese and wine Party; 19, Operating evening. Meets every 1st and 3rd Monday in the month, at Braintree Hockey Club at 8pm. Details 01376 327431.
HAVERING & DARC - 7, informal/On air night; 14, Christmas Dinner (Subject to Support!); 21, Christmas social night at Queens; 28, No Meeting - Fairkytes Closed; Jan 4, AGM. Details Brian, G6EBO, c/o Havering & DARC, Fairkytes Arts Centre, 51 Billet Lane, Hornchurch, Essex RM11 1AX.
HODDESDON RC - 8, Quiz and natter night. Details 01920 466639.
SOUTHEND & DARS - Details from: PO Box 88, Rayleigh, Essex SS6 8NZ.
VANGE ARS - 1, Junk Sale; 8, Tba; 15, Christmas Buffet, Members and Guests only; 22/29, No Meeting. Details Doris, 01268 552606.

GRAMPIAN

ABERDEEN ARS - 2, President's Address; 9, Junk Sale; 16, Christmas Cheer - bring a Pressie'; 23 & 30, Closed - Christmas Hols and New Year/ Hogmanay. Meets at Queen Mother House, Claremont Place, Aberdeen. Details 01569 731177.
MORAY FIRTH ARS - Meets every Thursday at 7.30pm in Fleurs House, 62 Plusgarden Road, Elgin. Details 01343 86395.

GREATER LONDON

ACTON, BRENTFORD & CHISWICK RC - 20, Talk 'Taming the End Fed Antenna' by G3GEH. Details 0181 749 9972.
BROMLEY & DARS - 13, Christmas Party (**2nd Tuesday**); Jan 17, AGM. Usually meets 3rd Tuesday of every month, 7.30 for 8pm at the Victory Social Club, Kechill Gardens, Hayes. Details Alan, G0TLK 0181 777 0420.
COULSDON ATS - 9, Annual General Meeting. Club meets on 2nd Monday in each month at St Swithun's Church Hall, Grovelands Road, Purley at 7.45 for 8pm. Details 0181 684 0610.
CRAY VALLEY RS - 1, TBA; 15, Curry Night; Jan 5, NO MEETING. Details 0181 850 1386.
CRYSTAL PALACE & DRC - 17, Christmas Party and video/film show. Details 0181 699 5732 or 01737 552170.
EDGWARE & DARS - 8, The grand Edgware Annual Junk Sale; Jan 12, AGM. Details Rod, G0SQL 0181 204 1868.
GRAFTON RS - 14, Christmas Party and Constructors Competition; Jan 11, AGM. Details John, G0DFZ, 0171 272 2328.
RADIO S of HARROW - 2, Demonstration of Packet Radio with the clubs newly installed Packet Station; 16, The Clubs new Logo judging and Adoption. Details Jim on 01895 632377 evening or 0171 251 2700 daytime.
KINGSTON & DARS - Club meets on 3rd Wednesday of every month at 8pm at 'Alfriston', 3 Berrylands Road, Surbiton, Surrey. Details Ray, G0KXK on 0181 398 1128.
SILVERTHORN RC - 2, VHF Activity Evening; 9, Talk on Novice Licence (to be conf); 16, Christmas Party. Details Dave, G0KHC 0181 505 1871 or contact G1NPT @ GB7HSN.
SOUTHGATE ARC - 8, Annual General Meeting. Details 0181 360 2453.
SURREY RCC - 5, Talk 'Why Digital' by Peter, G3ZPB; Jan 2, Talk 'Slow Scan TV' by Peter, G4WPB. Club meets at 'Terra Nova', The Waldrons, Waddon, Croydon. Details Berni on 0181 660 7517.
SUTTON & CHEAM RS - 1, Natter night; 15, Christmas Buffet at 7.30pm at Sutton United Football Club, Gander Green Lane, Sutton. Details John, G0BWV on 0181 644 9945.
WIMBLEDON & DARS - 9, Christmas Social; Jan 27, Surplus Equipment Sale. Details 0181 540 2180.

GREATER MANCHESTER

ECCLES & DARS - 6, Annual General Meeting. Informal meetings every Tuesday from 9.30pm. Lectures/demonstrations 1st Tuesday of each month. Details 0161 773 7899.
MANCHESTER & DARS - Now meets every Tuesday at 7pm at Simpson Memorial Community Centre, Moston Lane, Moston M40 9NB. Novice and RAE Courses are run on a continous basis and are free to members. Details G3IOA 0161 681 5406.
SOUTH MANCHESTER RC - 2, Software Set-up by G4HOW; 9, Chairmans Birthday Lecture; 16, Christmas Party; 23&30, Club CLOSED. Details G7FQY 0161 969 1964.
TAMESIDE ARS - Now meets every Wednesday night at 7.30pm at the ATC Hut, Moorcroft Street, Droylsden, Tameside. Details from: A N Laughlan, 8 Kempton Close, Droylsden, Tameside, M43 7JL.

GWYNEDD

DRAGON ARC - 5, Talk 'A brief history of British Radar; 19, Christmas Party. Details 01248 600963.

HAMPSHIRE

ANDOVER RAC - RAE classes each meeting at 7pm. Meets at Wildhearn Village Hall, 1st and 3rd Tuesdays of each month. Details 01264 773547 evenings.
BASINGSTOKE ARC - 5, Christmas Social; 27, 2m DF Competition 'The Turkey Settler' Fox - tba. Details 01256 25517.
HORNDEAN & DARC - 1, Video evening (from the RSGB library); Jan 5, The Video Signal by Stephen Harding, G4JGS, Sony Broadcast. Meets at Horndean Community School, room X5, Barton Cross, (off Catherington Lane), Horndean. Details 01705 472846.
ITCHEN VALLEY ARC - 1, Skittles evening with Waterside Club; 9, Novieces Evening; 23, Open Night with a Christmas cheer!. Details Ken on 01703 732997.

HEREFORD AND WORCESTER

BROMSGROVE ARS - 13, Technical Topics/ talk. Meets at Lickey End Social Club, Alcester Road, Burcot. Details Barry, G0TPG on 01527 542266.
BROMSGROVE & DARC - 9, Christmas Party Club meets every Friday night at 8pm, Avoncroft Art Centre. Visitors welcome -free parking on site. Details G3RLF 01905 796718.
MALVERN HILLS RAC - 13, Annual General Meeting. Varied programme of speakers and events, all visitors welcome. Details G0TWT, 01684 560490.
REDDITCH RC - 8, Talk & deomnstration entitled 'Various Computer Logging systems' by Roger, G3KWK. Details G3EVT, 01789 762041.
SOUTH BIRMINGHAM RS - 7, Christmas Party - Club HQ 7.30 for 8pm. Details Don on 0121 458 1603.
VALE OF EVESHAM RAC - 8, Annual Dinner at The Angel Inn, Pershore 7.30 for 8pm. New members always made welcome. Club details from G4NRD on 01386 41508.

HERTFORDSHIRE

CHESHUNT & DARC - 7, Talk 'Photography is my Business' by Rod, G0JUZ; 14, Members Forun & natter night; 21, Christmas get together; 28, No Meeting - Merry Christmas. Meets at the Church Rooms, Church Lane, Wormley at 8pm. Details 01992 464795.
HODDESDON RC - 8, A Video evening, two from the RSGB Collection; 22, Christmas Social evening. Details John, G7OCI 01920 466639.
STEVENAGE & DARS - 6, General Get Together to discus projects etc; 13, Christmas Chicken and Chips Supper - tickets from Peter, G7HCL; 20, Day centre CLOSED for Christmas Party; Next meeting Jan 4 1995. Details Peter, G7HCL on 01438 724509.

HUMBERSIDE

BRIDLINGTON & DARS - 1, Talk by Ernie, G4TKY; 29, Talk by Jack, G5VO. Now meets at the Links Golf Club, Flamborough in Function room at 7.30pm. Details 01262 671268.
GRIMSBY ARS - 8, Christmas Party; 22 & 29, Club closed; Jan 5, AFS Organization. Details John, G3DOT 01472 825899.
HORNSEA ARC - Nov 30, Annual General Meeting; Dec 7, Getting started on Packet by G7NNT; 14, Novice Update from G3TLI and G0DEB; 21, Christmas Party; 28, Activity night. Details 01964 534283

ISLE OF MAN

ISLE OF MAN ARS - 5, Annual General Meeting at Royal Naval Assoc, Regent Street, Douglas at 8.30pm. Details GD6TWF QTHR.

ISLE OF WIGHT

BRICKFIELDS ARS and Vintage Wireless Museum - 1st Monday of every month, Bring & buy nights; Every Tuesday of week Novice Training & Construction evenings by Mike, G0SEB - 7.30pm to 10pm. Morse classes to be run as and when required; The Clubs Isle of Wight County Award is now Available, details Dennis, 2E1BND. Details G1VGM at GB7IOW.

KENT

DARENTH VALLEY RS - 14, Christmas Dinner. Details 01689 826846.
DOVER RC - During term time, club meets Wednesday evenings 6.30-10pm. Novice, full RAE and Morse classes. All ages (over 8) welcome. Details 01304 825030.
MAIDSTONE YMCA ARS - 9, Christmas Social. Details John, G0RHO 01622 832259.
MEDWAY AR & TS - 16, Christmas Social. Meets every Friday, other evenings include construction and Morse as required plus Novice help. Details 01634 685585 or 201462.
SEVENOAKS & DARS - 5, Annual General Meeting and Social. Details from The Secretary, Sevenoaks & DARS, c/o Council Offices, Argyle Road, Sevenoaks, Kent TN13 1HG.
WEST KENT ARS - 16, Christmas party. ***NEW VENUE*** Now meets at the Health Authority's Office, Sherwood Park, Pembury Road, Tunbridge Wells. Details G3OHV, 01892 664960.

LANCASHIRE

BURY RS - 6, Committee meeting; 13, Annual General Meeting; 20, Pre-Christmas preparations. ***New contact***, now Laurence, G4KLT on 0161 762 9308.
DARWEN ARC - Meets every 3rd Wednesday of the month at Darwen Catholic Club at 8pm. Details Bill, G2AKK 01254 703767.
FYLDE ARS - 13, Christmas supper & Social evening. Details G7CUL 01772 635464.
ROCHDALE & DARS - Meetings held every Monday, at The Cemetry Hotel, Bury Road. Details 01706 376204.
THORNTON CLEVELEYS ARS - Details G4BFH, QTHR.

LEICESTERSHIRE

LOUGHBOROUGH & DARC - 6, Christmas Dinner; 13, HF evening; 20, Christmas drink at 'Swan' Shepshed. Details 01509 218259.

LINCOLNSHIRE

LINCOLN SHORTWAVE C - Meets every Wednesday at the city Engineers Club, Waterside South at 8pm. Details 0427 788356.
SPALDING & DARS - 4, Junk Sale and Auction at the Community Centre, Spalding Common at 9.30am. Admission fifty pence. Refreshments available. Club meetings every Friday at the Clubroom, Old Fire Station, Spalding at 7.30pm. Details G4OO 01775 750382.
SPILSBY ARS. **Change of date of monthly meeting **. Now held at The White Hart Hotel, Spilsby, 1st Thursday in month at 7.45pm. Details 01790 752712.

LOTHIAN

EDINBURGH UNIVERSITY ARC - Meets on Tuesday evenings during term time. Details Alison, GM0UGG 0131 668 4618 or email: A.Aird@ed.ac.uk
LOTHIANS RS - Meets at Orwell Lodge Hotel, Polworth Terrace, Edinburgh at 7.30pm. Details Brian, GM4DIJ, 0131 337 7311.

MERSEYSIDE

LIVERPOOL & DARS - 20, Christmas Social. Meets at Churchill Conservative Club, Church Rd, Wavertree every Tuesday. Now offer RAE Course, Novice RAE and Morse courses. Details Ian, G4WWX on 0151 722 1178.
NORTH SEFTON ARC - Meets 2nd Wednesday of each month. Details 01704 579017 or Fax 0704 570089.
WIRRAL ARS - 7, Post Cards(Wirral) by J M Ryan; 21, Christmas Bunfight; Jan 4, Open. Details G3FOO 0151 644 6094.

MID-GLAMORGAN

MID-GLAMORGAN ARG - (****NEW***) Details from Roger, GW3XJC on 01656 733729 or Tom, GW0TOM on 0656 736954.

NORFOLK

DEREHAM ARC - ***DECEMBER*** No Meeting - Happy Christmas. Meets at St Johns Ambulance Station, Yaxham Road, near Tesco in Dereham at 8pm. Details 01362 691099.
ARC FAKENHAM - 6, Christmas social. Meets at Trinity Church Room, Hempton at 7.30pm. All welcome. Details 01485 528633.
GREAT YARMOUTH RC - 1, Talk 'PC Trends' by G4GLI; 8, Informal; 15, Sherry & Pies evening; 22/29, No Meeting. Details Tony, G3NHU 01493 721173.
NORFOLK ARC - Nov 30, Annual Dinner, Norman Centre. **NEW CONTACT** Now Mike, G4EOL on 01603 789792.
YARMOUTH RC - 1, Talk 'PC Trends' by G4GLI. Details Tony, G3NHU on 01493 721173.

NORTHAMPTONSHIRE

KETTERING & DARS - Club meets every Tuesday at Ise Lodge Community Centre, St Vincents Ave., Kettering at 7.30pm. New members especially welcome. Details John, G3ZSE 01536 511913.
NORTHAMPTON RC - Meets every Thursday at RAFA Club, Grove Road, Northampton at 8pm. Details 01295 760640.

NOTTINGHAMSHIRE

ARC of NOTTINGHAM - 1, Christmas Quiz; 8, Forum & NoA; 15, Christmas 'DO'; 22, 'Now for something completely different' by Mike, G2SP; 29, No Meeting. Details 0115 950 1733.
MANSFIELD ARS - 5, Christmas Party (**Note change of date**); Jan 9, Sherwood Forest and other Awards. Meets at the Polish Catholic Club, Off Windmill Lane, Woodhouse Road, Mansfield at 7.30pm. Details 01623 423697 or 792243.
SOUTH NOTTINGHAM ARC - 2, Open Forum - Members only; 9, Sherry & Mince Pie only; 16, Club Christmas Dinner(venue & time to be announced). Details Julie, G0SOU 01509 672734.

NORTH YORKSHIRE

HAMBLETON ARS - 1, RAE Course; 8, Practical/operating night; 15, RAE Course; 22, No Meeting - school closed for Christmas. Meets every Thursday at Allertonshire School, Brampton Road at 7.30pm. Details Bob Young 01642 710886.

OXFORDSHIRE

BANBURY ARC - 14, Christmas Dinner at the Unicorn Hotel, Market Sq., Deddington. Details 01295 253509.
OXFORD & DARS - Nov 24, Talk & demonstration by Mr C Pettitt of Eddystone Radio. Details 01865 247311.
VALE OF WHITE HORSE ARS - 6, Christmas Dinner at The Great Western Junction, Station Rd, Didcot. Details from Ian. Tel: 01235 531559.

SHROPSHIRE

SALOP ARS - 8, Christmas Dinner. Details 01743 361935.
TELFORD & DARS - 7, Equipment Night'; 14, Computer Networks by G6UDX; 21, Christmas Social, Club HQ; 28, Club Net 144.6 & GB3TF. All meetings take place at Dawley Bank Community Centre, Telford at 7.30pm. Details Dave on 01952 588878.

SOMERSET

TAUNTON & DARC - 2, Talk 'Microcomputers' by Dave Paul, Support Eng Thorn EMI.; 13, Christmas Dinner Other Fridays in the month informal meetings at 7.30pm. Club Net Wednesdays at 2000 UTC 3.750MHz +/-. Details G3WNI, 01823 680778.
YEOVIL ARC - 1, Club Project - the 'Coker' Transmitter by G3PCJ; 8, Quiz night; 15, Club Project - the 'Coker' Transmitter Testing; 22, Mince Pies with RF source in the Club Shack; 29, Club Station on Air, committe meeting. RAE Class held every Thursday for beginners. Meets at The Red Cross HQ, Grove Avenue, Yeovil at 7.30pm. Details Cedric, G4JBL, 01258 473845.

SOUTH GLAMORGAN

CARDIFF RSGB Group - 12, Christmas Dinner. Details 01222 810368.

SOUTH YORKSHIRE

SHEFFIELD ARC - 5, Video on Blenhiem Place; 8, Raynet meeting; 12, The Grand Christmas Quiz; 19, Christmas Dinner (venue to be set); 26 and Jan 2, Bank holiday - 197 club closed. Details 0114 2446282.

STRATHCLYDE

CUNNINGHAME & DARC - Come along for a natter or enrol in our RAE/Morse Classes. Meetings every Thursday at Woodlands Centre, Kilwinning Road, Irvine. Details 01563 40048.
MID-LANARK ARS - Every Friday at 7.30pm, Lecture and chat nights, RAE and Morse classes at Newarthill Community & Education Centre, High Street, Newarthill, Motherwell. Details GM7FXK, QTHR.
PAISLEY (YMCA) ARC - RAE/Morse classes, run on Tuesdays. Details Stuart, GM0UKD 01505 335195.

SUFFOLK

FELIXSTOWE & DARS - 5, Talk 'Antennas' by Richard, G0RZG; 12, Armchair Christmas Video; 26, Boxday - No meeting. Details Paul, G4YQC 01394 273507(evenings).
IPSWICH RC - CW evening. Details Sheila, G8HYE 01473 742072.
SUDBURY & DRA - 6, Open Forum - Questions & Answers on anything related to Amateur Radio; 24, Natter evening. Details 01787 313212 (before 10pm).

SURREY

DORKING & DRS - Club meets at 'Friends Meeting House', South Street, Dorking at 7.45pm. Details John, G3AEZ, 01306 631236.
ECHELFORD ARS - Nov 24, Talk 'Satellite Technology'by Robin, G3TDR; 8, Christmas Party. Details 01344 843472.

TAYSIDE

DUNDEE ARC - 6, Construction Night; 13, Lecture 'The RSGB and its Committees' by Ian Suart, GM4AUP President RSGB and Frank Hall, GM8BZX Council Member Zone 'G'. College closes for Christmas recess. Meets at 7pm. Details from GM4FSB, QTHR.
STRATHMORE & DARC - Now meets on Wednesdays at 7.30pm in the rooms of 2231 (Forfar) Squadron, Air Training Corp, 1 Lochside Road, Forfar, Angus. Details Alan, GM4JCM, QTHR.

TYNE AND WEAR

HAZELLRIGG ARC - Meets every Monday, Hazellrigg Community Centre at 7pm. Classes for Morse, Novice and talks on various subjects held on last Monday in the month. Details 0191 264 4608 after 6pm.

WARWICKSHIRE

MID-WARWICKSHIRE ARS - Meeting on 2nd & 4th Tuesdays at St Johns Ambulance HQ, 61 Emscote Road, Warwick at 8pm. Details 01926 424465.
RUGBY ATS - 4, 2m AFS & Fixed Contest; 6, Open Meeting; 10, Annual Christmas Dinner at Dunchurch; 13, Christmas Quiz.. Meets every Tuesday at 7.30pm. Morse class also runs from 7.40pm onwards. Details from Peter, G0JEW 01455 552449.
STRATFORD U AVON & DARS - 12, Open House/Night on Air - Visitors most welcome; 25, Christmas Greetings on the Air. Meets at the Home Guard Club, Main Street, Tiddington, Stratford upon Avon at 7.30pm. Details Martin on 01789 740073.

WEST GLAMORGAN

PORT TALBOT ARS - Re: Clubs 50 years Anniversary. Calling all ex-members of Neath/Briton Ferry, now called Port Talbot ARS, formed in 1946. Please contact ASAP the Secretary GW0NKF, QTHR or Tel: 01639 892311.
SWANSEA ARS - 1, Annual General Meeting - College House; 15, Annual Quiz. Details GW3SIY 01792 403527.

WEST MIDLANDS

ALDRIDGE & BARR BEACON ARC - Meets 1st & 3rd Mondays in the month. Details 01922 36162.
RS of BLOXWICH - 6, Open Evening & preparations for Christmas social; 20, Christmas Social & Awards night; 27, Society Net, from 8pm on 432.725MHz FM/SSB. No Smooking allowed at society meetings. Details 01922 683877.
COVENTRY ARS - Usually meets every Friday at 8pm. Visitors are always welcome. Details (G1ORG at GB7COV) or Tel: 01203 311468.
MIDLAND ARS - Every Wednesday, RAE &

Morse classes; Every Thursday 'Night on the Air'; 2nd and 4th Monday in month. PC night; Last Friday in month Atari night. Details John, G0LAI 0121 628 7632.
STOURBRIDGE & DARS - 5, On Air & natter night; 19, Family Christmas Social Gathering. Details James French, G7HEZ, 2 Pepper Hill, Stourbridge, DY8 1BJ or packet G7HEZ @ GB7PZT.
SUTTON COLDFIELD ARS - Nov 28, Annual General Meeting. Details Tony on 01827 874010.
WEST BROMWICH CENTRAL RC - 4, Talk 'The work of the County Air Ambulance' by Ian Nichols, County Air Ambulance; 11, Annual General Meeting. Details Ian, G0PAI on 0121 561 2884.

WEST SUSSEX

CHICHESTER & DARC - 6, Club meeting; 20, Christmas Party & presentation of the Marcuse Trophy. Details G0KNU 01243 573541.
HORSHAM ARC - 1, Annual General Meeting at 8pm. Details Peter, GBSUI 01737 842150.
WORTHING & DARC - 7, Christmas Party; 14, Talk/slides 'Tarawa' by G0KAG; 21 & 28, No Meeting; Jan 4, Discussion Evening. Details 01903 753893.

WEST YORKSHIRE

HALIFAX & DARS - 20, Social at 7.30pm. XYL's and YL's welcome. Meets at the Royal Oak Pub, Wards End, Halifax (private 1st floor room). Details 01422 202306.
KEIGHLEY ARS - 8, Packet on Air - G0KRS & G7KRC; 22, Christmas Buffet. Club meets every Thursday at the Ingrow Cricket Club, Keighley at 8pm. Details Kathy on 01274 496222.
PONTEFRACT & DARS - Meets every Thursday, 7.30pm at Carleton Community Centre, Carleton, Pontefract. Visitors and new members are always welcome. Morse classes Monday nights (Reg, G4KMW) and Novice classes Tuesday nights (Colin, G0NQE). Details 01977 677006.
SPEN VALLEY ARS - 1, Talk 'GB3ET Repeater update and a Simple TV Receiver' by the GB3ET Group; 15, Quiz Night. Details David on 01924 497767.

WILTSHIRE

CHIPPENHAM & DARC - Meets Tuesdays 7.45pm, Sea Cadet HQ, Chippenham. Details Jon, G4LGZ 01225 743352.
SALISBURY R & ES - 6, Talk 'Oscilloscopes' by Frank, G8PCB; 13, Christmas Party; 20 & 27, Club Closed. Details David on 01722 330971 (weekends).
TROWBRIDGE & DARC -7, Christmas Party. Details 01225 864698 (evenings).

RALLIES AND EVENTS

This is a list of all rallies, hamfests, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Rally News - DIARY'.

4 DECEMBER

LEEDS AND DARS Christmas Radio Electronic and Computer Rally -*******CANCELLED******* Details from G0IBU who is QTHR.

11 DECEMBER

VERULAM ARC Rally - **NEW VENUE** Watford Leisure Centre, Horseshoe Lane, Garston, Watford, Herts. Doors open 10am. Details from Walter, G3PMF on 01923 262180.

22 JANUARY

OLDHAM AR Club Mobile Rally - Queen Elizabeth Hall, Civic Centre, West Street, Oldham, Lancs. Doors open 11am, 10.30 for disabled visitors. Event features many traders with variety of items and a bring and buy. Talk-in on S22 via GB4ORC, commencing at 7.30am. Refreshments will be available from 11.30 in the Failsworth Suite, balcony over-looking the main hall. Again this year a Mobile contact prize and certificate for the furthest mobile contact with an operator on his way to attend the rally, up to 2pm. Free programme draw prize and parking. Details 0161 652 4164 or 01706 846143.

5 FEBRUARY 1995

SOUTH ESSEX ARS Radio Rally - The Paddocks, Long Road, Canvey Island, Essex. (The Paddocks is located at the end of the A130) Doors open 10.30am. Features trade stands, bring and buy, home made refreshments, free car parking. Disabled car parking facilities outside main doors. Admission £1. Talk-in on S22. Details Roger, G0LTO on 01268 693786 or Ken, G0BBN on 01268 755350.

12 FEBRUARY

CAMBRIDGE & DISTRICT ARC Rally - Addenbrookes Ambulance Station, Cambridge. Doors open at 10am. Features trade stands, car boot sale and a bring and buy. Refreshments available. Details from John, G0GKP on 01954 200072.

NORTHERN CROSS Rally - Rodillian School, on A61 between Leeds and Wakefield, near junction M1/M62. Doors open at 11am, 10.30 for disabled visitors and bring and buy. Features usual dealers and groups and a bring and buy stall. RSGB Morse Tests available on demand, subject to two passport photos and the necessary fee. Refreshment available. Talk-in on 2m and 70cm. Entry still one pound. Details Dave Gray on 0113 282 7883.

19 FEBRUARY

RSGB VHF CONVENTION - Details G3MVV 01277 225563.

25 FEBRUARY (SATURDAY)

10th RAINHAM Radio Rally - Rainham School for Girls, Derwent Way, Rainham, Gillingham, Kent. Doors open 10am, 9.30 for disabled visitors. Event features the usual trade stands plus a few new ones selling computers and peripherials. Many special interest groups, Raynet, RNARS, Packet, Kent Repeater Group and Kent TV Group and a bring and buy stall. Ample off road parking. Licenced bar, snacks and refreshments, with a place to sit and eat. All on one level with easy access for the disabled. Admission one pound, children under 14 free. Further info from Martin, G7JBO 01634 365980 any reasonable time.
9th TYNESIDE ARS Rally - Details Stuart G0BEV 0191 281 0999.

26 FEBRUARY

BARRY MOBILE Rally - Trader details from Mike, GW8CMU 01446 711426 and General enquires from Margaret, GW4GSH 01446 738756.

11-12 MARCH (SATURDAY-SUNDAY)

LONDON Amateur Radio & Computer Show - Details Steve, G3ZVW 0181 882 5125

12 MARCH

10th ANNUAL WYTHALL Radio Club Rally - Details Chris, G0EYO 0121 430 7267.

19 MARCH

NORBRECK Amateur Radio Electronic and Computing Exhibition - Details Peter, G6CGF 0151 630 5790.

26 MARCH

THE MAGNUM Radio & Computer Rally - Details Bob, GM0DEQ on 01563 40048.
PONTEFRACT & DARS, 15th Annual Components Fair & Spring Rally - Details Colin, G0NQE on 01977 677006.

9 APRIL

LAUNCESTON 9th Amateur Radio Rally - Details Roy, G0IKC on 01409 22164 or Rodney, G8HDW on 01566 775167.
WHITE ROSE Rally - ***NEW VENUE*** Leeds Universaty. Details Allen, G7ELS on 0113 262 6584.

16 APRIL

CAMBRIDGESHIRE Repeater Group Amateur Radio Rally - Details Darren, G1ERM on 01223 60601 evenings.

22 APRIL (SATURDAY)

INTERNATIONAL MARCONI DAY H/Q - Details Norman, G4USB 01209 212314.

23 APRIL

BURY RS Annual Rally - Details G4KLT, 0161 762 9308.
SWANSEA ARS Amateur Radio and Computer Show - Details Roger, GW4HSH 01792 404422.

30 APRIL

BRITISH ATV CLUB (BATC) Rally - Details & trade enquiries Mike, G6IQM 01788 890365 or Fax 01788 891883.

6 MAY (SATURDAY)

DARTMOOR Radio Rally - Details Ron on 01822 852586.

8 MAY (MONDAY)

MID CHESHIRE ARS Rally - Details David, G4XUV 01606 77787.

14 MAY

MARS/DRAYTON MANOR Radio and Computer Rally - Details Norman, G8BHE 0121 422 9787(evenings).

21 MAY

11th YEOVIL QRP & Construction Convention - Details G3CQR, 01935 813054.

28 MAY

TRAFFORD Rally (The Great Northern Rally) at G-Mex - Trade and further enquiries Graham, G1IJK on 0161 748 9804.

4 JUNE

SPALDING Amateur Radio and Computer Rally - Details G4TWR, 01775 722940.

11 JUNE

THE 26th ELVASTON CASTLE National Radio Rally - Details from Ken, G3OCA, 01332 662818. Trade enquiries, Keith, G1ZLQ 01332 662896.
ROYAL NAVAL Amateur Radio Society (RNARS) Annual Mobile Rally - Details Clive, G3YTQ on 01329 234143.

18 JUNE

THE GORDON Rally (The North of Scotland AR Convention) - Details GM6TAN QTHR.

2 JULY

YORK Radio Rally - Details Dave, G7FGA 01904 790079.

8 JULY (SATURDAY)

CORNISH Radio Rally and Computer Fair - Information & booking Ken, G0FIC 01209 821073.

9 JULY

SUSSEX Amateur Radio & Computer Fair - Information and booking Ron, G8VEH 01903 763978 or 0273 417756 office hours.

22 JULY

AIR FORMATION Open Day - Colerne Airfield. (RSARS) Stall applications etc to RSm G Baldry on 01225 743240 x5256.

23 JULY

COLCHESTER Radio & Computer Rally - Details Richard, G7BIV, 01376 571239.
2nd HUMBER BRIDGE Amateur Radio Rally - Details or bookings Roly, G0UKS 01482 837042.

30 JULY

SCARBOROUGH ARS Radio Electronics and Computer Fair - Details Ross, G4ZNZ 01723 514767.

6 AUGUST

RSGB WOBURN Rally - Woburn Abbey, Bedfordshire. Details from Norman Miller, G3MVV, 01277 225563.

13 AUGUST

38th ANNUAL DERBY Mobile Rally - Details 0332 556875.

20 AUGUST

6th GREAT EASTERN Rally - Details Ian, G0BMS 01553 765614 or at GB7OPC.

27 AUGUST

TORBAY ARS ANNUAL Mobile Rally - Details John, G3YCH, QTHR; 01803 842178.

3 SEPTEMBER

PRESTON ARS 27th Mobile Rally.
VANGE ARS Rally - Details Stuart, G1VWB 01375 859632.

10 SEPTEMBER

SOUTHEND & DRS 75th Anniversary Radio & Computer Rally - ***NEW VENUE***. Details Ron, G0UAW on 01702 353676 or Fax Martin, G0OQR on 01702 602271.

8 OCTOBER

KIDDERMINSTER & DARS Rally - Details G8JTL 01384 894019.

20/21 OCTOBER (FRIDAY/SATURDAY)

LEICESTER AR Exhibition - Details Frank, G4PDZ on 0116 287 1086.

SILENT KEYS

WE HAVE BEEN advised of the deaths of the following radio amateurs:

G0GGI	Mr H Jackson	
G0HGT	Mr H Stammers	06.09.94
G0HTN	Mr T Nicholson	26.07.94
G0JJC	Mr S F Butler	Sept 94
G0KBT	Mr J H Wills	28.08.94
G0UYO	Mr D R Wych	20.09.94
G1LGP	Mr W A Jarrold	12.03.94
G1YVX	Mr C C Nash	29.09.94
G3ATT	Mr F P Dew	03.08.94
G3AWO	Mr J A Fair	26.06.94
G3CYS	Mr J B Walker	21.09.94
G3EFC	Mr J W Waddington	10.09.94
G3FQO	Mr J W Morgan	
G3HQU	Mr J G (Gerry) Jackson	18.08.94
G3LID	Mr B White	30.09.94
G3TFU	Mr D L (Les) Woodhouse	01.08.94
G4DVR	Mr J J Life	June 94
G4LST	Mr C Searle	17.09.94
G4HQ	Mr F D Roberts	15.05.94
G4JEA	Mr A E Jeffreys	06.08.94
G4KBZ	Mr C S Headley	19.05.94
G4KFG	Mr D Twist	01.05.94
G4MCO	Mr J F Hook	15.09.94
G4MNW	Mr B Midgley	24.09.94
G4MXG	Mr J Adams	27.08.94
G4NLT	Mr P Linthwaite	16.01.94
G5XB	Mr S A G Cook	29.09.94
G6INJ	Mr G W McGlen	19.09.94
G8CON	Mr E Mitchell	Aug 94
G8FAY	Mr D P D Pink	
G8LCN	Mr M Johnson	Mar 94
G8YMG	Mr D H Rosevear	12.09.94
RS21146	Mr R E W Hardy	15.09.94

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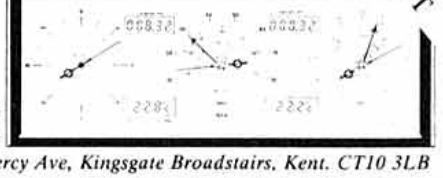

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Zonal Council members

Zone A (North of England): Peter Sheppard, G4EJP, 89 St Catherines Drive, Leconfield, Beverley, North Humberside HU17 7NY. Tel: 01964 550397.

Zone B (Midlands): Post vacant.

Zone C (SE England and East Anglia): Neil Lasher, G6HIU, 8 Highwood Grove, Mill Hill, London NW7 3LY. Tel: 0181 201 1578.

Zone D (SW England): Julian Gannaway, G3YGF, Dean Hill Barn, East Dean, Salisbury, Wiltshire SP5 1HJ. Tel: 01794 40008.

Zone E (Wales): Clive N Trotman, GW4YKL, 19 Park View, Dolau, Llanharen, Pontyclun, Mid Glamorgan CF7 9RZ. Tel: 01443 226198.

Zone F (Northern Ireland): Ian Kyle, GI8AYZ, 1 Portulla Drive, Pond Park Road, Lisburn, Co Antrim BT28 3JS. Tel: 01846 665034.

Zone G (Scotland): Frank Hall, GM8BZX, 45 Priory Cottages, Lunanhead, Forfar, Angus DD8 3NR. Tel: 01307 467565.

For general advice and details on local clubs, or if you don't know who to contact:

Your **RSGB Liaison Officer** see September and October *RadComs*, page 91.

Specialists

Antenna Planning: Booklet free to members from RSGB HQ. Planning application refused – RSGB Planning Panel, via RSGB HQ. Planning Advisory Committee Chairman – Geoff Bond, G4GJB, QTHR.

Audio Visual: Library Coordinator – David Simmonds, G3JKB.

Awards: For contest awards, refer to the appropriate contest committee. For other awards, enquiries and applications go to either the: HF Awards Manager – Fred Handscombe, G4BWP; IOTA (Islands on the Air) Awards Manager – Roger Ballister, G3KMA or VHF (and Microwave) Awards Manager – Ian L Cornes, G4OUT. Trophies Manager – David Simmonds, G3JKB.

Band Plans and operating practices: See the *RSGB Call Book* or January 94 *RadCom* for latest bandplans. For policy, contact the appropriate spectrum manager or committee chairman: HF Committee Chairman – David Evans, G3OUF, QTHR; VHF Committee Chairman – Peter Burden, G3UBX, QTHR; Microwave Committee Chairman – Steve Davies, G4KNZ; HF Manager – Post vacant; VHF Manager – Dave Butler, G4ASR; Microwave Manager – Mike Dixon, G3PFR.

Beacons: HF Beacon Coordinator – Prof Martin Harrison, G3USF, QTHR. VHF Beacon Coordinator – John Wilson, G3UUT, QTHR. Microwave Beacon Coordinator – Graham Murchie, G4FSG, QTHR.

RSGB Contests: First contact the appropriate contest adjudicator (see the contest rules). For policy, contact the respective Committee Chairman: HF Contest Committee – Chris Burbanks, G3SJJ, QTHR; VHF Contest Committee – David Johnson, G4DHF, QTHR; ARDF (direction finding) Committee – Post vacant.

EMC: Advice on solving breakthrough and other electromagnetic compatibility matters: Committee Chairman – Robin Page-Jones, G3JWI, QTHR.

Emergency: Emergency Communications Officer – Greg Reilly-Cooper, G0MAM.

Exhibition & Rally Committee: Chairman – Norman Miller, G3MVV, QTHR.

History: Society Historian – George Jessop, G6JP.

IEE: Liaison Officer – Peter Saul, G8EUX.

Licensing: LAC Vice-Chairman – Julian Gannaway, G3YGF, QTHR. Licence Renewals – SSL, PO Box 885, Bristol BS2 8RH. New Licence Applications – SSL, PO Box 884, Bristol BS2 8RH. SSL Help Desk – 0272 258333.

Membership Liaison: MLC Chairman – Peter Sheppard, G4EJP, see Zone A (left).

Morse: Morse Practice Transmissions Coordinator – David Pratt, G4DMP. Chief Morse Test Examiner – Roy Clayton, G4SSH.

Packet Radio: Datacomms Committee Chairman – Tom Lilley, G1YAA, QTHR.

President: Ian Suart, GM4AUP, QTHR. President Elect: Clive Trotman, GW4YKL, (see Zone E left).

Propagation: Propagation Studies Committee Chairman – Charlie Newton, G2FKZ, QTHR.

QSL Bureau: Outgoing cards – PO Box 1773, Potters Bar, Herts, EN6 3EP. Incoming cards – your QSL sub-manager (see *RSGB Call Book* or November *RadCom*, p91 for a list). QSL Bureau Liaison Officer – John Hall, G3KVA.

Repeaters: Repeater Management Group Chairman – Geoff Dover, G4AFJ, 31 Newbold Rd, Kirkby Mallory, Leicestershire, LE9 7QG.

Spectrum Abuse: Packet – Via Datacomms Committee. Repeaters – Via the Repeater Management group. Other – Via Licensing Advisory Committee. Intruder Watch Coordinator – Chris Cummings, G4BOH.

Technical & Publications: Committee Chairman – Dick Biddulph, G8DPS, QTHR.

Training and Education: Committee Chairman – John Case, GW4HWR, QTHR. Radio Amateur's Examination – George Benbow, G3HB, QTHR. Novice RAE – Hilary Claytonsmith, G4JKS, QTHR. Project YEAR Coordinator – G4JKS.

The Society has a large number of volunteer experts available to help and advise members on a wide variety of subjects. Each month we will be focussing on a different section of the volunteer workforce, whilst still giving brief details of the main office-holders. See also the Information Directory section of the *RSGB Call Book*.

RSGB QSL Bureau Sub-Managers

Part 2: G4FAA – Novice

Callsign Series	Sub-Manager
G4FAA-FZZ	Mrs A Burchmore, G0ARQ 49 School Lane, Horton Kinby, Dartford, Kent DA4 9DQ.
G4GAA-GZZ	Mr J C Terry, G4GEU, 126 Dawberry Fields Road, Kings Heath, Birmingham B14 6NZ
G4HAA-HZZ	Mr D Roebuck, G0LJM, 44 Parkside Grove, Bradford, W Yorks BD9 5LL
G4IAA-IZZ	Mr C J Webb, G4JFF (address under G0IAA)
G4JAA-JZZ	Mr J A Towle, G4PJZ (address under G0JAA)
G4KAA-KZZ	Mr K Draycott, G3UOT (address under G0KAA)
G4LAA-LZZ	Mr C Lennox, G4LXU (address under G0LAA)
G4MAA-MZZ	Mrs C Wilding, G4SQP, 92 Ravenhill Drive, Codsall, Wolverhampton WV8 1BW
G4NAA-NZZ	Mr M Musgrave, G4NVT, 49 Vowler Road, Langdon Hills, Basildon, Essex SS16 6AQ
G4OAA-OZZ	Mr D Lavis, G0DMT, 48 Gilda Crescent, Polegate, East Sussex BN26 6AW.
G4PAA-PZZ	Mr R Colvin, G0BXQ, 46 Beechwood Ave, Woodley, Berks RG5 3DG
G4RAA-RZZ	Mr D Buckley, G3VLX, 'Little Oaks', Park Road, Marden, Tonbridge, Kent TN12 9LG
G4SAA-SZZ	Mr D Lavis, G0DMT, 48 Gilda Cresent, Polegate, East Sussex BN26 6AW
G4TAA-TZZ	Mr J Porter, G3YZR, 94 Oaken Grove, Haxby, York YO3 8QZ
G4UAA-UZZ	Mr D Lavis, G0DMT, (address under G4SAA)
G4VAA-VZZ	Mr R C Powell, G4VAA, 11 North Park, Fakenham, Norfolk NR21 9RG
G4WAA-WZZ	Mr L Gaunt, G4MLV, 31 Moat Hill, Birstall, Batley, West Yorkshire WF17 0DX
G4XAA-XZZ	Mr S R Tyler, G4UDZ, 2 John Court, Hoddesdon, Herts EN11 9LZ
G4YAA-YZZ	Mr D J Newbury, G0ENR, 8 Mayfield Road, Pershore, Worcs WR10 1NW
G4ZAA-ZZZ	Mr J Densem, G4KJV, 'Cotswold', Startley, Chippenham, Wilts SN15 5HG
G5 series	and reciprocals: Mr R Pasquet, G4RAA, 64 Bricks Bury Hill, Upper Hale, Farnham, Surrey GU9 0LY
G6AA - ZZ	Mr F Harris, G4IEY, 4 Merestones Dr, The Park, Cheltenham, Glos GL50 2SS
G6AAA-ZZZ	Mr D & J Brooks, G4IAQ and G4IAR, 28 Avon Vale Rd, Loughborough, Leics LE11 2AA
G7AAA-ZZZ	Mr D J Hudson, G6OVO, 62 Derron Avenue, South Yardley, Birmingham B26 1LA
G8AA - ZZ	Mr F Harris, G4IEY (address under G6AA)
G8AAA-ZZZ	Mr J F Purvess, G0FWP (address under G0DAA)
GBXAAA-MZZ	Mr G Whaling, G0PPR, 32 The Croft, Little Snoring, Fakenham, Norfolk NR21 0JS
GBXNAA-ZZZ	Mr A Devereaux, G0TTZ, 39 Lower Green Road, Rusthall, Tonbridge Wells, Kent TN4 8TW
GD series	Mr G W Ripley, GD3AHV, Corlea Bungalow, Ronague Road, Ballasalla, Isle of Man
GI class A	Mr E Barr, GI7FFF, 'Ed-Mar', 1 Onslow Drive, Bangor, Co Down BT19 7HQ
GI class B	Mr E Barr, GI7FFF, 'Ed-Mar', 1 Onslow Drive, Bangor, Co Down BT19 7HQ
GJ series	Mr R Allenet, GJ3XZE, Les Sablons, Le Bourg, St Clements, Jersey JY9 9LE
GM0AAA-LZZ	Mr G W Spiers, GM0AGN, 43 Sheuchan View, Stranraer, Dumfries & Galloway DG9 7TA
GM0MAA-ZZZ	Mr J E Clough, GM0MDD, 84a Main Road, Fairlie, Largs KA29 0AD
GM4AAA-ZZZ	Mr E Bell, GM4LKJ, 21 St Andrews Crescent, Dumbarton G82 3ER
GM1,6,7,8	Mr E Bell, GM4LKJ, 21 St Andrews Crescent, Dumbarton G82 3ER
GM2DAA-3ZZ	Mr J Johnston, GM3LYY, 'Dolphins', 2c Montgomerie Drive, Fairlie, Largs KA29 0DY
GM2AAA-3ZZZ	Mr J Johnston, GM3LYY, 'Dolphins', 2c Montgomerie Drive, Fairlie, Largs KA29 0DY
GU series	Mr S T Henry, GU4GNS, 'The Hermitage', L'Ancresse, Vale, Guernsey, Channel Islands
GW series	Mr K Hudspeth, GW0ARK, 67 Bloomfield Road, Blackwood, Gwent NP2 1LX
RS	Mr D Borne, G4CYW, 'Roughways', Chub Tor, Yelverton, Devon PL20 6HY
NOVICE	Mr M Shread, GM6TAN, 2a Seatown, Gardenstown, Banff AB45 3YQ

The LAST WORD

MALTESE CROSS

Let us once and for all settle the conditions for visiting amateurs to the Island of Malta.

1 *Malta has not ratified CEPT TR61-01* and as such no visiting amateur can operate there without first obtaining a visitor's licence. This has to be applied for prior to visiting, a lot of amateurs are not aware of this and have attempted to operate and got into trouble.

2 You must also apply for permission to 'Temporarily Import Radio Equipment'. Without this any radio equipment will be confiscated by Customs until you have permission. This is then entered into your passport and an inventory made of it. On leaving the country this must be produced and if correct your passport is again marked. This applies every time you visit the country. You must take out what you brought in, or you miss the plane.

Also, Malta has no CB operation; it is illegal and anyone caught could be sent packing home and passport endorsed.

A 9H3 licence will allow you to operate only as per your own Class A or B or Novice licence. The cost at the moment is about £6. There are plans afoot to increase but this is being argued by the Malta Amateur Radio League (MARL) who are putting their case to the Government. Apply to: The Dept of the Prime Minister, Wireless and Telegraphy Branch, Evans Buildings, Merchant Street, Valletta CMR 02, Malta.

A G Fisher G4VBH

HIGH PRICE

G7SKK's letter on the high price of entry level commercial equipment is an often-heard complaint. Others will doubtless be able to explain why comparable CB gear is cheaper (volume of production and import spring to mind as reasons). But let me offer two thoughts.

My first SSB transceiver, the cheapest then available, cost me about 20% of my not very princely annual salary. My salary is still far from princely, but 20% of it would buy me quite an upmarket transceiver from today's range. *Ergo*, some HF gear is considerably cheaper (in comparative terms) than 25 years ago.

Second, the knee-jerk reaction to G7SKK's letter is to say "Build something". But to build VHF gear is far from easy for the newcomer.

Those of us who started before the Class B licence became available generally started on the LF bands, for which it is much easier to build. Are we perhaps making a big mistake in encouraging newcomers to go for the Class B licence, which was originally introduced as a specialist's licence? I note that among the Novices, Class B licences issued outnumber the A licences by about 10 to 1!. Even a totally non-technical person like me can build gear for 160 or 80m. It's where I'd encourage any serious beginner to start, Morse or no Morse!

John Marshall G3RKH.

CZECH CHEQUE

I was very upset to read the item (*News & Reports*, October) to the effect that an Alinco DJ-1 had been stolen from OK2VZE during his stay in Manchester and wonder whether it might be possible for amateurs in this country to raise enough funds - perhaps with a little assistance from the importers - to replace it?

I appreciate that radio gear is being stolen all the time but feel that this is a special case given that not only was OK2VZE on holiday here but that, according to your report, the relative cost of the rig is so high for him. We complain about prices ourselves, sometimes comparing unfavourably with the USA, but we do not realise that amateurs in some other countries face far higher relative prices.

I am personally prepared to contribute £50 - but wonder where to go from here?

Name and address supplied

VOLT DROP

Although your item 'Britain to go 230V' (*News & Reports*, November) may be quite correct in stating that the forthcoming reduction in mains voltage will not cause any problems to consumers, it is unlikely that it will go unnoticed.

The resulting and significant 9% reduction in power will be very evident when using domestic appliances containing motors or heating elements, eg mowers, power tools, vacuum cleaners, cookers, kettles etc. Fortunately it should make no measurable difference to our RST reports!

R H Percival G4DBA

INSTRUCTOR NEEDED

May I say a very big thank you to the members of the Hoddesdon Radio Club, in particular John Rudd, G7OCI. My father, G3LCN, died in June this year. Peter Bateman, G3LCG kindly helped my mother to dispose of his equipment. In conversation I mentioned that my 'little horrors' would have been fascinated by the old valves and the challenge of building a radio. That was when I learned of the Novice Training Scheme. My enthusiasm was fired.

Peter kindly sent details of possible contacts. The trail led me to John and the Hoddesdon Radio Club. Not only have they encouraged me to take up the hobby in my own right, but they are organising a special event station at my school on November 26th, to coincide with Children in Need.

My pupils are eager to get started on the Novice Training Scheme, but despite extensive enquiries I cannot find a qualified Novice Licence Training Instructor, or three. I have put my name down for Novice Training but it will be some time before I become qualified to teach the scheme to my own pupils.

Everyone has been very encouraging and supportive. My father always said that hams were a breed apart and he was right. I am well and truly hooked. My only regret is that I did not hear of the scheme until my father's death. He would have been a real asset to us, particularly as I frequently enrolled both my parents in canal trips and other expeditions with my pupils.

Hoddesdon Radio Club members have greatly influenced my progress to date and so, to them all, a very big thank you.

Miss S C Curlis, Lyndhurst Special Unit, Lyndhurst Middle School, Borehamwood.

MYSTERY MORSE

During a recent visit to Gibraltar, I was both pleased and puzzled on seeing a sizeable signboard at the very busy road-side close to the frontier with Spain, bearing nothing other than the following Morse Code symbols in large print: "-.-. ..---". For those not familiar with Morse, this means CUT.

Now the one thing at a premium in Gibraltar is space, so I remain intrigued as to the reason for such a prominently positioned large sign, solely in Morse Code and visible mainly to people headed towards Spain. Its audience-capture rating had to be strictly on the low side, yet someone had considered its message-content and placement to be worthwhile.

I would be interested to find out more of this mystery message.

Ed Chicken MBE G3BIK

Please note that the views expressed in *The Last Word* are not necessarily those of the RSGB. We reserve the right to edit letters for publication. All letters are acknowledged and may be passed to the relevant department or committee.

GRADED LICENCE

Regarding the call from Mr Buddery, G3OEP, (*The Last Word*, October) for a graded licence, I have heard this view expressed several times usually by people who have spent a lifetime in radio, both as a hobby and professionally.

As someone who had virtually no knowledge of radio, and very little in electronics, I have nothing but admiration for those who can construct a working radio from an empty corn flakes box, a bit of string and some sticky tape. I also believe that if the entry into amateur radio were made more difficult, there would be far fewer people being licensed. I have the impression this is what some would like, to maintain the myth that amateur radio is an elitist hobby.

I enjoy the hobby, I am proud to call myself a radio amateur, but I don't think of myself as being any better than someone pursuing another hobby. I cannot see the sense in denying amateurs the use of certain parts of the radio spectrum, just because they cannot receive Morse at 30WPM, or cannot fix their HF rig when it packs up, other than to maintain a pecking order.

I may not be highly qualified, but I wouldn't dream of demanding that someone move frequency on 80m because I was going to have a net with my pals. I've heard it happen more than once! Good operating procedure is just as, if not more, important than technical ability. After all, I don't need to know how to build a car to be able to get a driving licence.

A Radley G0TTM

GB2SM SUCCESS

It is not my practice to rush into print to air my views about matters of public interest - but the present occasion is quite an exception. I simply want to say "thank you" to the Society for the very firm and obviously successful line taken in the matter of the threatened closure of GB2SM.

I know that the amateur airways have hummed with indignation about the proposal and many people have made their views clearly known. Nevertheless I think those denigrators of what our Society tries to do for amateur radio should note this recent achievement.

It is only one of the practical and effective measures that the Society has dealt with during my membership and I would suggest that more meaningful support and less criticism from some people is what will help to ensure that amateur radio remains an important ingredient in technological progress.

Just think of what we now take for granted which has resulted from the endeavours of those early dedicated amateurs who had to 'do for themselves' when there were no quick ways of putting together the equipment for getting on the air.

Let's encourage more amateur endeavour by supporting our National Society.

A S Douglas G0DVW

ARIS PRAISED

On Saturday 27th of August my wife and I had the unfortunate experience of our QTH being struck by lightning which most of all affected my wife's left side for a couple of days and, secondarily, affected most of my radio equipment in some way or other.

The fortunate part was that on the recommendation of the RSGB I had insured my equipment with Amateur Radio Insurance Services. I rang up ARIS on the following Monday morning and at 8 o'clock on the Tuesday morning a claim form was on the mat. The outcome of my claim from start to finish has been very professional in all aspects.

W E Wright G7EPY

NEW LISTINGS WORK

I write to express my appreciation of the way in which the *1995 RSGB Call Book* has been compiled. The additional listing of members by surname enabled me to trace a former RAF chum of mine.

Ex-RAF members (and those still serving) who joined the Service as Boy Entrants may be interested to learn that an ex-RAF Boy Entrants' Association has recently been formed. Anyone interested in this organisation is invited to contact me for further details.

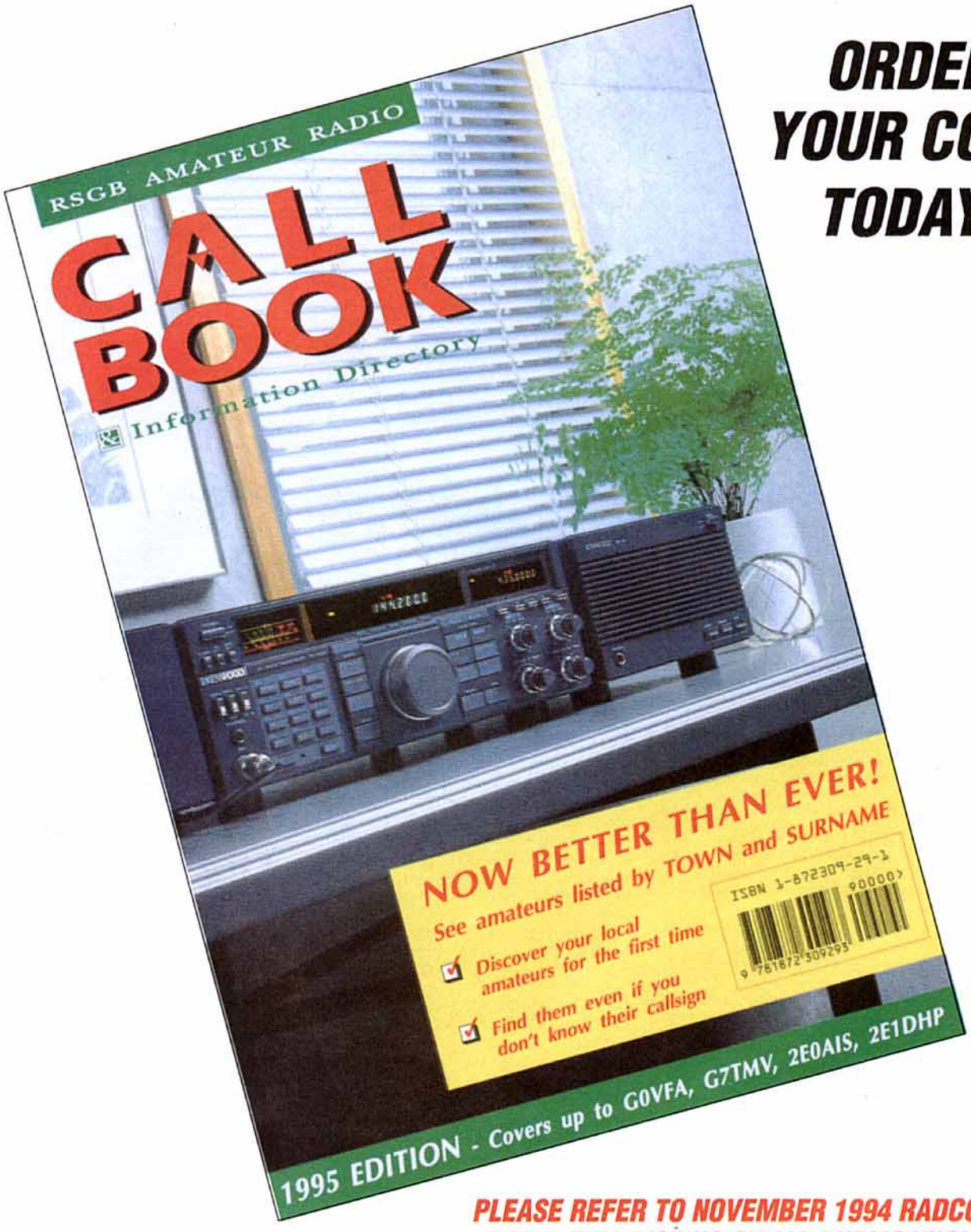
P D Rowe G3JSP

DUMB TERMINAL USER

I would like to say thanks to Siskin Electronics Ltd. As a real dumbo on computers and packet radio it's a pleasure to ring Siskin and find someone who can talk down to my level, and sort out my problems.

Ted Holmes G4TLY

The 1995 RSGB Call Book - The



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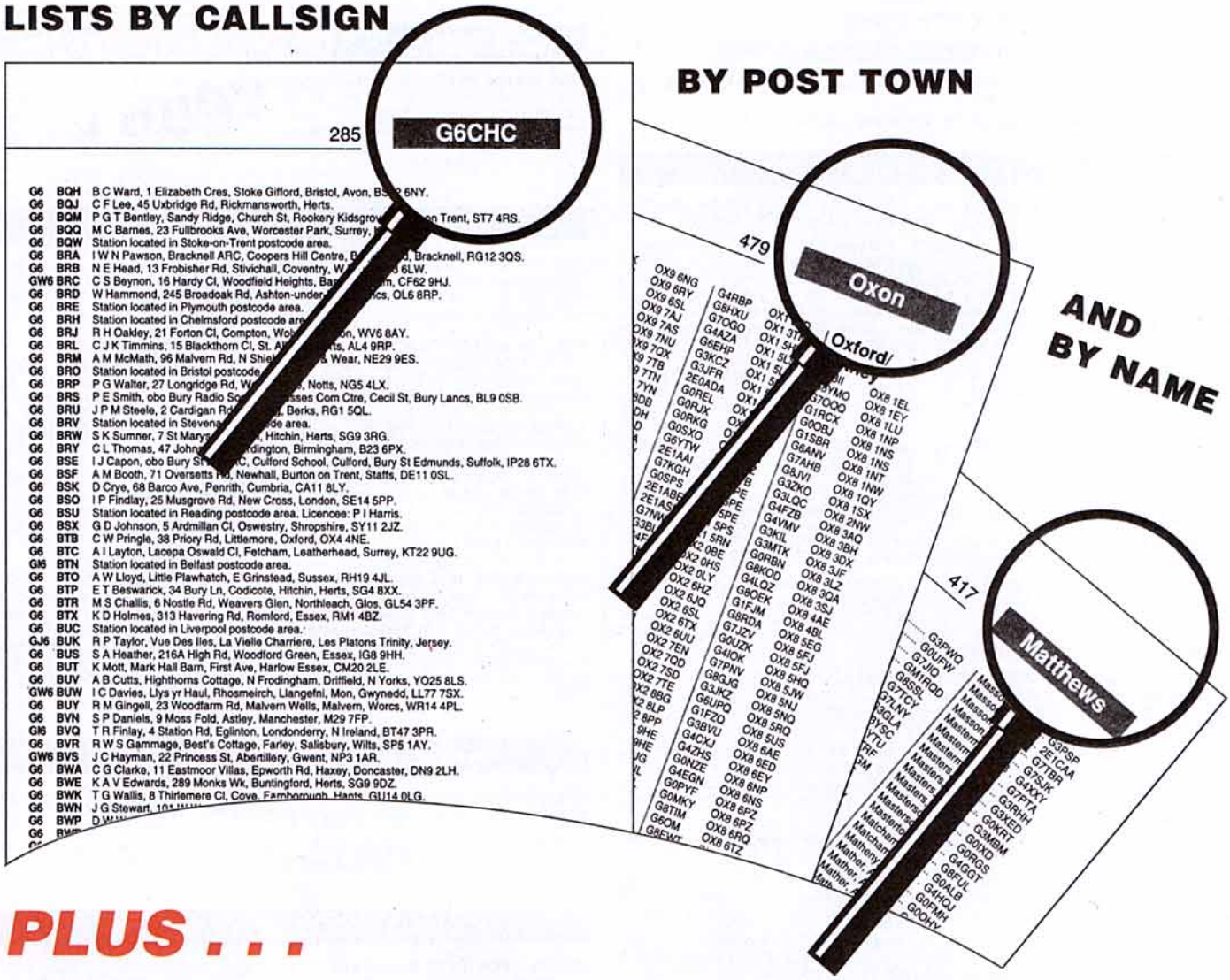

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PAYMENT. Payment may be made by post, enclosing a cheque or postal order. These should be crossed and made payable to 'Radio Society of Great Britain'. If sending cash please use registered post. We accept Visa and Access (Mastercharge) cards and our telephone number for credit-card orders is (0956) 70 73 73. Our Giro account number is 533 5256.

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G4TJB QSL CARDS, CARDS printed to your specifications, send large S.A.E. for samples and full product list. Unit 6, Worle Industrial Centre, Coker Road, Worle, Weston-super-Mare, BS22 0BX. Tel: (0934) 512757, (0850) 707257, Fax (0934) 512757.

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"ALL RISKS" INSURANCE for portable/mobile/base station amateur radio and ancillary equipment. A service for RSGB members only. Also public liability and equipment insurance for affiliated clubs and societies. Details and leaflets from Jennifer Lawson, Amateur Radio Insurance Services Ltd, Shepheards Hurst, Green Lane, Outwood, Surrey RH1 5QS. Tel: 034-284-4000. Fax: 034-284-4554.

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SUPER-DUPER, the PC Contest Logger. "Highly recommended" — RadCom, September 1993. With printed manual and upgrades for 12 months. HF £25.00, VHF £25.00, both £39.00. Paul O'Kane E15DI, 36 Coolkill, Sandyford, Dublin 18. (00 353 1295 3668).

G4UXD's MORSE TUTOR/PRACTISE: See Feb. "Novice News". IBM-PC's, BBC's. New "QSO" format. Random everything! Adjustable speed, delay, letter frequency. 100 tests, attach your key £9.99. SAE details/trial. P. Brandon, 1 Woodlands Rd, Chester, CH4 8LB.

G4BMK PACTOR — See display advert this issue. Grosvenor Software, 2 Beacon Close, Seaford, Sussex.

SHACKLOG4 *the* PC logging system. Real time and post event QSO logging. QSL labels. Database analysis, reports, import, packet terminal etc. Optional IOTA database (G3KMA). Plus lots more!! Still only £27.50!! SASE (+disk for demo copy) for full details. G3PMR, 30 West Street, Gt Gransden, Sandy, SG19 3AU. 0767 677913.

THE WINTER 1994 G0LOV/G4LUE UK AMATEUR CALLBOOK for IBM compatibles. The Callsign Data is supplied by the Radiocommunications Agency October 1994. Specially written database, easy to install and use. Fast searching, by callsign, address, postcode, surname or wildcard, shows WAB book numbers. Facilities also includes UK repeaters, mailboxes, nodes and Local RIS address and lists radio clubs, and European repeaters. £12.50 plus £1.50 PPI. J. Bailey, 8 Hild Avenue, Cudworth, Barnsley, South Yorkshire S72 8RN.

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COURSE FOR CITY & GUILDS, Radio Amateurs Examination. Pass this important examination and obtain your licence, with an RRC Home Study Course. For details of this and other courses (GCSE, career and professional examinations, etc) write or phone — THE RAPID RESULTS COLLEGE, Dept JT108, Tuition House, London SW19 4DS. Tel: 081-947 7272 (9am-5pm) or use our 24hr answerphone service 081-946 1102 quoting JT108

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NEW MORSE TEST — Practice in QSO format — Tutor for BBC micro or audio cassettes — see page 27 RadCom October 1993. Details FIRSOFT 6 Eastfield Drive, Woodlesford, LEEDS LS26 8SQ. 0532-825519.

VERULAM A.R.C. RALLY, Sunday, 11 December. Watford Leisure Centre, Horseshoe Lane, Watford. Off A405: M1/J6: M25/J21A. See Martin Lynch AD.

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ADVERTISERS INDEX

NEXT COPY DATE

The display advertisement copy date for our February 1995 issue will be **6th December 1994**

ICOM'S NEW IC-736 HF/50MHz STAGGERING VALUE & PERFORMANCE AT £1849!

The IC-736 has many features that make it superior to other transceivers, here are just a few to prove it:

- Built-in power supply and high-speed automatic antenna tuner on all bands, to save shack space.
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- 100 watt output power for both HF and 50MHz bands.
- Quick-split function with one-touch offset.
- Newly developed DDS system to provide 1Hz tuning steps.
- Double band stacking registers.
- Memo pad function.
- XFC function.
- Split lock function.
- Built-in electronic keyer
- Full Break-in.
- Bright and large LCD shows modes, receive and transmit frequencies.

Some typical operations:

- Push ANT to select antenna (two connections are available).
- Push FULL to activate full break-in (QSK) function.
- Push TUNER to instantly activate the internal 160-6m automatic antenna tuner.
- DDS (Direct Digital Synthesis) provides crystal clear reception and transmission.
- Adjust KEY SPEED to vary the speed of the internal electronic keyer.
- Press SSB, CW/N, AM, or FM to select desired operating mode.
- Press MP-R to recall memo pad memories for intermediate use.
- Press MP-W to automatically write the present operating frequency and mode to memo pad memory.
- Using the KEYPAD, select a desired band or directly enter frequencies.
- Retain your last selected frequency and modes with DBSR (Double Band Stacking Registers - Two frequencies per band), use one for CW and one for SSB.
- Hold SPLIT down for one second to start the split mode function and initiate QUICK SPLIT feature, equalizing both VFOs to the same frequency.
- Press NOTCH and adjust to eliminate annoying beat signals.
- Rotate MEMORY CHANNEL SELECTOR to select a channel from 101 available memories (memories store frequency, mode, antenna selection and tuner on/off condition).
- Adjust PBT to reduce interference.
- Push RIT and/or ΔTX to change the transmit or receive frequency +/- 9.999 kHz.

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As a base station, the compact full function FT-900AT includes direct keypad entry for pinpoint accuracy during quick band/frequency changes. Other features you'll like include CW keyer with front panel speed adjustment, speech processor, twin stacking VFOs, IF Shift and Notch. No competitor offers this! Bonuses, such as signal strength, power output, SWR and ALC digital meters, add value to the FT-900AT, and the proven duct-flow cooling system provides excellent long-term transmit power output reliability and frequency stability. For ease of use, Yaesu's exclusive Omni-Glow display enhances viewing in any light condition. And, since the high speed antenna tuner is built-in, it means less clutter in your shack.

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- 100 Memory Channels
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- CW Full Break-in Keying w/ Adjustable Speed
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MMB-20 Mobile Mtg. Bracket
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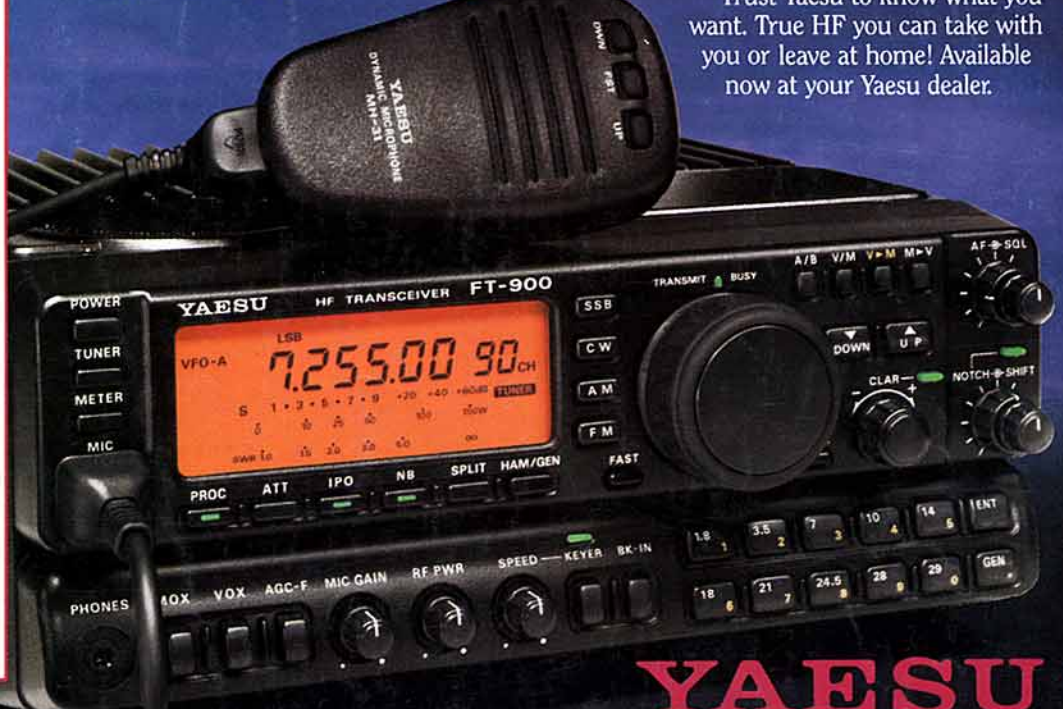

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