Radio Communication

The Journal of the Radio Society of Great Britain

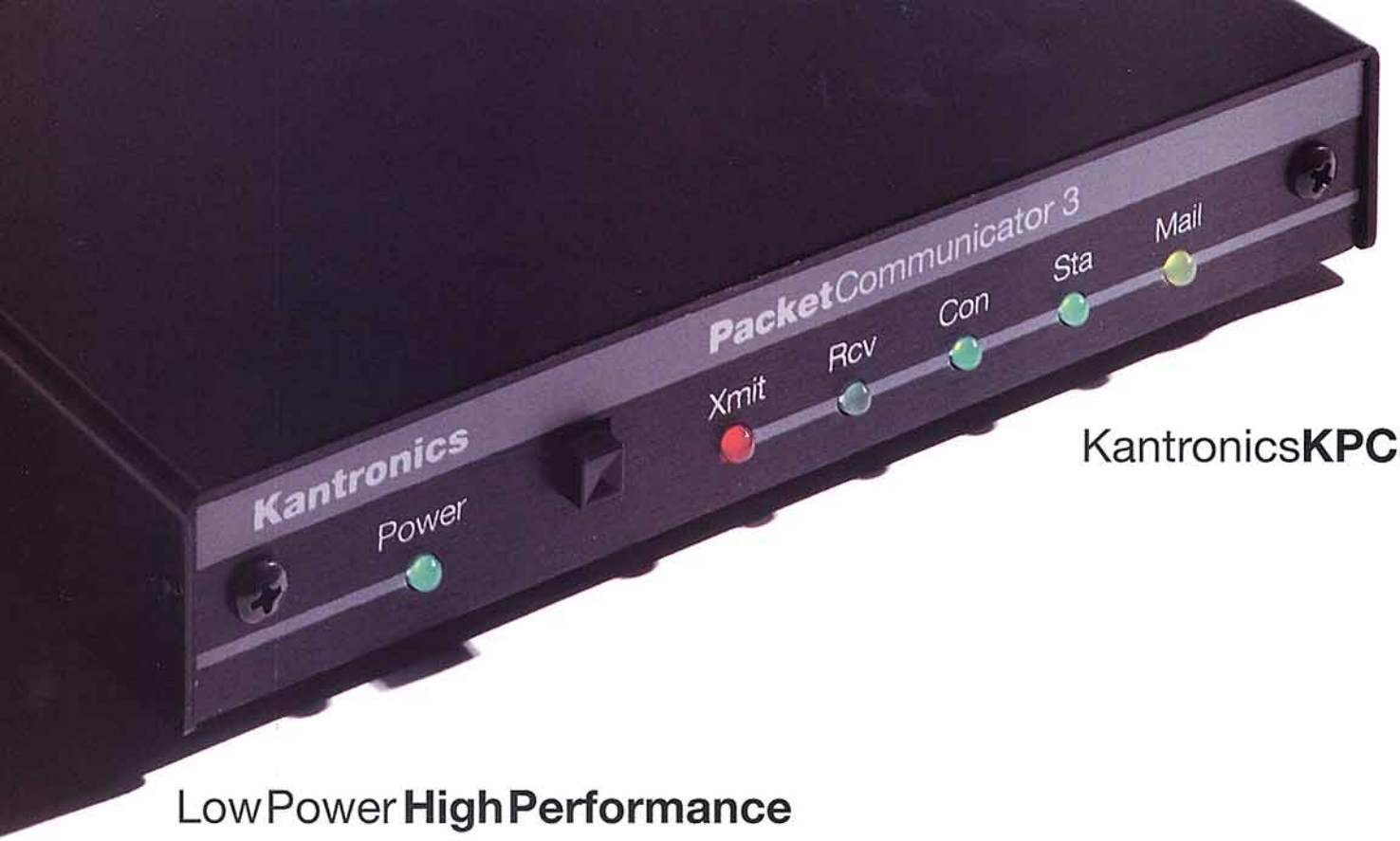
February 1993

Volume 69 No 2

THE VOICE OF AMATEUR RADIO FOR 80 YEARS

WATTS UP?

An Attractive HF Amplifier to Build



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N.B. for all other RSGB telephone numbers see page four.

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Radio Communication

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NEWS AND REPORTS

TECHNICAL FEATURES

COVER PICTURE:
This piece of home-brew equipment really looks good. G0MRF's article on page 29 shows how it was built. A colour feature.

REGULAR ARTICLES

CENTRE PAGES INDEX FOR 1992

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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Correspondence to honorary officers should be passed directly to them (QTHR), not to RSGB HQ.

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Corporate Members: UK and Overseas (*Radio Communication* sent by surface post): **£30.00.** Airmail rates on request.
UK associate member under 18: £15.00. Family member: £12.00
Corporate (Concessionary): £25.00 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): £15.00 (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

Members Hotline and Book Orders:
0707-649855

The RadCom Leader

HQ News

MY AIM THROUGH THIS COLUMN will be to keep you up to date with the changes and improvements that are being made to the Society's membership services and to bring to your attention the current position or any matters that will affect licensed radio amateurs and SWLs.

Those members whose subscription is up for renewal in March will recently have received their reminder letters which included details of the new Direct Debit facility. This is something we have eagerly awaited and can now offer this service to members. I am sure it will prove to be a popular method of payment in these recessionary times. From a Headquarters' accounting point of view, I would like to see the majority of the members paying their subscription in this way because it eases the administrative load, thereby cutting cost.

Another new service introduced this month enables you to keep up to date with the latest developments in amateur radio by telephone. Full details of this service can be found on page 7.

For the first time, Headquarters was open for business over the Christmas holiday and this was a success. A number of you took the opportunity to visit HQ, telephone book orders were brisk, and many enquiries were dealt with.

I have received a number of letters recently regarding the current position of the commercial sale of the personalised G-prefix vehicle licensing plates. I know there is a great interest in these plates among the amateur radio fraternity. The current situation is that the Driver and Vehicle Licensing Authority (DVLA) is not yet in a position to be able to release these plates for sale, nor is it likely that they will become available for some time. However, I am in regular contact with the DVLA over this matter and I will, of course, keep you fully informed of any developments.

I mentioned in last month's *Leader* the intention to hold an Open Day at Lambda House. The date for this event is Saturday, 19 June and more details will be published in due course. I hope large numbers of you will come to visit your Headquarters and meet the staff that work on your behalf.

Finally, may I bring to your attention the notice at the foot of this column concerning the change of telephone numbers at HQ.

Peter Kirby
General Manager

IMPORTANT!

RSGB HQ Telephone Numbers to Change

From 28 January all five-digit Potters Bar telephone numbers will be prefixed by '6'. This affects all RSGB HQ numbers which become:

Members Hotline and Book Orders: 0707 **6**49855
Main HQ Fax: 0707 **6**45105
Subscriptions Enquiries: 0707 **6**49805
Radio Communication Editorial: 0707 **6**59260
RadCom/GB2RS Fax: 0707 **6**49503

NEWS & REPORTS

● STOLEN from a car near Sevenoaks, Kent: Standard C520 dual-band transceiver S/N 06F-260 726 with tone squelch fitted; Microset VUR30 dual-band 30W amplifier with twin pre-amps; Diamond DP/EL770H dual-band antenna on magmount. Reward offered for recovery of equipment. Information to Peter Allcock, G1EHB, QTHR, or Sevenoaks Police on 0732 740055.

● STOLEN from Lincoln area: Yaesu FT-990 S/N 1K080232; Digital Message Unit S/N A00470002; Yaesu FT-480R S/N 0K050309; Yaesu FT-790 S/N 21020560; Icom IC-240 S/N 03495; Microset Linear RU20; B Davis Frequency Counter HFC 60-600 S/N 001523. Information to Lincs Police on 0522 529911.

● RAF HALTON ARS celebrates its 10th anniversary by airing GX1RAF and GX4SQC on 27/28 Feb. The club meets 1st and 3rd Thursdays of the month. Details from Terry, G4PSH: 0296 85760.

● STOLEN from near Lewes, E Sussex: Kenwood TS-950SDX S/N 40100213; TL-922 linear S/N 40400014. Information to Uckfield Police on 0825 762241.

● STOLEN from a car in Highcliffe, Dorset: Trio TS-430S S/N 7060337. Information to G3MPO, QTHR, or Christchurch Police.

● A TEAM of UK amateurs joined a relief convoy which travelled to Yugoslavia just after Christmas.

Code-Free HF?

THERE HAS been a very encouraging response to the request in December's *RadCom* and via *GB2RS* for radio amateurs' views on a UK class of HF licence which does not require a Morse qualification. Anyone who has not yet responded may wish to read 'A Code-Free HF Licence' (p7 *RadCom*, December). Comments should be sent before 8 March to: The RSGB HF Committee via RSGB HQ, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE, marking the envelope 'Code Free Licence'.

VHF Vacancies

THERE ARE two vacancies for full members of the VHF Committee. Particularly sought are members with knowledge of data communications, repeaters or FM operation. Applicants should write to the chairman Peter Burden, G3UBX, 2 Links Road, Penn, Wolverhampton WV4 5RF.

Helen Sharman receives RSGB membership whilst Derek Cole clocks up 25 years.

A Double Celebration

THE RSGB celebrated two happy occasions on Monday 11 January. The first was the presentation of a certificate to Britain's first astronaut Helen Sharman OBE, marking her election as an Honorary Member of the Society. The presentation was made by the President, Peter Chadwick, G3RZP.

In her acceptance speech, Helen thanked all those in amateur radio who helped make her voyage on the space station *Mir* so interesting. She singled out the school children involved in the JUNO project, Richard Horton, G3XWH (who coordinated the schools), and the RSGB which was instrumental in her obtaining the special callsign GB1MIR which she described as "wonderful".

The busy schedule on *Mir* had left few opportunities for radio contacts with the UK but Helen had been very pleased with those she had made. She confirmed that amateur radio had been of great help to all of the cosmonauts in combating loneliness on board. Concluding, she said that the certificate embodied all of the friendships she had made through her involvement with amateur radio.

RadCom's **Technical Illustrator Derek Cole shares a celebratory glass of wine with astronaut Helen Sharman at January's ceremony.**

25 Years

SHARING THE limelight with Helen Sharman was the longest serving member of our HQ staff, Derek Cole who completed 25 years in 1992. Oddly, Derek is not well-known to most who work at Potters Bar because he beavers away at his office at home in Essex, travelling to HQ only occasionally. Even more curiously, every member knows Derek's work well, but few know his name.

As the Technical Illustrator of *RadCom* and most RSGB books Derek Cole's circuit diagrams and sketches are known to tens of thousands of amateurs (and a good number of professionals) all over the world, and he is widely regarded as the best in his field. The President presented Derek with a magnificent engraved barometer to confirm that he is able to work under all pressures.

PHOTOGRAPH: GM0MYV

As part of her tour of the schools involved in the JUNO project, Helen Sharman visited Aberdeen's Northern College of Education. She was the guest of the Alford Academy Amateur Radio Club in the evening where she was photographed with Iain Reid, GM0MYV (left), and Mick Gordon, GM6VUL.

New Chairman

THE COUNCIL of the Society, on the recommendation of the HF Committee, recently appointed David Evans, G3OUF, as the new Chairman of the HF Committee. David, an enthusiastic and active DXer with a very long record of service to the Society, can be contacted through PO Box 599, Hemel Hempstead, Herts HP3 0SR.

From the 1993 President

1993 President Peter Chadwick, G3RZP, in the foyer of RSGB Headquarters.

ABRIDGED FROM a speech made by Peter Chadwick at his Presidential Installation on 9 January in London:

"It was on April 29 1963 when the envelope came through the letterbox, marking the receipt of my callsign, G3RZP. Although for many years I had been reading my father's copy of 'The Bull', as *RadCom* was then known, within 24 hours of the licence arriving, I had applied to join the RSGB. There were no family memberships in those days, but you joined the RSGB - it was the done thing, and those who weren't members were looked at somewhat askance. Little did I think that 30 years later I would be President.

Great Importance

"IN THOSE DAYS, Council members were looked at as people of great importance, worthy of respect, really the 'Mr Somebodies' in amateur radio. Maybe that was due to being an easily impressed youth, although my father had already complained long and loud about various perceived shortcomings of the RSGB - and said that you had no right to complain if you weren't a member! To this day, I follow in his footsteps in complaining about things in the RSGB; if there is nothing to complain about, complacency sets in. And, only if nothing is being done do no mistakes occur.

"There is no doubt that it was amateur radio that led me into the electronics industry, and into radio engineering, as a profession. I am still surprised, however, to go to a professional seminar on EMC, and hear advice given as 'novel' when referred to practices which were standard practice for anybody building an amateur transmitter in the sixties, as they are today.

"EMC is one of the bigger problems that we have to face today. Although the introduction of the EC standard has and will help to some extent, the levels of immunity prescribed for domestic equipment are sadly lacking. A proposal is being put to the EC authorities to raise the level of immunity and although certain national administrations have received intensive lobbying against this, it is hoped that such change can be rapidly implemented.

"One of the biggest weapons that can be brought out on the amateur's side is good publicity. For too long, we have continued to have the 'Tony Hancock' image with the public, and although sterling work was done in the late sixties and early seventies by the late Sylvia Margolis, the effects of that publicity have largely been dissipated. The RSGB is looking for a full-time Public Relations person whose job will be to improve both the public image of amateur radio, and the Society's image within UK amateur radio. As the public image improves, the amateur can be more easily cast in the role of the good guy, thus going some way to reduce antagonism when EMC and planning problems occur.

"Outside the UK, the RSGB is looked up to by other IARU member societies because of its expertise in many areas, and this reputation needs building upon. However, some of the misuse and abuse occasionally heard on the air can rapidly dissipate the benefits of good publicity.

Successful Engineers

"AMATEUR RADIO could be exploited in publicity terms in the area of employment. There are always jobs advertised in the electronics press for radio engineers, and the majority of today's successful RF engineers are radio amateurs. Amateur radio has provided for many of those engineers that spark of interest which has led to them getting where they are, and publicity for amateur radio can usefully and truthfully stress the advantages that this interest can bring.

"Despite the occasional poor impression of amateur radio given by some, it is interesting that I have seen in commercial laboratories throughout the world, books from RSGB and ARRL occupying pride of place on the bookshelves, and met, in my professional visits at home and abroad, so many amateurs occupying senior positions in both academia and industry. It is obvious that a greater public awareness of the benefits of amateur radio, both to the individual and the community, is deserved, and the RSGB intends that that will happen.

"The Society relies very heavily upon its volunteers to supplement the work of the professional staff. Those volunteers provide thousands of hours each year for amateur radio, from contests, through EMC and planning advice, to the QSL Bureau. When you listen to *GB2RS*, use a repeater, operate abroad with a reciprocal licence or in Europe under the CEPT agreement, get within 5kHz of the band edge on 80, let Scouts and Guides talk on a JOTA station, operate mobile, enter Field Day, get help with a planning appeal, and indulge in many more amateur activities, you are only able to do so because of the work of RSGB volunteers of past decades, as well as those of today. The activities of some of today's committees will bring benefits in the future. To paraphrase President Kennedy - 'Ask not what the RSGB does for you, but what can you do for the RSGB and Amateur Radio?'

Supreme Sacrifice

"I HAVE BEEN LUCKY in that I was brought up in amateur radio. My first Field Day was at the age of 13 months. My wife, Lynne, G4FNC, claims a deprived childhood in that she couldn't get to a communications receiver until she was eleven! For both of us, that early interest not only led to us meeting, but also to an interesting professional career. Many others have found amateur radio to be an interest, a means to provide service, a career, or a window on a world that sickness or disability would otherwise keep closed. There are people who would not be alive today without amateur radio, while there are also those dedicated amateurs who have made the supreme sacrifice while using amateur radio in the public service.

"Those who volunteer to help the cause of amateur radio through helping their national society are frequently unsung heroes from whose efforts the benefits are still being enjoyed years later. We should not forget the members of committees, Honorary Officers, members of Council and those hard-working officers the Company Secretary and the Honorary Treasurer. Despite the apparent beliefs of some, neither is paid a fat salary - in fact, they get exactly the same as the other volunteers - zero salary, a few headaches, a lot of moans, and little thanks. The Headquarters staff, too, frequently make efforts over and above the call of duty, and count as volunteers - I think they would all agree that working at HQ doesn't provide vast salaries and perks combined with nothing to do! For all these contributions, ladies and gentlemen, I give you a toast: The Society and its volunteers."

Antarctic Latest

LAWRENCE HOWELL, GM4DMA, reports that Ran Fiennes and Mike Stroud should have passed the South Pole by the time you read this. They have already walked half of the gruelling 2,200 mile journey across Antarctica and are on schedule. The aim is to be the first to cross the Antarctic on foot and at the same time to raise £2M for research into Multiple Sclerosis. They are in good spirits and their physical condition is reportedly good despite Ran's weight having dropped by 42lb.

Norwegian explorer Erling Kagge received much publicity for 'beating Fiennes and Stroud to the Pole' but his was a quite separate achievement as he travelled alone and his journey ended at the South Pole.

Morag Howell is providing the expedition communications from the bleak Patriot Base which was recently featured on BBC TV's *Pole to Pole* programme. She has managed to access INMARSAT for two to three hours a day which is remarkable as no-one has accessed this satellite from so far south before. Morag is active on HF amateur bands when possible as GB4MSS/VP8 but operation is from batteries charged by solar cells so power must be used sparingly.

GOSH!

HRH The Prince Philip, Duke of Edinburgh, KG, will open a special event station, GB0OSH, which runs from 24 to 27 February at Great Ormond Street Hospital in London. A sked has been made with King Hussein of Jordan, JY1.

The station is being sponsored on a cost per contact basis with a target of 300 QSOs per day. This should provide ample opportunity for children, staff and guests of the Hospital to speak with radio amateurs.

The aim is to provide funds for the hospital's ongoing appeal, and to promote the public's awareness of the Novice Licence. SMC and Waters and Stanton have provided equipment.

A vehicle anti theft system donated by Vecta (Essex) will be awarded to the person raising the highest amount over £400.

For information packs or donation arrangements please call Pippa Foreman at Great Ormond Street Fund Raising Dept on 071 916 5678.

PHOTOGRAPH: GM0MYV

Ian Ross, 2M0ACI operating GB2CIN on the 15 metre band, surrounded by teachers and pupils from schools in rural Aberdeenshire.

Children In Need

GB2CIN WAS aired again last November by the Alford Academy Amateur Radio Club operating from Strathadon Primary, a tiny rural school, in Aberdeenshire with only 25 pupils. Pupils from Corgaff Primary joined in as they are studying communications as a project. Over 120 contacts were made by the two HF stations and the children had fun with the phonetic alphabet and locating stations on a wall map. £252 was raised for the BBC's Children In Need appeal.

A similar amount was raised by the Submarine Radio Club based at HMS Dolphin, Gosport, who put on GB0NC from the Southampton College of Further Education. QSL cards were sponsored by Anchor Surplus of Nottingham.

To raise funds for Children In Need, RSGB HQ staff had a 'teddy bear day' on 19 November. Some dressed up as teddy bears, others brought teddies with them and a teddy bears' picnic was held at lunch time. At the end of the day a cheque for £180 was presented to the appeal at the BBC's Elstree Studios.

HQ staff donned bear costumes on 19 November to raise £180 for Children In Need. Pictured are (l to r) Mike Dennison, *RadCom* Editor (Rupert), Fiorina Sinapi, Amateur Radio Administrator; Sylvia Manco, Novice Licence Coordinator; Sue Rose, Assistant Finance Officer (the three bears) and Lynette Crawshaw, Receptionist (Goldilocks).

GB2RS by 'Phone

TO IMPROVE the service to members, the Society is *for an experimental period* making the *GB2RS* National News available by telephone. This will use a premium line.

The *GB2RS* news will normally be available to callers *in advance of the regular Sunday broadcasts* (usually from Thursday evening). We believe the service will be particularly useful to those who are not able to receive the scheduled broadcasts. And just like the normal broadcasts, this service will be available both to members and non-members. A proportion of the cost of calls will go to the Society, generating extra income and helping to keep your subscriptions down.

The service is accessed by calling 0336 407394. Initially only the national news will be available, but if there is a demand we will provide separate lines for local news bulletins.

Further information services are planned but will be implemented only if this experiment is a success. Another possibility is the automated delivery of newsletters and other important information by fax. If you have any suggestions for additional services, please send them to Nigel Roberts, G4IJF, via RSGB HQ.

The future of this experiment will depend on whether or not you use it. **Calls to 0336 407394 will cost 36 pence per minute at cheap rate and 48 pence per minute at all other times.**

Calling Beacon and Repeater Keepers

IN DECEMBER RSGB HQ posted *Repeater Report* to all keepers of Voice, TV and RTTY repeaters. In the same week, a request for up to date information was posted to all beacon keepers. Any beacon or repeater keeper who has not received the appropriate document should contact the Amateur Radio Department on 0707 649855 as soon as possible.

All Repeater Groups are reminded that if they do not wish to continue with the RSGB's public liability insurance after the end of March 1993, they must contact the RSGB's Repeater Management Group Chairman, Geoff Dover, G4AFJ, QTHR, urgently.

VHF/UHF Awards News

TWO LISTENERS have recently applied for very high levels of RSGB 50MHz award: Jan Steenbergen NL213 from Holland received 110 countries certificate number 2 plus the 100 squares award, while David Whitaker BRS25429 received the 200 squares and 70 countries awards.

The contrasting experience in our hobby was illustrated by newcomer Sarah Jewell, 2E1AJE, who was awarded 10GHz Distance certificate number 110 and 'old hand' Bill Hodgson, G3BW, who achieved the remarkable total of 300 squares / 40 countries confirmed on 2m, the second to be issued with this award.

Jerry Russell, G4SEU, headed a trio who received multiple certificates, counting in his haul 50MHz 40 countries, 50MHz 100 squares, 50MHz DX 25 countries, 144MHz 100 squares, 432MHz 40 squares and a 50MHz standard transmitting certificate. How does he manage to find time for all the operating which this entails as well as promoting on-air activity on 70MHz? Ela Martyr, G6HKM, netted 90 countries on 50MHz, 275 squares on 50MHz, 100 squares on 432MHz and 40 squares on 1.3GHz. Paul Baker, GW6VZW, updated his 50MHz totals to 70 countries, 225 squares and received a Senior transmitting award.

The Isle of Man was well represented by Andy Kissack, GD7JQI, with 50MHz certificates for 40 countries and 150 squares and Graham Atkinson, GD7HEJ, who received the 20 countries and 50 squares awards for 50MHz.

Congratulations to all award recipients who included the following:-

50MHz: 10 countries G7HJX, G0PEU; 20c DL3RK, G1MZD; 30c G4ASL; 40c G8BFL; 50c G1SDO; 90c G3VYF; 120c G3WOS. 50 squares G4ASL; 75s G3KPT, G1UGH; 100s G8BFL, GM1YZW; 125s G0MZZ; 150s G1SDO. DX 25 countries G4ASL. Senior transmitting G0JHC.

144MHz: 40 squares/10 countries DD9RY, GI0AIQ; 60s/15c G8ZRE, G0NFH, G1UGH; 80s/18c GW1MVL; 150s/20c GM4ILS; 175s/20c G6IJM, G4UXC, G4MKF. Standard Transmitting G1EBH. Senior Transmitting GW1MVL, G8ZRE.

432MHz: 70 squares / 15 countries G0EHV; 110s/15c G4NPH. Standard transmitting G7HCC, G0MLY.

Microwave: 1.3GHz 20 squares G8NEY; 25s G6LEU, G4FRE. 2.3GHz 10s G4EQD; 20s G4PMK; 40s G6DER. 10GHz 10s G4PMK. 24GHz intermediate G8AYY/P.

Details of RSGB VHF/UHF awards can be found in the 1993 RSGB *Call Book* or may be obtained from me on receipt of an SASE.

Ian L Cornes, G4OUT
VHF/UHF Awards Manager.

1992 Annual Meeting

THE RSGB's 66th Annual Meeting took place on Saturday the 5th of December in Central London. One hundred members attended what has been described as the most positive and friendly meeting for many years.

Amongst the awards presented after the AGM were the Founders Trophy for services to the Society which went to Roger Western, G3SXW, for his work prior to the RSGB Strategy Conference, and three Certificates of Merit which went to Pat Hawker, G3VA for his contributions to amateur radio literature for many years; to Kurt Davies, W8PTA, for assistance to the Society at the Dayton Hamvention; to Pop Seymour, G3GNS, for 25 years of slow Morse transmissions; and S H Foster, GI3GAL for 25 years reading the GB2RS bulletin. Four awards went to the writers of RadCom articles: The Ostermeyer Trophy was awarded to Mike Grierson, G3TSO, for A Miniature 80-metre SSB Transceiver; the Courtney-Price Trophy to Les Moxon, G6XN, for All Band Beam Antennas; the Wortley-Talbot Trophy to Bob Rylatt, G3VXJ, for The EXJAY Multiband Antenna System; and the Norman Keith Adams Prize to Geoffrey Billington, G3EAE, for An Impedance Diagram for Transmission Lines. The Minutes of the AGM and a report on the informal session will be published in Radio Communication as soon as they are available.

Birmingham Repeaters

THE CENTRAL Birmingham VHF repeater, GB3BM, has now closed down and the keeper has relinquished the franchise. Franchises for GB3BM and GB3AM in South Birmingham are now vacant and any group of radio amateurs is invited to contact the RSGB's Repeater Management Group with a view to taking over either or both franchises. Application should be in writing to the RMG Chairman, Geoff Dover, G4AFJ, QTHR.

Midland repeaters GB3BX, GB3CF, GB3MH and GB3WK are now available only from 0700 to 1800 until further notice.

● THE RAE syllabus change announced in January's *News & Reports* will take effect from May 1994. RSGB publications will be updated.

Golden Antenna

THIS AWARD is presented each year by the German town of Bad Bentheim "for an exceptional humanitarian deed in the field of amateur radio". Since 1982 the award has gone to amateurs in many countries for work as diverse as supporting a jungle doctor, coordinating rescue work in the Italian earthquake, helping Romania,

Nominations are requested from individuals and organisations concerning work carried out by individual licensed radio amateurs or groups of licensed amateurs "who in emergency situations have rendered their help to other people self-sacrificially."

The winner will have an expenses-paid invitation to attend the presentation at the German-Dutch Radio Amateur Festival.

The Golden Antenna is awarded annually for humanitarian work involving the use of amateur radio.

PHOTOGRAPH: PHOTO COORDINATES

Sheila Johnson, G7GJC, daughter of Southampton *GB2RS* newsreader Peter, G8LVC, was presented with her Duke of Edinburgh Gold Award by ITN newscaster Trevor McDonald on 15 December. Sheila sat the Radio Amateur's Examination, as part of her training towards the award. She was one of 350 gold award holders who met HRH The Prince Philip, Duke of Edinburgh, KG, at St James's Palace. Prince Philip is Patron of the RSGB.

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DOES IT AGAIN!

PACTOR finally hits the streets this month with the release of two upgrade packages for the Kantronics KAM. There are two versions available, one for KAMs with V5 firmware and one for V4. Both include the new PACTOR EPROM (V6.0) together with the PACTOR operations manual. The V5 update also includes an update for the Hostmaster II+ program. The upgrade for V4 will give all the V5 features and new Command and Operations manuals.

Make sure you're not left behind in the great datacoms rush! Visit one of our many showrooms around the country to see what digital modes can do for you. If you're in the south east, pop into our Maidstone branch and have a chat with our new manager, Steve, G6URJ. Thanks to Steve's extensive knowledge and enthusiasm, Maidstone is fast becoming the datacoms capital of England! We've since upgraded our computer systems there so that everyone can see the benefits! The full range of Kantronics equipment is also there on working display — call in now and be tempted!!

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KAMPAC	PACTOR ROM, EEPROM, NEW COMMANDS, OPERATIONS & PACTOR MANUALS FOR KAM V4	£95.00
PC COMBO	TERMINAL AND WEFAX SOFTWARE	£49.95
HOST MASTER	HOSTMASTER II+ FOR DATAENGINE & KAM	£59.95

Colin G3XAS at
BOURNEMOUTH
27 Gillam Road,
Northbourne,
Bournemouth
BH10 6BW
Tel: 0202 577760

Dave G4KFN at
NEWCASTLE
Newcastle Airport,
Woolsington,
Newcastle Upon Tyne
NE20 9DF
Tel: 0661 860418

Tony G4CYE at
BRISTOL
79 /81 Gloucester Rd
Patchway
Bristol
BS12 5JQ
Tel: 0272 771770
NEW

Fred G4RJS at
LONDON
223/225 Field End
Road,
Eastcote,
Middlesex
HA5 1QZ
Tel: 081 429 3256

Tony G4NBS at
CAMBRIDGE
162 High Street,
Chesterton,
Cambridge
CB4 1NL
Tel: 0223 311230

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It's ironic but Kenwood's 2m mobile rarely sees the inside of anyone's car these days! Why? Probably because it's an excellent, lower cost alternative to a VHF base station.

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It has a powerful 25W output in SSB, CW and FM modes, suiting a wide range of VHF linear amplifiers (see our BNOS range!) with a low power setting at 5W for QRP operators. Receiver sensitivity is excellent and RIT and RF gain controls increase flexibility. AND it's got a proper analogue S-meter!

Mode change is announced in Morse code, with indicators to remind you and as well as selecting mode from front panel controls there is an automode setting which changes modes as you scan or tune across the band.

Despite being a compact size, it has many features found only on larger radios, including dual digital VFOs, an all-mode squelch, noise blanker and a semi break-in circuit for optimum CW operation. The usual gizmos are also there: ten memory channels will store frequency, mode and repeater offset with Ch 1 being a priority alert and two others to store independent transmit and receiver frequencies. The Scan switch allows a programable band scan, or memory scan. Repeater operating is also catered for, with offsets and reverse repeater.

For UHF enthusiasts, the TR851E is available again and is the ideal companion to the 2m version. Please phone for details.

The TR751E is available now at all Lowe branches at £699.00 including our unique Two Year Warranty.

BUTTERNUT FROM LOWE

Cushcraft make a super aerial called the R7. It covers 7, 10, 14, 18, 21, 24, & 28 MHzand it costs around £369.00. Butternut also make super aerials and they make a comparable model called the HF 9V. But here's the difference - The HF9V covers 3.5, 7, 10, 14, 18, 21, 24, 28 AND 50MHz ! What's more it will save you over £100 compared to the R7 ! We're not saying the R7 is a bad aerial (after all we also sell them !), we just thought you'd like a choice. More for less ??.....It could only happen at Lowes !!

AERIAL FARMING THE BUTTERNUT WAY

Part of the folklore of amateur radio handed down by the oldtimers is to start your antenna system small and then let it "grow" as the neighbours get used to it. Sound advice, but now its a possibility with Butternut's HF6V. It starts life as a six bander (80, 40, 30, 20, 15, & 10m - all the important ones !) You can then add a kit for 17 and 12m or maybe the 6m kit or combine both those with the topband add-on to give you a full ten bands. Start your antenna farm today. The HF6V is only £199.95 - a lot less than you thought !!

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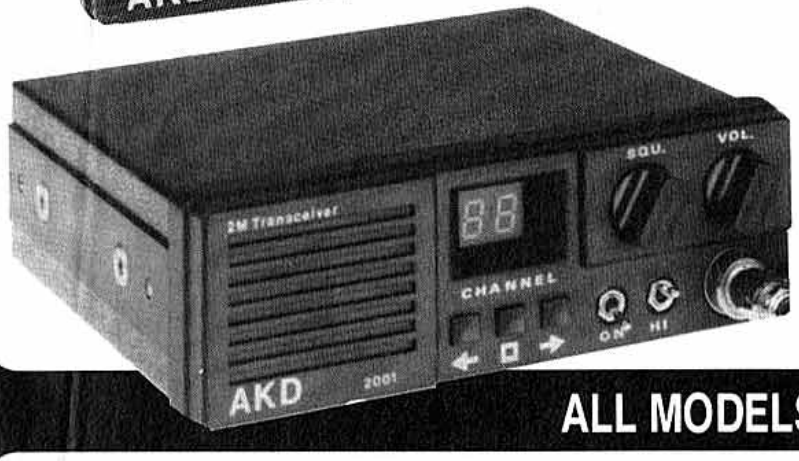

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HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham B17 8QB

A LETTER FROM G0SGB draws attention to the small number of DX stations which extract IRCs from those who they work but do not always QSL. He quotes the case of FR5DX to whom he has sent IRCs on three occasions with no response. Maybe a 'black list' in this column? There are obviously times when replies get lost, and the cost of QSLs is now so high that one IRC leaves the popular DX station out of pocket - and of course people in some remote places have no outgoing national society QSL bureau. Perhaps those working the DX *should be told what to send* and a promise given to respond?

Please disregard the notice in the January column which said that the final 1992 WARC table would appear in *this* issue - quite impossible of course because the end of 1992 was well past the relevant deadline. For 'February' please read 'March'! I really wish that space had permitted the annual 28MHz table to appear - it seems that the real enthusiasts have still been having fun on that band - for example G4MUW's total to early December was only ten less than he had reached at the end of 1991.

ROMANIA

JEFF BOTTOM G3SDG, visited Romania recently and was told by the Administration that CEPT Recommendation T/R 61-01 had been implemented in a partial manner - they would require 30 days notice of the proposed visit and would then issue authorisation. Applications should be sent to the Ministry of Communications, General Inspectorate of Communications, 202A Splawl Independant, Sector 6, Bucharest. (Tel: + 40 1 6386891, Fax: +40 1 3124797).

LEBANON

I HAVE received a list of 'active Lebanese members of the Association des Radio-Amateurs Libanais (RAL)' for the year 1992. It includes OD5s, AQ, AW, BE, BO, BU, CN, EP, ET, FE, FH, FI, FZ, GB, GC, GI, HA, HC, HO, HQ, HU, IM, IR, IU, IZ, JA, JE, JI, JL, JM, JU, JW, JZ, KB, KC, KE, KI, KP, KR, KS, KU, KV, KW, KZ, LE, LW, MB, MD, MO, ML, MM, MT, MU, MW, ND, NE, ARA, RAK, and ZZ. Unfortunately there are many pirates using Lebanese callsigns when handling illegal third-party traffic between the Middle East and South and Central America.

DX NEWS

VARIOUS bulletins from the DXCC desk at ARRL have announced that documentation has been received from 9D0RR for operations from 5 to 17 August 1992, and that cards from any operation in Iran since 20 August 1988 will now be accepted for DXCC credit. A press release dated 25 November said that the ARRL Awards Committee had voted unanimously to accept three recommendations from the DXAC. These are to add **Croatia** (9A), **Slovenia** (S5), and **Bosnia Herzegovina** (4N4) to the DXCC countries list. QSOs made with 9A and S5 on or after 26 June 1991 and with 4N4 on or after 15 October 1991 will now count and QSLs may be submitted now. Consideration of the addition of **Macedonia** was deferred. Operations recently accredited for DXCC purposes include:- 7Q7CW, C9RAA, D2/F6BLQ, D2CW, D2FGC, ET3BC/ET3YL, JT1/K7HDK, KP5/N0TG, PY0TSN, S21ZC, S79CW, TA/DK7PE, AH0G/TF/P, TU4EF, VS6/DK7PE, ZA/DF3CB, ZB2/IK0FVC, and ZS9/DK7PE.

Long Island DX Bulletin says that V85PB is keeping up his activity near 3.8MHz around 2300. The same source quotes UA9MA who has advised that at least for the time being QSLs for EZ9MA, R9MWS, UA1OIL, UA9MA, UA0B/UA9CDE, UH/UA9MA, UJ/UA9MA, UL/UA9MA, UL9C/R9MWS, UM/UA9MA, UQ/UA9MA, XV9MA, 4K2BAZ, 4K2BDU, 4K2OIL, 4K2OKV, and 4K2/UV6ABL, should be sent to DK8FS and not to him due to the unreliability of the mail service (see *QTH Corner*).

RSGB DX News Sheet reports that following recent discussions with the Ministry of Communications in **Bhutan** a proposal for the introduction of the amateur service is at ministerial level. When this is accepted there is a good chance that VK9NS will be the first to be notified. A recent *JARL News* says that at the end of March 1992 there were 1,203,226 amateur radio stations in Japan. S21B is now on from **Bangladesh** thereby doubling the number of indigenous Bangladeshi amateurs in the country. Erik, WZ6C, is now S21ZG. The VR2 prefix is now being used by Hong Kong and at the time of writing several VR2s were meeting G0SGB at 1100 on 21.285MHz at weekends. A92BE in **Bahrain** is often to be found near 28.5MHz around 1500.

Mozambique is no longer very rare and C9RJJ appears most days around 1500 in the 28.485-28.520MHz slot. At about 1630 he moves to 21.205MHz and at 1900 to 21.030MHz. *Long Island DX Bulletin* also says that he will be found on alternate days on RTTY near 14.080MHz from

BAND REPORTS

The Christmas mail seems to have delayed reports from some regulars but thanks to G2HKU, G3s GVV, KKJ, LPS, YRM, G4s DBN, DJC, GW4KGR, G4s MUW, NXG/M, OBK, and G0s BZF and KDS, for the information. Stations in italics were using CW:

1.8MHz

0000	*A61AC, OD5/SP1MHV, OH0W, SV9BAI, UD6DKW, 8P9HT*
0300	*VP8GAV*
0700	*C6AHJ, EA9EA.*
0700	*AA5BL, ZL3GQ.*
1600	*KH6CC*
1800	*FK8CP, ZC4Z*
2000	*KH0AM, UH8BAZ, VS6WO.*
2100	*JA5AUC/JD1, VK6HD.*
2200	*JA3VEL, JA4LXY, JA6IEF, TZ6VV, YB6AVE, UL7ACS, V85AA, 4K2MAL, 5U7M, 6V6U, 9K2MU.*
2300	*JR6PGB, 6W6/K3IPK, 9M2AX, 9V1ZE.*

7MHz

1400	*BV7BW*
1500	*K6DC*
1900	*JA5DQH, VK6LW, VS6WO.*
2000	*BV/K1RX, JY8YJ.*
2300	*A61AC, OD5/SP1MHV, VQ9AC.*

10MHz

0700	*FY5EW, VK9NS, ZL7AMO, 5T5CJ.*
1700	*H44DX, ZC4VT.*
2000	*A71AL/SP5EXA, 4J4GAT.*

14MHz

0800	P29AI, V63OM, VP8VN.
0900	V73EX, YB0RX.
1500	AP2JZB, V85SS, XU1EGC, YI0MR.
1900	HF0POL, ZL4OD.
2000	PY0TSN, TN1AT, *VP8GAU, 5X5WR.*
2100	VK66VU.

21MHz

0800	BY8AC.
0900	BV3AR, BY4BC, HL4LT, 5X5WR.
1000	PY0TSN, YB9AWR.
1200	VQ9KC.
1500	C9RJJ, 5R8GW, 7Q7JL.
1600	P43LJP, 3X0HNU.
1700	D2EL, D68GA, ZL1SL.
1900	*FM2GO.*

24MHz

1200	5X5WR.
1300	FY/OH7AM, KG4HG, *S79S, V31RO, 4J4GAT*
1600	C56/F6AUS, TL8CK.

28MHz

0800	A71CH, PY0FF, VS6CU, ZL2KY.
0900	AP2AJ, BV2AR, *V85PB*, ZL4NR.
1000	HS0RT, S21A, VU2VMI, YI1BGD.
1200	C9RJJ, *HC8N*, JY4OGC, *PY0FM, 3W4VL*, 3X0HLW, 5U7M.
1400	D2EL, FR5DX, WB8GEX/P/VP5, 4U1UN, 5H3PS.
1500	WN4KKN/HC8, HH2PK, P40W, TU4SR, VP8ML, XE1KK.
1600	FS/N3NCW, W6-W7-W0, ZF2QA/ZF8.
1700	*W6/G3MHV, YN/SM0OIG*

QTH CORNER

C9RJJ	via W8GIO *direct only.*
DK8FS	W Herzing, Goethestr. 14, D-6364 Florstadt 5, Germany.
DL1VU	Karl Hille, Goethestr. 3, D-8172, Lenggries, Germany.
OJ0/OH3AC	Box 74, SF-15141 Lahti, Finland.
S21B	via W4FRU, John Parrott, P O Box 5127, Suffolk, VA 23435, USA.
S5	QSL bureau ZRS, Box 180, 61001 Ljubljana, Slovenia.
S92SS	C L Lewis, C P 522, Sao Tome, Republic of Sao Tome, W Africa.
T32GG	KE6GG, 39400 Paseo Padre Parkway, Fremont, CA 92041, USA.
T32VU	DJ3TF, Othmayrstr 200, D-8540 Amberg, Germany.
VR2GO	GPO Box 9887, Hong Kong.
ZD8DZ	Dez Watson, 12 Chadswell Heights, Lichfield, Staffs, WS13 6BH.
9A	QSL bureau HRS, Box 564, 41000 Zagreb, Croatia.
9K2USA	K8EFS, 4300 S.Cochran, Charlotte, MI 48813, USA.

2300. C9RDM also appears regularly on 14.160MHz at 2330. Another regular is V51E in **Namibia** who tends to appear on 28.490MHz between 1500 and 1700, and on 21.318MHz from 1800. S92SS, in **Sao Tome** - who was previously A22AA - may already be on 14, 21, and 28MHz by now.

According to *DX'press* N6QHO/D2, who has been worked on 14MHz SSB, will remain in **Angola** for another two years and operates only in this mode. Dez Watson, G0DEZ, has written to tell me that he will be on **Ascension Is** for a period of six months from the end of February, probably as ZD8DZ and on all bands. He prefers CW and will be found near the recognised QRP frequencies (3.560, 7.030, 10.106, 14.060, 21.060, and 28.060MHz). If you have the misfortune to hear or contact '3V8AS' please do not bother to QSL 'via IK5GQM' as the station is a pirate. TU4SR should now have left **Ivory Coast** and resumed being OH8SR. N2RHP/T5 has been reported on 28MHz SSB and is probably a sign of increasing activity from **Somalia** following recent events.

It seems that recently a D2ACA QSL was rejected by the ARRL DXCC desk because it had been issued by RT5UY - it could be that only those being sent out by UT3UY are acceptable.

DL1KVC/P is located in **Antarctica** and can sometimes be found on 14.246MHz between 1700 and 1900. He is located near the site of the former DP0GVN station and he will be replaced by the former operator of Y88POL in the middle of this month. LA2GV may already be on the air from Antarctica as 3Y2GV. VP8CGK is in **S Georgia** and according the the *Long Island DX Bulletin* is often near 14.200MHz at 1600 at weekends.

EXPEDITIONS

OF PARTICULAR interest to IOTA followers is an expedition to Southwater Cay in the Belize Caribbean Sea Coast South area by NN7A/V31JZ and NG7S/V31RL from 22 to 24 February. This will be the first operation from the group and activity will be CW only using barefoot rigs and vertical and wire antennas. An IOTA number will be assigned when the event takes place - as is normal in IOTA procedure. Before the expedition they will operate in the ARRL CW DX contest from Belize as V31RL.

1993 WARC BANDS TABLE

	10MHz	18MHz	24MHz	Total
G3KKJ	124	**172**	**155**	451
G3WGV	**136**	162	119	417
G4OBK	103	154	144	401
G2VJ	79	109	111	299
G3IAR	69	97	59	227
G3ING	62	89	42	193
G2AFV	69	72	42	183
G4MUW	-	71	44	115
G4NXG/M	-	70	31	101
G4XRV	99	-	-	99
GJ4GG	19	34	20	73
GM0KMJ	-	-	62	62
GW4RGT	13	21	16	50
G0KDS	-	12	14	26

Karl Hille, DL1VU, who is at present expeditioning in the Pacific area.

Members of the Lahti Radio Club, OH3AC, will be operating from **Market Reef** at the end of February - weather permitting from the 25th to the 28th. They will be on all bands with CW, SSB, and RTTY.

It is thought that XE1XA and others may be planning a visit to **Revilla Gigedo** in early February.

The possible KH1 visit could still be making their last few stops. The **Howland Is** stay was scheduled to end on 2 or 3 February and **East Kiribati** (T32) should be reached by 8 February.

A visit to **Navassa Is** is being planned for late March - the callsign is likely to be W5IJU/KP1 and more information will be available later.

CONTESTS

1993 ARRL INTERNATIONAL DX CONTEST

0000 20 February to 2400 21 February (CW)

0000 6 March to 2400 7 March (Phone)

1.8 to 28MHz excluding WARC bands. Work USA and Canada. Single-operator single and multi-band, single-operator assisted (users of spotting nets), QRP (single-operator all band - 5W or less output), multi-operator single, two, and unlimited transmitter categories. Exchange RS/T plus three figure number indicating approximate output power. W/VE stations will give their state or province. Three points per QSO. Multiplier is total of states/provinces worked on each band (includes DC but not KH6/KL7) - a possible total of 62 per band. Logs may be submitted on disk (IBM-compatible MS-DOS formatted and as an ASCII file). They have to be sent to ARRL Contest Branch, 225 Main St, Newington, CT 06111, USA, before 7 April 1993 - entry forms can also be obtained from this address in exchange for IRCs. (NB I do not have a supply of these).

In the **1992 ARRL DX Contest (CW)** UK scores were as follows. (Note that stations in the 'A' category were using up to 5W output and those in 'B' between 6 and 150W). Special mention for **G4BUE** who was top DX station in the QRP class (and won the W8MEP trophy), **G3LNS** who was top DX station on 3.5Mz (also winning a trophy) and **G3FXB** who was third DX station on 7MHz. **(All band)** - G3MXJ (2,000,700), G3WPF (1,923,984), GW5NF (1,557,864), GU3MBS (678,366), G2QT (515,985), G4BUE (A - 513,240), G3SXW (380,460), G3ESF (B - 348,264), GW3JI (B-331,170), G3NKS (292,572), G4BUO (239,304), GU4RWP (191,484), G5MY (B-172,161), G4BWP (169,632), G3HJF (B-165,798), GM3YOR (B-163,503), G3DFV (B-160,308), GI0NWG (B-154,560), GM3ZAS (B-150,183), G4ZME (B-138,000), GM4HQF (A-58,302), G3JKY (B-29,988). **3.5MHz** - G3LNS (82,800). **7MHz** - G3FXB (160,911), G4ZOB (B-33,411), G5LP (20,055). **21MHz** - G3RTE (166,557), GX0ING (91,905), G3LSW (B-15,093). **28MHz** G4UZN (87,120), GM3CFS (43,650).

In the **Phone section** special mention for **G3FXB** and **GM0ECO** who were sixth and ninth DX stations on 7MHz, **GW4BLE** and **G4CNY** who were world second and third in the DX entry on 21MHz, and G4OJH and GW0ARK who came world seventh and eighth in the DX class on 28MHz. In the top DX QRP scores G0PAM and G0AEV were fourth and seventh respectively. In the **All band** category scores were as follows: G2QT (800,496), GU4WRP (554,820), GM3BCL (504,912), G4XKR (482,625), G4BUO (388,731), GI0NWG (B-341,880), G0PAM (A-335,943), G0AEV (A-146,100), G3ICCG (B-24,021), GU3MBS (B-13,965), G0NYD (A-5,346). On **7MHz** G3FXB (113,550), (98,100), G0KBB (74,682), G3NKS (11,520), GM4KHE (2,850). On **21MHz** GW4BLE (405,000), G4CNY (390,600), G4IUF (66,420). Finally - on **28MHz** G4OJH (502,149), GW0ARK (447,633), GX3EEO (B-74,025), G4MET (B-45,402), GM3CFS (B-31,284), G4OBE (B-10,812), and G4LJR (B-10,152).

AGCW SEMI-AUTOMATIC KEY PARTY

1900 - 2030 17 February

Only mechanical semi-automatic keys may be used. 3.540-3.560MHz.

EA RTTY CONTEST 1993

1600 13 February - 1600 14 February

TENTH BYLARA CONTEST

1900 - 2200 11 February and 1000 to 1300 13 February

I am able to supply copies of the rules of any of the contests listed above in exchange for an SASE.

PACC CONTEST

1200 13 February to 1200 14 February

1.8 to 28MHz adhering to IARU bandplans. Mixed CW and SSB. Single and multi-operator and listener sections. Exchange RS/T plus serial QSO number from 001. Dutch stations give two letters indicating their province - GR, FR, DR, OV, GD, UT, NH, ZH, FL, ZL, NB, or LB. Each QSO with Holland counts one point and a station may only be worked once per band. Multiplier is one for each province worked on each band (maximum 72). In the 1992 event **G4IQM** scored 15,606 points, and **GM3CFS** 12,660 in the single-operator category and **GB5TT** 5,775 as a multi-operator entry. Other UK scores were G3ESF (14,790), GM3KLA (9,350), G2HLU (9,000), G5LP

continued on page 20 ▶

HF F-LAYER PROPAGATION PREDICTIONS FOR FEBRUARY 1993

The time is represented vertically at two-hour intervals GMT 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	....48874...	....79996...	....89998²..	...1988894..	...677778821	641755456876	986422224789	++4.....4++
MALTA	....587651..	....79888²..	....99996²..	...19889982.	11.587778972	773854457898	998632224799	+++3.....4++
GIBRALTAR	....166441..	....28877³..	....69989⁶..	....8999982.	88778971	563475556898	998853223699	++++2....4++
ICELAND	....1443...	.....26751..	.....58983..	.....89996..	....4888894.	33..76567884	886453335688	+++52...235+
** ASIA								
OSAKA	....22.....	....54.....	....77.....	...1872.....	...2753223..	1..142124744	....1...2573	.........24.
HONGKONG	....7851....	...18972....	...288851...	...2677631..	....3545651.	2...12124764	1.......2576	243
BANGKOK	...189984...	...289996...	...3688881..	...2476783..	1...15457711	4....2124777	2.......2578	255
SINGAPORE	...178884...	...279896...	...3688881..	...2376783..	1...15457722	3....2124777	1.......2576	254
NEW DELHI	...18886....	...38888....	...467883...	...335675...	1..112457222	721...124677	72......2578	4........25+
TEHERAN	...289984...	...488996...	...7668881..	...7446784..	311511357833	8542..124788	862.....1577	+4.......255
COLOMBO	...289985...	...378997...	...4568892..	...2246785..	1....1357843	62....124788	61......1578	3........24+
BAHRAIN	...288884...	...488897¹..	...6557883..	...6336786¹.	4113..357864	973....24788	862.....1577	+4.......254
CYPRUS	...19+9971..	...3999993..	...6888996¹.	1..887889831	5317655689⁷5	9865322358⁹9	9862...13688	++3.....3++
ADEN	...2++8971..	...4778984..	...6556897².	2..522478842	6212..147987	974....14798	872.....1577	+4.......244
** OCEANIA								
SUVA/S	....133....	.....2561...	....57741..	....177763..	....5555761.	...2422245..	...12...12..	....
SUVA/L	....321...41	1...642..162	21..8652147³	12.186544763	..147433673.	...441.135..	...11...12..	....
WELLINGTON/S	.....4531...	....16752...	....48876...	....677771..	...17545751.	...24212451.	....2...22..	....
WELLINGTON/L	..........¹.	....2.....11	11..52....33	221.741..243	.121742125⁴1	...241.1341.	....1...12..	....
SYDNEY/S	....75453...	...187675...	...398788...	...4876782..	...2654576¹.	....3212473.	....1...252.	.........2..
SYDNEY/L	....1.....	....12....11	....452...42	....6642.164	....6533356³	....4211364.	....1...141.	....
PERTH	...288643...	...388766...	...4687882..	...3576785..	1...2435784²	2....1124785	1573	.........24.
HONOLULU	..........¹.	.........1..	.........4..	.........161.	.1..212.362.	.132422143..	..252...11..	...2........
** AFRICA								
SEYCHELLES	...2457741..	...4568864..	...5446887².	2..322478942	6311..147987	962....14789	84......1577	+........245
MAURITIUS	...2688882..	...3678995¹.	...4456898³1	21.322478963	7411..147998	951....14799	83......1578	5........25+
NAIROBI	...1777884..	...3777896².	1..5555899⁵2	32.522368985	8623...36898	994....14798	872.....1577	+5.......254
HARARE	....5678851.	...1677898⁴1	21.454579974	53.532258997	9823...26999	9951....4799	873.....1578	+4.......25+
CAPETOWN	....5688973¹	1...6678985²	31.165568986	64.343247998	98351..15899	9962....2699	874......378	+4.......4+
LAGOS	....8++89741	1...9877996³	32..8555899⁶	651273237998	99564...4899	89961...1699	6883.....378	455......4+
ASCENSION IS	....6866774¹	....8866786²	32..8644588⁶	652.84223898	996361...599	99973....379	87851.....58	5552.....2+
DAKAR	....5++8884.	....7887896²	22..8755698⁵	552.86324898	987273..1699	98964....379	76862....158	54+3.....2+
LAS PALMAS	....4998971.	....6999983.	....8988997²	12..98878994	675286656899	999764323689	889731..1379	+++4.....4+
** S. AMERICA								
5th SHETLAND	.....356774.	....1577886²	22..4777677⁵	542.67655567	776275322246	567542....13	24442......1	....
FALKLAND Is	....1588883.	....2788885²	11..5876567⁴	442.77643466	887175³1.136	788642....14	47762......1	2443........
R DE JANEIRO	.....664563.	8756761	11..2864468⁴	432.47422477	8871651..158	999642....37	88862......4	+5+3........
BUENOS AIRES	.....476783.	....2686775¹	11..5775556⁴	332.77632356	7771753...37	899642.....4	68862......1	35+3........
LIMA	......8887³.	......9877⁴.	......8655⁵2	111.21642234	455.5331...5	799452¹....2	48862.......	2553........
BOGOTA	......8887³.	......9877⁴.	......8654⁵2	1642244	445.2331..16	788442¹....3	68762......1	3543........
** N. AMERICA								
BARBADOS	.....2988⁸3.	.....4977⁷5.	.....7855⁵72	111..7632365	555.153...47	998442¹...16	88662......3	+543........
JAMAICA	......7887².	......8877⁴.	......8755⁵2	1653244	444.2342..16	788342¹....3	68762......1	3543........
BERMUDA	......8887².	.....1888⁸4.	.....3876⁶72	5653574	444.1542125⁷	888342¹...26	88762......3	5543........
NEW YORK	......4886¹.	......6988³.	......7877⁶1	2675573	343.1444225⁶	888332¹1..25	68862......2	3553........
MEXICO	.......8861.	.......8863.	.......8653¹	275222	343.21342..2	488342¹1....	27862.......	.453........
MONTREAL	......4886¹.	......6887³.	......7877⁶1	2776673	342..4443366	888331¹.136	68862......3	3553........
DENVER	........64..	.......2761.	.......4863.	67541	332.1..54224	477241121..2	26852.......	.3+3........
LOS ANGELES	.........44..	........661.	........862.	.......1853¹	231.1..36211	367242.23...	14852.......	..53........
VANCOUVER	..........2..	........14..	........362.	.......573.	231.1..26542	366241.24212	14752...1...	..43........
FAIRBANKS	....	....	.........1..	.......131.	12..22235742	343242124543	12452...1211	...2........

The provisional mean sunspot number for December 1992 issued by the Sunspot Data Centre, Brussels was 83.3. The maximum daily sunspot number was 132 on 11 December and the minimum was 34 on 7 December. The predicted smoothed sunspot numbers for February, March and April, are respectively: (classical method) 81, 79, 77; (SIDC adjusted values) 89, 86, 83.

VHF/UHF NEWS

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

SOME GOOD tropospheric propagation over the Christmas holidays plus auroral activity resulted in 1992 going out in good style. The end-of-year Fixed Station Contest encouraged some welcome activity on 4m, 2m and 70cm. Even so, fewer reports than expected arrived by the deadline date.

NEW COUNTRIES

THE FORMER Czechoslovakia split into two new countries on 1 January. The Czech Republic comprises Bohemia and Moravia, the prefixes remaining OK1 and OK2 respectively. The easternmost region, which used to be OK3, is now known as Slovakia, with a new prefix, OM3. Stations appear to be keeping their original suffix but I'm not sure what the novice prefixes are - the old Slovakian ones were OL8, 9 and 0. To the south, the Hungarian VHF prefix, HG, has been discontinued, all calls now being HA.

PUBLICATIONS

NEWSLETTERS

The December 1992 issue of *The VHF-UHF DXer* includes an article by N1BWT on rewinding 28V coaxial relay coils to run on 12V; the results of the noise figure measurements at the November 1992 Martlesham Round Table meeting; a contribution from G0DJA on working stations via auroral reflections using QRP, and hints on removing SMD ICs from PCBs by DF7IT. A book review and band reports on 50, 144, 430 and 1,296MHz complete this 20 page issue. The newsletter now appears monthly. Contact editor/publisher Dave Hardy, G8ROU, for subscription details; he is QTHR.

Kate Wragg, G0FEZ, edits the *Newsletter* of the Worked All Britain Awards Group. The latest issue was No.76 for December 1992. It includes a list of their LF, HF and VHF contests and a calendar of proposed mobile rallies for 1993, some feature articles, a crossword, cartoon and lists of awards issued last September, October and November. Contact membership secretary Brian Morris, G4KSQ, for more details at QTHR.

NEW BOOK

The idea for a new VHF/UHF book was first proposed in 1987 and it finally appeared in late December 1992 as *The VHF/UHF DX Book*. In his Introduction, editor Ian White, G3SEK, explains that he ". . . . started this project because no existing amateur radio book seemed to capture the reality of VHF/UHF DX, with its unique blend of advanced technology and personal skill."

Ian recruited an impressive team of authors to write specific chapters, and all should be familiar to *RadCom* readers. Geoff Grayer, G3NAQ, wrote the 66-page Propagation section, starting from first principles and examining all known modes from tropo through FAI to EME, copiously illustrated with 46 diagrams.

Dave Butler, G4ASR, contributed the 29-page chapter on Operating which contains a wealth of commonsense advice on how to find and work the real DX. For MS, he includes a flow chart, suggests how to log a QSO and illustrates a typical *invalid* contact. I like the 'DXer's Year Planner' diagram showing when the different modes on various bands are most likely to occur.

Station Assembly by G3SEK is a short, mathematical chapter showing how to assemble the most effective receiving system. Ian deals with noise, sensitivity and path loss and there is a section on ground and Sun noise. His next chapter covers Receivers and Local Oscillators, analysing the requirements for strong signal performance. He introduces the TCALC microcomputer program for automating design calculations.

Transmitters, PAs and EMC matters are lucidly covered by John Nelson, GW4FRX, in 43 pages of technical information. (The piece on checking the width of transmissions reminds me of the many tests John and I carried out when he lived in Hampstead). This is essential reading for anyone proposing to commission a new PA of whatever power level.

Beam Antennas and Feedlines by Gunter Hoch, DL6WU, is an exhaustive treatise on the design and practical construction of Yagi antennas.

Years of computer analysis and practical testing on professional antenna ranges have resulted in optimum designs. They are the standards by which all VHF antennas are now judged.

The remainder of the book is devoted to descriptions of equipment for the 50MHz to 430MHz bands and is targetted at those who enjoy metal-bashing and wielding soldering irons. Chapter 8, 144MHz, includes Sam Jewell's, G4DDK, 'Suffolk' transverter, GW4FRX's notes on the W1SL PA and a short piece on DX antennas. Chapter 9, 50/70MHz, features Dave Powis's, G4HUP, 50MHz transverter and Dave Robinson's, G4FRE, 'Cray' 70MHz transverter. Both are thoroughly illustrated with diagrams and photographs, PCB layouts and parts lists.

Chapter 10, 432MHz, features John Wilkinson's, G4HGT, 'DXer's Transverter' including a TCALC performance analysis; G3SEK's low noise GaAsFET preamplifier contribution based on G3WDG's work; the K2RIW PA by GW4FRX and G3SEK and more on DL6WU Yagis.

The next section, Power Supplies and Control Units, by GW4FRX includes the proven, published designs by the author and Melvyn Noakes, G4JZQ. John dispels some of the myths about screen supplies for tetrodes, still commonly believed by some designers and constructors. An integral part of all installations is the control of the transmit/receive function and John makes no apologies for covering this subject in minute detail.

The final chapter is Test Equipment and Station Accessories by Roger Blackwell, G4PMK. This contains designs for lots of useful accessories you can build to help get the best performance from your station. There is a very comprehensive nine page Index which alone took a week to compile.

The VHF/UHF DX Book will appeal particularly to the more technically minded amateurs who are keen to understand how equipment and propagation works and who then put that knowledge to working some real DX. The information is state-of-the-art and the sub-editing by GW4FRX has produced a very readable book in

LOCATOR SQUARES TABLE
STARTING DATE: 1-1-1979

Callsign	50MHz	70MHz	144MHz	430MHz	1.3GHz	Total
G4RGK	167	-	319	182	58	726
G3IMV	403	-	492	125	52	1072
GJ4ICD	559	-	264	121	65	1009
G6HKM	415	-	237	118	57	827
G4TIF	310	28	207	112	-	657
GW4LXO	440	23	261	108	48	880
G0GMB	66	-	215	108	-	389
G4SSO	80	-	269	99	-	448
G4MUT	186	25	158	97	34	500
G8LHT	196	20	202	93	17	528
G0EHV	-	35	187	81	-	303
G4RRA	-	-	299	80	-	379
G0CUZ	-	-	374	78	-	452
G0EVT	217	2	233	65	1	518
G6MXL	110	23	115	64	28	340
G1SWH	245	33	179	63	9	529
G4DEZ	141	-	251	62	56	510
G6ODT	-	3	57	52	-	112
G0NFH	133	26	101	51	18	329
G0FIG	200	-	171	42	-	413
G4YTL	-	38	279	37	-	354
GW8JLY	-	-	271	36	-	307
G8PYP	228	1	122	35	-	386
G3FIJ	1	24	80	22	3	130
GW6VZW	332	-	143	6	-	481
G0FYD	162	-	191	6	-	359
GU7DHI	329	-	106	5	-	440
G7JAF	-	-	53	3	-	56
G7CLY	70	-	60	2	-	132
G6HCV	355	-	241	-	-	596
G0JHC	457	-	48	-	-	505
G0MGA	249	-	216	-	-	465
G4SWX	-	-	404	-	-	404
G4DHF	-	-	342	-	-	342
G0HVQ	268	-	71	-	-	339
G1SMD	206	-	112	-	-	318
G1UGH	193	-	121	-	-	314
G8XTJ	147	-	126	-	-	273
GW4VEQ	-	-	267	-	-	267
G3FPK	-	-	246	-	-	246
GW4FRX	-	-	235	-	-	235
G4DOL	-	-	223	-	-	223
GM1XOG	181	-	-	-	-	181
G7LIJ	-	-	151	-	-	151
G7EWL	54	2	78	-	-	134
GM0GDL	-	-	122	-	-	122
GW0PZT	-	-	120	-	-	120
G0HDZ	11	-	67	-	-	78
G4OBK	21	1	45	-	-	67
G6AJE	-	-	25	-	7	32
GW7EVG	-	-	28	-	-	28

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Next deadline is **26 February**. Band of the month 430MHz.

RSGB NATIONAL VHF CONVENTION

Sandown Exhibition Centre, Esher, Surrey

SATURDAY 6 MARCH 1993

● One Day Exhibition and Lecture Programme ● Specialist Groups ● Full Lecture Programme on VHF, UHF and Microwave Subjects ● Morse Tests (by prior booking) ● Presentation of Trophies ● Comprehensive Trade Exhibition

PROGRAMME

1030	Convention opens. Enter through main entrance.
	Refreshments. Snack bar in the hall will be open from 1100 to 1800 and the licensed bar will be open throughout the convention.
1130	AGM 6m Group.
1330	Convention address and presentation of trophies by RSGB President P E Chadwick, G3RZP.

LECTURE PROGRAMME

Detailed Arrangement for Lectures will be Notified on Arrival

	A	B
1415	Log Periodic Aerials for 6, 4 and 2m. *Mike Gibbings, G3FDW*	Operating on 24GHz *Steve Davies, G4KNZ*
1515	Home Brew Moonbounce *Pat Gowen, G3IOR*	Update of 10GHz Modules *Charlie Suckling, G3WDG*
1615	VHF Committee Forum	Remote Imaging Group AGM *Henry Neale, G3REH*
1715	Lecture Sessions End	
1730	Trade Exhibition Closes. Convention Ends.	

ADMISSION

Admission will be by payment on entry as follows:

Convention and Exhibition £2.00	(over 65)	£1.50
	(under 18)	£1.00
	(under 14)	Free

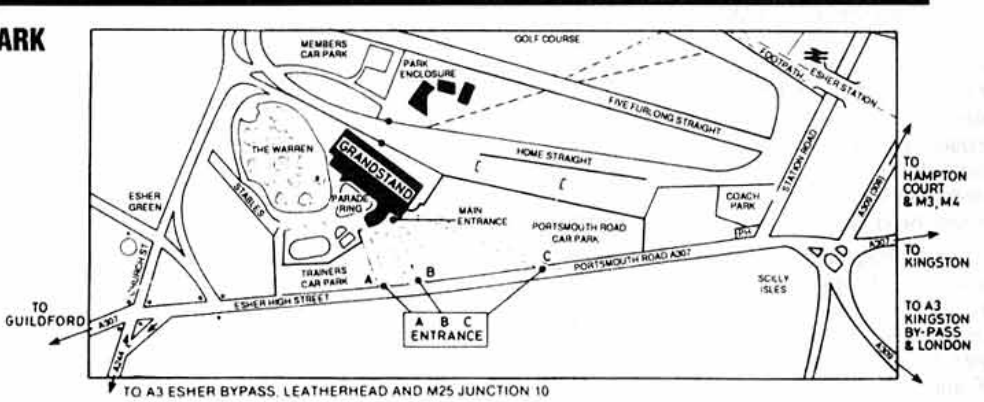
ACCESS MAP TO SANDOWN PARK

RAIL TRAVEL:
British Rail
WATERLOO TO ESHER

TALK-IN STATION:
GB2VHF:
Channels S22 SU22

STAND BOOKINGS:
Les Hawkyard G5HD
Tel: 0409-281342

DETAILS:
Geoff Stone G3FZL
Tel: 081-699 6940



Map by courtesy of United Racecourses

the modern style. It is published by DIR Publishing Limited of PO Box 771, Buckingham, MK18 4HH, who I thank for providing a pre-publication copy.

MOONBOUNCE

MARK HOLLOWAY, G4YRY (IO90), who runs 250W to four 9-ele Yagis on 144MHz, completed a sked with DL3BWW at 1520 on 8 November. In the second leg of the ARRL Contest on the 14/15 November weekend he completed random QSOs with WA6MGZ, SM2CEW and UZ2FWA at moonset, all on CW, the DL, SM and UZ being new initials.

Others heard in the contest included DL1MAJ, DL3BWW, DL8DAT, GM4YXI, IK3MAC, LA8YB, LZ2US, SM4RNA, SM5FRH and W5UN.

The next favourable weekend is 6/7 February at full Moon and approaching perigee. For a London QTH, moonrise on the 5th is at about 1540 at 63° azimuth, reaching a maximum southerly elevation of 55° just before 2315. Moonset is around 0630 on the 6th at 291°, giving a North American window from 0415 to 0600.

Saturday afternoon moonrise is at 1700 at 70° providing an Asian window for about 80min. Maximum southerly elevation of 50° occurs at 0010 on the 7th with moonset about 0700 at 284°; a North American window is available from 0445 to 0630. Sunday moonrise is just before 1830 at 80° with an Asian window till 1930. The Moon's declination varies from 16° at 0000 on the 6th to 5.8° at 2400 on the 7th; all times GMT.

CONTEST THOUGHTS

I WAS chatting with Clive Penna, GM3POI (OKE), after the December Fixed Station contests and he said he doesn't like events with county/country multipliers; they may be great for accumulating high scores for Midlands stations, but those around the edges of the mainland have little chance. He won't be entering any more of this type.

If we must have multipliers, locator squares would seem to be a fairer basis. To illustrate this, take Channel Islands stations who would probably not work many counties for multiplier points, mostly because mainlanders don't beam their way. But they would be more likely to pick up multipliers to the south and east by working some of the French squares. Maybe it is time we reconsidered contest scoring and scrapped the uniquely British radial ring system? Most people who enter contests now use a computer to score them, so why not adopt the one-point-per-kilometre points system as used everywhere else? We have to use that in IARU events anyway.

The maximum of 25 points for 50MHz contest contacts needs revising, if we keep the radial ring system, and Clive suggested it be based on the greatest distance between extreme points in the British Isles. It is about 1,300km between Unst in the Shetland Islands and Jersey in the Channel Islands, say 49 points. Your comments on any of these ideas would be welcome.

50MHZ

NEWS

Ted Collins, G4UPS (DVN), reports that OD5SK has received the missing beacon Tx and installed it in Tripoli at the end of November. It signs OD5SIX on 50.078MHz and runs 10W. Samir plans to build a better antenna for it. SM3NRY is worth listening for as he is in the rare JP82 square. From Antarctica, VK0AQ should be active from Casey Base using an IC-505 transceiver, 80W amplifier and 3-ele Yagi. His QSL route is via VK3OT.

PROPAGATION

In his November report, Ray Cracknell, G2AHU (HWR), notes that both sunspot numbers and solar flux values were slightly up on the October figures. This has somewhat halted the very rapid decline that set in during Spring 1992. It was a disturbed month with a major flare on the 2nd and proton events between 1 and 6 Nov. He states that ". . . . 50MHz produced the worst conditions experienced since the band was returned to amateur use in Europe. Looking ahead, Ray reckons ". . . . that F-layer DX on 50MHz from Britain during the winter months will only occur with the help of winter Es for the first hop during the next few years. Nevertheless, the likelihood of such a 'dirty' Sun as in 1992 is very remote and winter Es should improve markedly."

ACTIVITY

It seems that people have all but deserted the band in recent weeks. As G2AHU points out though, very little is known about tropo propagation at 50MHz which is why the G4UPS (IO80JV) daily tests at 0900 with G3CCH (IO93QO) over a 350km path are so worthwhile. Ray hopes that more operators will consider such regular tests over different paths and distances, noting barometric pressure, humidity, temperature and general weather conditions.

Another mode worth researching at 50MHz is meteor scatter between pairs of stations, to supplement results obtained from monitoring beacons and broadcasting stations in eastern Europe. Ray also feels there is a need for an auroral watch group to organize a European warning system. These activities should be encouraged to ensure the band sustains a reasonable level of activity throughout the year.

The only detailed report was from G4UPS who, on 26 November, had QSOs with OK3CM (JN86), S51GW and S57AC (JN76) and IK2GSO around midday.

On the 29th, SM7FJE was S9 for several minutes from 1220 and next day there was propagation to OZ for a while from 0900. For the first 12 days of December, Ted reported virtually no DX into Devon.

On the 13th there was some MS activity in the Geminids mixed up with Es propagation which latter brought QSOs with YU7AU and YU2IQ (KN04) just before 2000. On the 15th from 0835 there was Es propagation, mainly to LA, SM and OZ which resulted in a few QSOs. The last contact was with OK1MJL (JO70) at 0953. From about 1740 on the 17th there was auroral activity with G, GM, SM and OH3MF heard.

Major Ken Ellis, G5KW (centre) receiving a silver salver from Geoff Brown, GJ4ICD and Mike Turner, GJ0PDJ, when he visited Jersey in late October. The award was for Ken's pioneering work on 50MHz.

144MHZ

IN A LETTER received on 18 December, Brian Underdown, G7LIJ (KNT), reported that the AFS Contest brought GLR and HBS for new 1992 counties, best DX heard being GM4AFF (IO87). On the 9 December he finally caught up with GW4VEQ (IO73) for a new square. At 1030 on the 15th, beacon HB9HB was S7 and DB0FAI (JN58) was S2, but the DX didn't get going till 1700. Stations worked included DL5MAS (JN57), DK0OG, OE5XJM and OE5OLL (JN68), DG5OAF (JO51) and SP2NJI (JO92).

Arlen Pardoe, GM0HUO (FFE), considers himself very lucky in being one of only four British stations to complete an MS contact with JX7DFA (IQ50) during the Geminids on 13 December. He first discovered this station while listening on the European VHF net on 14.345MHz in the afternoon when he announced he was QRV on 144.095MHz. The CW QSO was completed in 20min from 1835, the QRB being about 1,640km. It gave Arlen a new field, square and country.

I cannot recall if Jan Mayen, a DXCC country situated way above the Arctic Circle midway between north Norway and Greenland, has ever been worked before on 2m from the British Isles. Unfortunately the following day JX7DFA's 2m antennas were destroyed in a gale. His home callsign is LA7DFA and QSLs should be directed to that QTH.

December was a good month for GM0HUO. In an aurora on the 7th he worked OZ1DOQ (JO65) and LA1KHA (JO49) in the late evening. On the 17th, inspite of no beacons being heard via aurora, many DL, LA, ON and SM stations were copied from 1930. Next day at 1835, GM4JFG, SM5BSZ and the OY6VHF beacon were heard, the latter being also copied for 5min at 1816 the following day.

Good tropo on the 27th brought ten SSB contacts with DL, F, G, GM, ON and PA stations between 1238 and 1744, some counting for contest points. On the 28th Arlen made more tropo SSB QSOs from 1510 with DL, OZ and SM stations, then from 1610 an aurora brought LA4XGA (JP33),

QSL

RSGB QSL Bureau,
PO Box 1773, Potters Bar,
Herts, EN6 3EP

● I am often asked why the Society does not market a standard QSL card which members could utilise by imprinting their personal callsign in a provided space. What do you think? Is there sufficient interest and if so would they sell? Let me know. If you think there is a call for one I will see that the Society gives it urgent consideration.

While we are on the subject should such a card be fairly plain and simple or should we commission a unique and colourful card? Remember however that the more complicated the design the more expensive the card will be.

● Henry Harrison, G0IVX, has written to me about QSL success rates. Henry is most efficient and has the return rate on a database. His figures show Germany 66%, Russia 13%, Yugoslavia 33%, Italy 62%, USA 66%, Poland 33% and Spain 60%. His overall return rate is 41% One good point that Henry makes is 'don't expect a QSL card until a year after the contact'. On the other hand I say 'never give up hope' but we don't want to start that saga all over again!

● The QSL Bureau in Taiwan has moved and its address is now: CTARL QSL Bureau, PO Box 93, Taipei, Taiwan. The QSL Bureau in India has also moved and its new address is: ARSI QSL Bureau, PO Box 6143, Madras 600017, India.

● Dan Lockyer, GW3HCL, has written to me about my VE query and tells me that it was the commencing sign in pre-World War 2 wireless telegraphy procedure and its commercial equivalent is CT (Ted Allen, G3DRN, tells me, however, that VE appears in the ARRL Handbook as SN with a different meaning which is a different configuration of the dots and dashes).

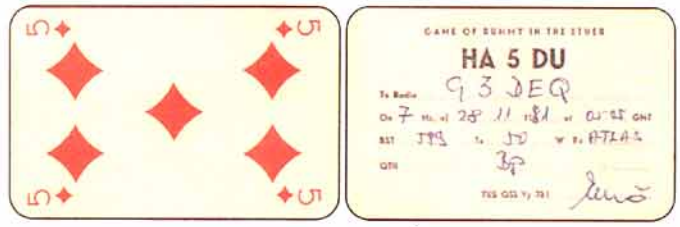
Dan goes on to tell me he thinks a commencing signal was necessary because early receivers and master oscillator transmitters were prone to drift off frequency during transmission. The preliminary VE gave an operator just enough time to 'tweak' his receiver onto the calling station. Dan says he has personal knowledge of this in the 1930's when working as an operator on multi station nets. At the commencement of the day's business every outstation had to net onto the control station transmitter frequency but as the day went on all the outstations were on slightly different frequencies. Hence the need for some 'tweaking'.

Oh the joyful unpredictability of pre-black box radio when every time you switched on was an adventure!

● Dick Standbridge, G8NT, has written me about the use of VE and enclosed a very interesting photocopy from a Post Office Training Manual he was issued with in 1926. Under a heading 'Rules for Signalling' it states: 'Always begin with the 'understand' signal (..._.) to give the receiving clerk time to get ready. Use the same signal also at the finish'. It is that last sentence that I find most interesting in that I was taught to send VA at the end of transmission and I wonder when the change was introduced.

I may have been instructed incorrectly of course but I learnt my code in the early 50's from ex-Cable & Wireless operators who really knew their stuff. I well remember one man who could send perfect 25WPM Morse indefinitely whilst carrying on a conversation with someone who had come into the room! I am still in awe of that sort of expertise.

John Hall, G3KVA



Two sides of an unusual QSL card which appears to have been part of a complicated award scheme. It is playing card size.

VHF NEWS

DK3BU (JO33) and SM5MIX (JO79) on CW and DC9YC (JO31) on SSB at QTE 10-40°. OZ5ACG (JO75) was on tropo at 2040 and just after midnight he worked SM7FMX (JO65) on SSB. There was another aurora on the 29th from 1330 in which he contacted GM3POI (OKE) and LA5KO (JO59) on CW.

GM3POI (IO88OW), participated in the 26-29 Dec contests. Clive's best tropo DX on the 27th was FC1CYB (JN17) and best auroral DX on the 28th was OH8UV (KP34VJ) at 1709km. On the 29th he found OKs in JO70. There was an aurora in progress when he telephoned me in the evening of 2 Jan.

Edward Allely, GW0PZT (GDD), wrote that the persistent high pressure system - up to 1,042mb - didn't produce much DX until 26 December when he worked a few ONs and DLs in JO30 and JO40, a QRB of around 800km. Best DX heard was HB9DFP (JN37) at about 1,000km. The next real DX was on the 28th when numerous weak OZs appeared from JO56/57, such as 1AZZ, 6ABA and 6AVE.

The afternoon aurora on the 28th, 1530-1630, brought GM3POI. It restarted at 1710 with numerous GMs active, but not much outside Britain. At 1800 he worked UZ2FWA (KO04) at 1,664km for a new square, country and best auroral DX to date. There was another Scottish type aurora next day plus tropo to the south. QSOs included FC1PAU (IN88) and EA1TA (IN53). Beacon EA1VHF was S9-plus on the 28th and 29th but there was very little amateur activity from Spain.

At G3FPK, contest activity seemed reasonable on the 28th and 29th.

UZ2FWA was quite strong up to 1800 on the 28th and I worked GM4YHF/P (IO78) at 1810. The event fizzled out by about 1820. I discovered the aurora on the 29th at 1520 but only worked GM3POI and GM4YHF/P again.

DEADLINES

THERE WERE no reports on 70MHz or 430MHz activity so that winds it up for another month. The deadline for **April** is **26 February** and for **May** it is **1 April**; no need to send in any Annual Table scores till then. The fax machine is on 081-668 5582, my CompuServe ID is 70630,603, the telex number is 9312111074(CN) and the BT Gold mailbox is 76:MSX021.

HF NEWS

continued from page 15

(8,685), G0IEZ (1,988), and G4ZIB (1,643).

TEN-TEN INTERNATIONAL NET PHONE CONTEST

0000 6 February - 2359 7 February

Please observe a 'quiet zone' between 28.490 and 28.510MHz. Unfortunately I have no other details - suggest that if you are interested you contact Peggy Pinnell, G4MAE.

UBA CONTEST

1300 27 February - 1300 28 February

Scheduled for this time but no rules received. As 1992?

FRENCH CONTEST

0600 27 February - 1800 28 February

As above.

QSL VIA

There are far too many topical QTHs to include in *QTH Corner* so here are a few more which appeared mostly during the CQ DX contests:- DU1/DL1VU - DL1VU, FM2GO - FB1MUX, FO/SM0NZY etc - SM0NZY, FS/N3NCW - N3NCW, FW/Y58IO and FW/Y31XO - Y58IO, H27W, H23W - 5B4WN, HC8N - AA5BT, HT1T - SM0KCR, J37H - KJ4VH, J79MAE - DL5MAE, JT1/UV3HD - DJ2VZ, JY9VC - DK9VC, KC6/DL1VU - DK5EX, KH2S - JH4RHF, OT2T - ON6TT, P40I - OH2KI, P40J - WX4G, P40MM - N2MM, P40USA - NA5U, P40W - N2MM, PT0F - AH3C, S79S - KQ1F, T30CT - DL1VU, T31AF - DL2MDZ, T32BE - WC5P, T32VU - DJ3TF, T33VU - DL4YAH, T5CB - KA1PM, US50BS - UB5BAZ, V31RY - WN0B, V63VU - DB5UJ, VK9CB - VK6LA, VK9LD - VK4CRR, VK9NY - JH5OWN, YN0YN - KN9P, YP6F - YO6KAF, ZB2/N5OKR - KU6E, ZK2XI/ZK2XJ - JA3JM, 8Q7BX - I4ALU, 8P9Z - K4BAI, 8R1K - OH0XX, 9M6NA - JE1JKL, 9X5AB - DL6NA

THANKS

To those who helped again this month and also to the writers of the following for information: the *Lynx DX Bulletin* (EA2KL), *DX'press* (PA3DZN), the *Long Island DX Bulletin*, and *RSGB DX News Sheet* (G4DYO). Please let me have everything for the **April** column by **19 February** at the very latest.

SWL NEWS

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

I HAVE STARTED to receive feedback following the series of tips aimed at improving listening techniques, and still further comment about how useful the DX Net frequencies have been.

Referring to one letter in particular, from Philip Davies, G1EMD, he now has twelve DX frequencies programmed into his Icom IC-R72 and he commences his listening periods by checking these memories.

Although DX Nets can sometimes be difficult to listen to because so much time can be wasted waiting for something new or interesting to appear, they are a good source of DX when there are no 'easy' countries left to hear. Philip refers to logging four new ones recently thanks to the European DX Net on 14.243MHz. They were 5X5WR, TN1AT, FR5AI/G (Glorioso Is), and VP8CFM (South Orkney Is). These took him to 268 countries heard since he started listening in 1985.

WHERE ARE THEY NOW?

PHIL OAKLEY, G0BVD hits the headlines this month. He joined the Society in 1981 and used RS46114 for about five years. Using a Sony ICF6700W with a 67' dipole, his main interest was in 'Hearing All States', but after passing the RAE and becoming G6UDY, he only heard 38. Then he remembered some advice from this column that it is no good spending hundreds of pounds on a radio and compromising on the antenna. So, he bought two 11-element Cushcraft beams for 144MHz and enjoyed some DXing on that band. Because of his interest in HF SWLing he decided to take the Morse Test, and became G0BVD, after which his interest in US States returned and he has now worked them all except Utah.

Phil does more listening than operating - the mark of a good HF operator - so he feels that his 'apprenticeship' as an SWL has stood him in good stead. His biggest regret is that he heard and taped W5LFL in the Spacecraft 'Columbia' but never sent off a listener report!

4S7 QSL CARDS

AS REGULARS will know, I am handling QSL cards for SWL reports for the 4S0UK and 4S7DGG expedition mounted by Doug, G0LUH, and others last year. Cards are now available and all direct and bureau cards have been dealt with. I am also acting as the SWL QSL Manager for Deryck, G3VLX, for his 4S7VLG expedition last October. Unfortunately Deryck picked up a rather nasty bug while in 4S7 and the QSL cards have been delayed. They may be available at about the time you read this.

DX NEWS

MY COMMENTS about LF DXing seem to have been heeded and Albert, BRS48462, provided extracts from his 3.5MHz log. Conditions early in December were quite good but, according to Albert, the path to ZL was poor. Signals to the USA were good, and a consistent visitor to the top end of the band was TI4CF. Other callsigns logged included A92BE, FK8CP, HL1IUA, VK6LK and 8R1AK.

A surprise contributor this month was Paul, G6MEN. Back in 1980 he purchased an FT7B as an incentive to take and pass the RAE. The incentive worked, but he has never passed the Morse and for much of its life the FT7B has been on loan to a Class A operator. It has now been returned and during a bout of insomnia decided to try the receiver on 3.5MHz.

For an aerial, Paul simply stuck about a metre and a half of wire in the aerial socket. Amazingly, he logged a number of W's, FM5CD, HH7PV, KP4RF, 4Z4UR, 7X2BK and 9K2MU.

Elsewhere, my usual contributors offered the following as the better DX of the period, but the early closure of the HF bands had become most marked. Perhaps the most unusual occurrence mentioned this month was reported by Robert Small, BRS8841. At 1100 on the Sunday of the CW leg of the CQWW Contest, he could hear both sides of JA/W QSOs on 21MHz.

Now for the best loggings:

28MHz: A41KW, C56/F1LGQ, C9TDM, FY0EK, PY0FF, 3X0HNU and 9K2US.

21MHz: BV2BT, BY4RSA, E28DX (Kon Samui Is, Thailand), JT1V, TJ1MR, YK1AO, XX9MD and ZL7AMO.

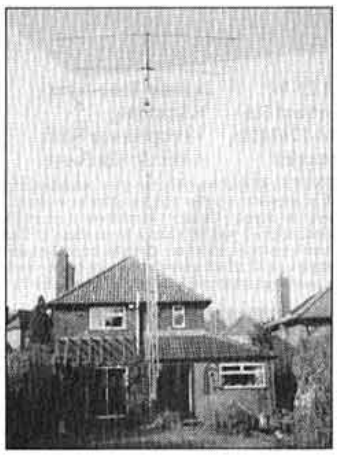
14MHz: KI7AM/DU8, FR5ZN, K6MYC/KH6, PY0TSN, S79S, XE1AE/XF3, 7Q7LA and 8J2BO.

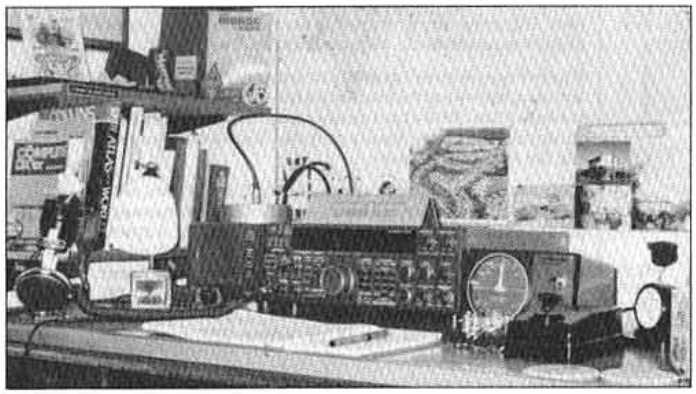
7MHz: T32BE, VK9LD, V63JC - All logged around 0700 on a US/DX Net on 7.183/7.068MHz.

The big expedition news at the time you read this will be the trip to KH1 (Howland Islands). Usual DXpedition frequencies will certainly net you this juicy morsel of DX.

FINALE

NEWS FOR **April** must reach me no later than **11 February**.





Shack of Phil Oakley ex-RS46114. As G0BWD, he uses a Kenwood TS950S HF transceiver. Left: Phil's 60ft Versatower and Jaybeam TB3 antenna.

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Peter Waters G30JV/G0PEP

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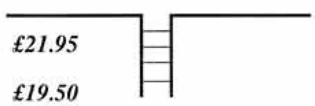

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Novice NEWS

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

AN INVITATION to listen to slow Morse transmissions on 1.976MHz appeared in December's *RadCom*. I hope you have not been listening avidly *every* evening and been disappointed. John, G3SJE, wrote to me with more information as follows:

He has been using that frequency, giving slow Morse transmissions for many years and it was a bonus to discover that the frequency fell within the Novice section of the band although, of course, for practice listening purposes, that did not matter.

GB2CW transmissions are done on behalf of the Edgware Club (callsign G3ASR) and to put the record straight, listen for that callsign on *Monday* evenings, between 2030 and 2230 on 1.976MHz, when John will be sending CW at four to fourteen WPM. There is a further opportunity to hear him on alternate Thursday evenings when he goes a bit faster - eight to sixteen WPM between 1930 and 2100. John is occupied with club meetings on the second and fourth Thursdays of each month, so listen for his transmissions on the first and third Thursdays.

He sends a wide variety of material, including QSO-type items. With a change in the format of the 12WPM test, many potential G0s could benefit too.

However he realises that 'B' licensees cannot call and tell him they are there, but he would be delighted to meet Novice 'A' licensees - please give him a call.

HARPS FOR SHORT

SINCE I ASKED for information from radio-active schools, I have been busy trying to bring the information on them up to date on a file and answering letters. One school who answered was the Hardy Memorial Primary School in Northern Ireland. George, GI4SRQ, not only sent a long letter, but included Packet printouts which showed how amateur radio, especially using Packet, can circle the world and introduce youngsters to each another. Hardy Amateur Radio Packet Station (HARPS for short) is the school station with the callsign GN0RPS - 'RPS' was reserved to denote 'Richhill Primary School' or 'Radio Packet Station'. The station runs continuously in the classroom it shares with ten and eleven-year-olds.

I do not understand all the intricacies of Packet I must confess but, from the print outs, it seems that regular contacts have been made with American, Australian and New Zealand stations, not to mention those in the UK. American schools seem to be particularly active - so much so that one BBS Sysop over there tried to curtail their activities. Bob, KB8AST, has spent some time trying to link schools and Gary, WQ1F, is coordinator of Pacpals International. George is busy making a file containing pupil profiles to send to Gary.

Youngsters prepare their message on a word processor and then it is given to George to send them. This gives the youngsters a chance to correct and perfect their message before George sends it. A maildrop collects messages from the Sysop of Ivor at GB7WRI and they are sent the same way.

A world-wide network of schools is George's aim and he is working hard to achieve it. If you and/or your school are interested, why not get in touch with him? He is QTHR or, better still, send a message via GB7TED or to HARPS, GN0RPS at GB7WRI.

This means that, in one school alone, there is a classful of children each year who see the benefits of amateur radio. Who knows how many of these will decide that the hobby has a lot to offer and enter into it in their own right? Are there any more schools actively involved in this way? Let me know.

NOVICE COURSES

DO YOU live in the North Birmingham area? And do you know anyone who would like to attend a Novice training or an RAE course? Or perhaps you would like to learn Morse?

John, G4YZO, tells me that Novice courses are held at Perry Common School and Leisure Centre, and more courses are being planned.

On Monday evenings, there is a would-be constructors' class (Beginners Building Electronic Projects is the course title) at 6.30, followed at 8.15 by the RAE course. As the Centre is registered for City and Guilds exams, there is no need to attend at a strange place for this at the end of the course.

A Morse class for all grades takes place on Friday evenings at 7.15 and the aim is to set up a permanent test centre at Perry Common on a regular basis every two months or so - or as needed.

The ultimate aim is a centre where all aspects of amateur radio and associated hobbies are together under one roof, where anyone interested can meet others of like mind.

If you would like to know more, give John a ring on 021 353 9326. If you would like to give him a hand in helping others to learn I am sure he will welcome you. As the project grows, I hope to tell you more. It sounds a good idea and I wish John success.

FORWARD PLANNING

ONCE MORE it is time to think of TDOA. This takes place during the weekend 20/21 February and by now Guide and Brownie groups who have participated before will be making their plans for this year and, hopefully, more Novices will be involved. Many Guide leaders and Guides were introduced to the hobby through TDOA and decided to take the plunge into a Novice course, and many then went further and took the RAE. So this year there could be even more stations taking part in the event.

Help is always needed - and appreciated. Many Clubs support their local groups and give their time and help in setting up stations - often from scratch in less than ideal locations. Often too, the station can only be set up just before the youngsters arrive, and there is little time to do the testing to make sure the event runs smoothly and effectively.

Can you help? Does your Club have a Guide or Brownie group nearby who would like to take part but has no amateur within the ranks who knows how to set about running a TDOA station? Could some of the members volunteer if needed?

There are many forms of help needed - station building, operating, logging, supervising and encouraging the youngsters. Even if you cannot spend a full day with them, you will find an hour or two very rewarding. Many TDOA stations try hard to contact similar groups overseas - and succeed. Even if you are not connected with a Club, you can go along and give some welcome help. So make some enquiries to see if there are any local groups who would be grateful for your help, and go along.

Let us hope that the weather is kinder this year and conditions better so that many Novices will be on the air gaining experience and that we will hear you.

A final word to amateurs in general - please listen for TDOA stations and make the weekend memorable for a lot of youngsters. Hopefully many stations will be active again, maybe we will meet.

Victor Mitchell, GI4ONL (seated), and Robert Pinkerton, GI0NCA (standing), pictured with members of the Cumber Claudy Guides at 'Thinking Day on the Air' (TDOA) special event station GB4CGG in Northern Ireland.

Novice NOTEBOOK

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

THIS MONTH we'll look at some useful tools for the home constructor. To start with, it's not necessary to have all the tools mentioned below, but a soldering iron, a pair of electricians' wire cutters, and a three millimetre screwdriver are the bare essentials. In a short time as you become more ambitious, you'll no doubt be keen to add other tools to your collection.

THE RIGHT CHOICE

OF COURSE one of the most important tools is a good soldering iron, and there is a bewildering selection to choose from. For our purposes, these range from useless to very good. The iron must be light to hold, the mains lead needs to be very flexible, and the power rating not too low. An 8 watt iron is excellent for use on very fine PCBs, but as soon as a larger diameter connecting wire is soldered the temperature drops and a dry (faulty) joint is almost inevitable.

On the other hand, a 40 watt iron without temperature control is good for the heavy work, but when used on a PCB is likely to melt the adhesive holding the copper track and damage the board. A 25 watt iron is normally the best compromise between power, temperature and price. If cost is not so important a 40 watt temperature controlled iron is ideal and these can be obtained in either mains or 24 volt versions.

Personally, I use several irons (see photograph) to cover a variety of tasks, including an old gas heated soldering 'bolt', a 40 watt 240 volt Weller and a 25W Weller soldering station. Soldering stations tend to be expensive, but fortunately the irons can be purchased without the station and a suitable base and transformer unit constructed at lower cost.

SOLDER SELECTION

THE NEXT most important tool is the solder! A good multicored solder is essential and I would suggest 18SWG or 1mm solder for the Novice. Very fine solders will give you excellent control of the amount of solder applied to a joint. Often beginners to construction apply too little or too much - the right amount is important.

Removing components from printed circuit boards (PCBs) can be a little tricky, even when you have some construction experience! Three options spring to mind, and I suggest that eventually you have all of them. The first one is solder wick (also known as desolder braid), which is excellent for cleaning a joint. It's obtainable from Maplin shops and some hardware stores.

A solder sucker is a delight to have and use. Again a number of variations are available but a medium size one is best. The smaller the size, the less air sucked in and the less solder removed. Solder suckers with anti-recoil makes solder removal easier as they stop the nozzle jumping off the board.

THERE IS A KNACK

TO USE A solder sucker effectively there is a knack! Hold the sucker at 60° to the board on one side of the joint and the tip of the iron on the other side. When the solder has melted and the component leads are really hot, remove the iron and at the same instant press the button on the sucker. This gives a good flow of air over the joint and removes all the solder.

Make sure you always have a damp sponge handy to keep the tip of the iron clean. If the wire is not free after using the solder sucker, gently apply the tip of the iron to move the wire to the centre of the hole. A little practice on some old circuit boards, and you'll soon get the hang of it.

A final soldering tool that's useful is a little hook. It can be made from a length of thin piano wire bent at one end with a finger grip at the other. Hook this under a component lead on top of the board while the joint below is heated - it saves burnt fingers!

CUTTING IT FINE

NEXT YOU'LL need a pair of wire side-cutters. In fact two sizes are best - a pair of electricians' cutters with a cutting edge of about 0.75in (19mm) for heavier wire and a pair of wire snips. These vary in price from a couple of pounds upwards, but those I have used for the last year are Texas mini-diagonal snippers at about £6. Used properly, they will last a long time. Use them for small component wires only, and if you have any doubts about a wire being too big *use the big cutters*! That way they'll give many thousands of cuts.

ADDITIONAL TOOLS

SCREWDRIVERS with flat blades and shafts of 3 and 6mm are a must, as well as a 'Philips' cross-head type. I don't know how they size cross-heads but one with a 5mm diameter shaft is about right.

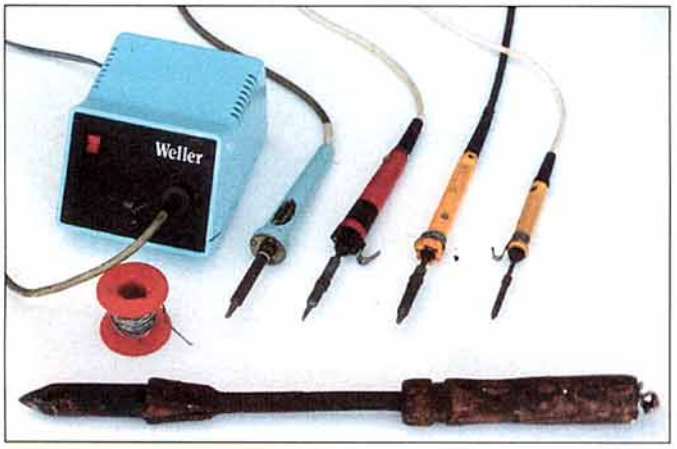
Pliers come next. Both a standard electricians' type, and a pair of snipe nose pliers are best - it's likely you'll soon find them indispensable.

Finally wire strippers: I have tried many of these but have settled on two types. For fine inter-wiring I use the Plasplug automatic wire stripper and for heavier wire I use the BT type. The main reason for using both is that I don't have to keep altering the BT type for different wire settings.

KEEP ON COLLECTING

AS MENTIONED before, it's not essential to start off with a huge tool collection - tools can be collected over a period of time. I rarely buy them new except for wire snips as any found second hand tend to be at the end of their life. My main source of tools is market second-hand tool stalls and (best of all) boot fairs. Just remember to bargain with the seller for the best price - he usually *expects* it!

[Readers may also be interested in the Home Construction series of articles by John Case, GW4HWR, in the May to Dec '91 issues of *RadCom* - *Ed*].



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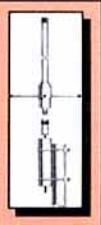

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RADCOM TECHNICAL FEATURE

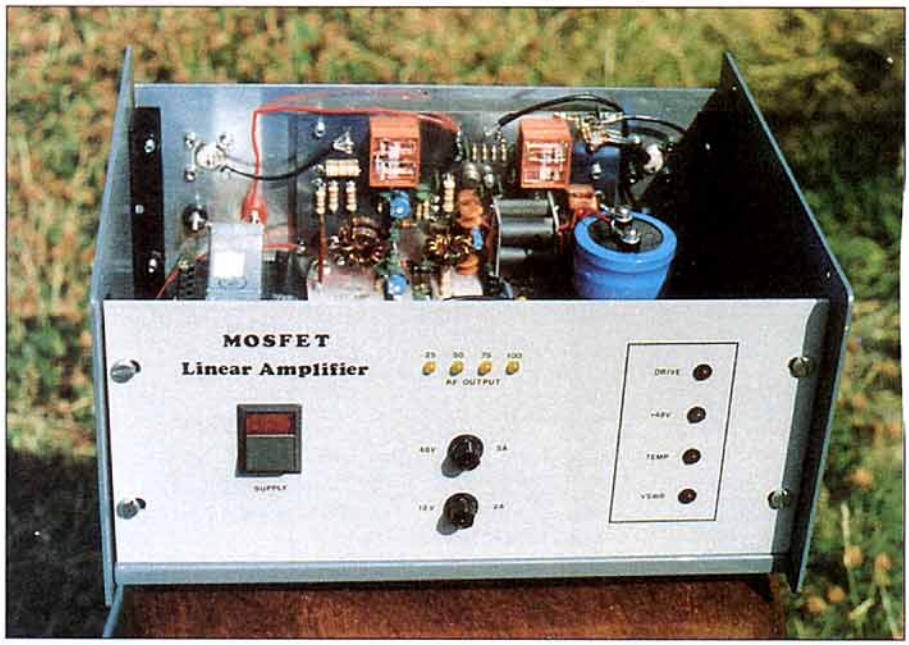
100W HF MOSFET Amplifier

The first of a two part article by David Bowman, G0MRF

HAVING FINALLY MADE it onto the HF bands, after years on VHF with assorted black boxes, I felt it was time to design and construct some of my own equipment. After all, a glance at my new licence confirmed that amateur radio was all about "the self training of the licensee". The amplifier described here now complements a homebuilt VHF to 20m transverter. It also represents a step forward in the use of low cost power MOSFETs as previously reported [1]. The amplifier uses two MOSFETs in push-pull, and is capable of producing 100 Watts RF output from 1.8 to 14MHz. Slightly lower power is available on 18 and 21MHz.

Construction is straightforward and is certainly low-cost when compared to bipolar transistors. Unlike many published designs, this unit incorporates on-board transmit/receive switching and a low-pass filter at the output. An input attenuator allows compatibility with existing equipment having an output power greater than 3-4 watts.

The amplifier has been designed for base station use, and requires a supply of 48-50V. While this may rule out mobile operation, it does permit the use of simple unregulated power supplies which would be impractical with 12 volt equipment. Although designed for a lower frequency limit of 1.8MHz, testing of the prototypes has revealed the -3dB points of the amplifier to be 225kHz and 16MHz representing a total bandwidth of 6 octaves!



MOSFETS OR BIPOLARS?

BEFORE WE LOOK AT construction, let us briefly consider two of the differences between bipolar transistors and the n-channel power MOSFETs used here. Firstly, bipolar transistors are current controlled devices, ie a small current flowing into the base causes a much larger current to flow between the collector and emitter junctions. The FET, however, is a voltage controlled device. A voltage applied between gate and source causes current to flow between the drain and source junctions. As there is no current flowing into the gate it can be seen by Ohm's law that the input impedance of an FET is very high. An

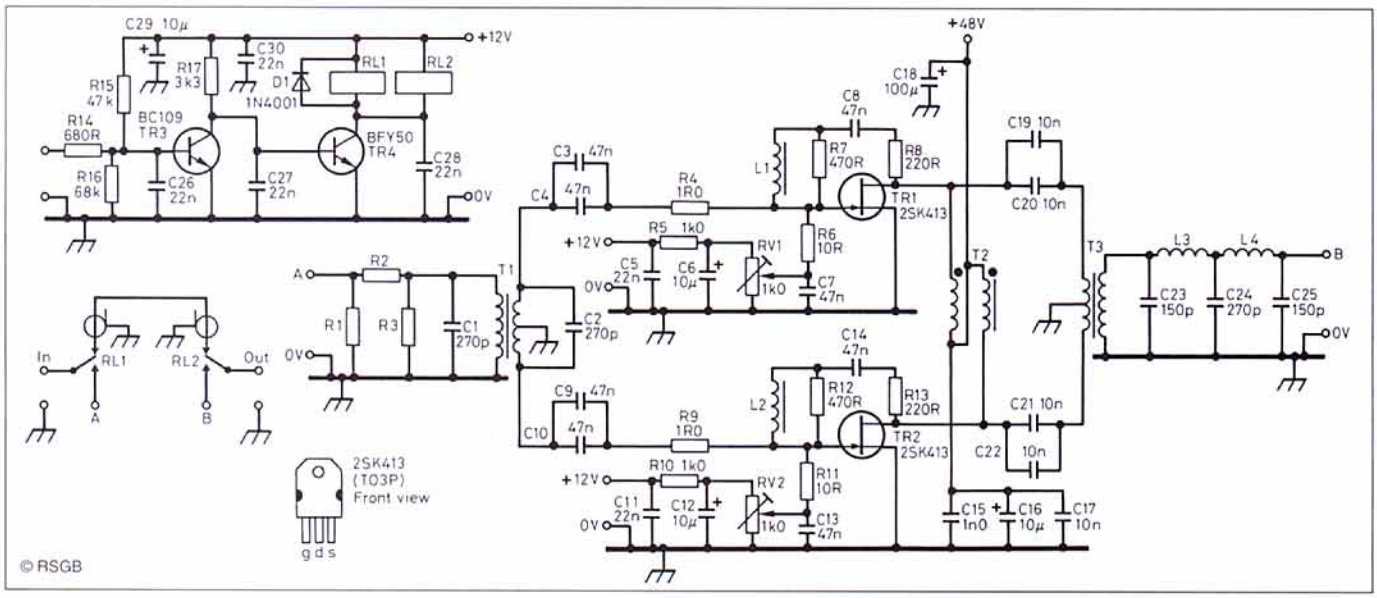


Fig 1: The amplifier circuit has been designed to use low-cost MOSFETs to provide a most effective way of boosting your HF signal.

input impedance at DC of several megohms is not uncommon. This characteristic allows very simple bias supplies to be used with FETs.

The circuit presented here (see **Fig 1**) uses a 1kΩ potentiometer to adjust the bias for each device. This technique cannot be used with bipolars owing to to their high base current requirement. As the frequency increases, differences in input impedance become less pronounced. The FET input is highly capacitive, and this capacitive reactance causes the input impedance to be lowered at high frequencies. Also the gain of a bipolar transistor increases dramatically as the operating frequency is lowered. For example, a typical bipolar device (MRF428) has 13dB more gain on 160m than on 10m. The average FET, however, will have a much smaller variation of gain with frequency. This allows comparatively simple networks to be used for gain compensation.

CIRCUIT DESCRIPTION

THE CIRCUIT HAS TWO enhancement mode power MOSFETS operating in push-pull. RF drive is routed from the input to transmit/receive switching relay RL1. When the amplifier is selected, the drive is applied to the 50Ω input attenuator R1-R3. Resistor values are chosen so that the correct level of drive power is presented to the FETs. T1 is a broadband transformer (turns ratio 2:1) with two functions. Firstly, it steps down the impedance from 50Ω on the primary (drive) side to 12.5Ω. Secondly, the secondary winding is centre tapped. This provides two antiphase signals which drive the FETs via C3, C4 and C9, C10 respectively. C1 and C2 compensate for the inductive reactance of the transformer windings and ensure a low input VSWR.

As the two halves of the amplifier are identical, I will describe the section around TR1 only. From T1, the RF passes through coupling capacitors C3 and C4. R4, prevents any tendency towards instability in TR1 by adding 1Ω (resistive) in series with the input impedance of the FET. Bias is provided to the gate of TR1 by the combination of R5 and RV1 with decoupling by C5, C6 and C7. RV1 sets the bias voltage from 0 to 6 Volts, which allows the device to be operated anywhere between class C and class A. R6 is used as a path for the bias from RV1 to the gate of TR1 and also provides a partial load for the RF input. Although this 'passive-gate' technique lowers the input impedance, it allows the highly capacitive input of the FET to be driven with ease.

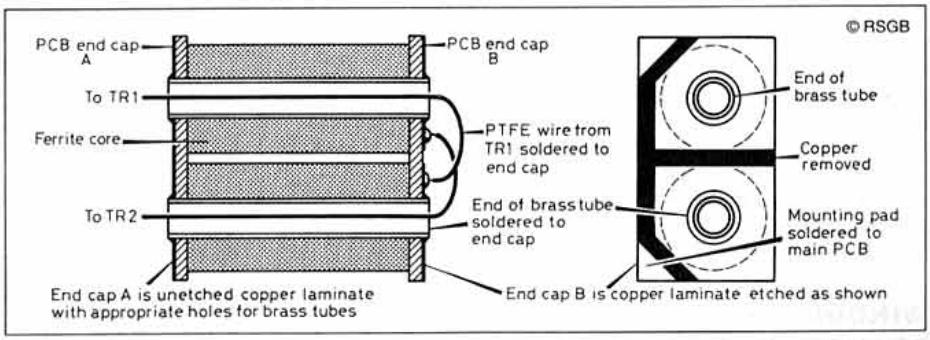


Fig 2: The output transformer T3 is constructed from two ferrite sleeves mounted on brass tubing.

Negative feedback is applied to the gate by R7, R8 and L1. Coupling capacitor C8 blocks the DC voltage. The feedback from these components improves the linearity of the amplifier and provides gain compensation. At high frequencies, the feedback is primarily determined by R7, whereas at LF the reactance of L1 decreases allowing a higher level of feedback and hence lower gain. The supply voltage is decoupled at the input by electrolytic C18 and at a point adjacent to T2 by C15, C16 and C17. T2 is a bifilar wound RF choke providing a balanced feed to the two transistors. The bifilar construction assists in the reduction of even harmonic energy.

Finally, having generated our RF signal at the drains of the FETs, we now have to combine the two halves of the signal and match to a 50Ω output. This is achieved by broadband transformer T3, with the signal AC coupled from the drains by C19 - C22. The transformer is of conventional design, with a turns ratio of 2:3 (impedance ratio of 1:2.25). Both windings use PTFE insulated wire to withstand the high temperatures that can occur in the transformer during sustained operation. Details of T3 are given in **Fig 2**. From T3 the output signal is passed through a five element low-pass filter, then to the transmit/receive switching relay RL2.

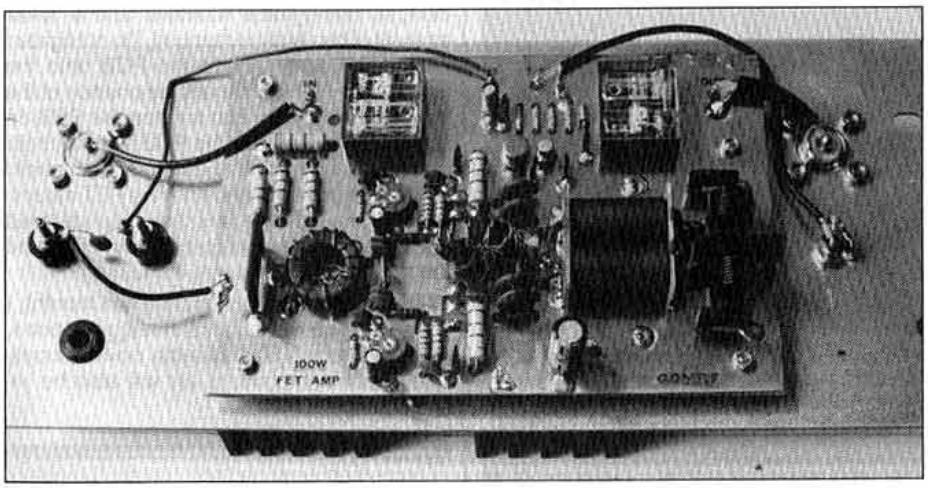
The Tx/Rx switching circuit is built around TR3 and TR4. The RF amplifier is switched in circuit when the input (R14) is connected to ground. This arrangement should suit most commercial and home built equipment.

CONSTRUCTION

THE SUGGESTED LAYOUT is shown in **Fig 3**. PCB details will appear in part two. Start by fitting the pins that connect the two sides of the PCB together. These should be firmly pressed into the PCB with a hot soldering iron, soldered in place on both sides and then cut close to the board. Next, assemble the output transformer T3. The transformer (Fig 2) comprises two ferrite sleeves mounted on two lengths of brass tubing. Tubes and ferrites are held in place with two small PCB end caps. Prior to soldering, the assembled transformer is held down on a flat surface to ensure that all components are in the correct position. The tubes are then soldered around their entire circumference, and the assembled transformer (minus PTFE wire) positioned centrally between the four holes used for the termination of the windings.

With T3 placed in the correct position, solder it with a generous amount of solder. The end cap that forms the RF centre tap is positioned close to C19-22 and soldered along its entire length. Next, fit the two relays followed by the Tx/Rx switching circuit - TR3 and TR4 should be fitted within 2mm of the PCB. The remaining PCB components can now be soldered, leaving the remaining transformers, inductors and the low-pass filter until last. Resistors R8 and R13 should be mounted with 1mm clearance between the resistor body and the ground plane. The PCB also has space for a 50Ω pi attenuator. This is used when the available input power exceeds 3-4W. If the attenuator is not required, the pads on the PCB used for R1-R3 should be bypassed with a short length of coaxial cable. The values of R1-R3 will depend on the available drive power - (see **Table 1**). Further details in [2] and [3].

Six connections are made between tracks on the two sides of the board. These are made in the central region of the PCB around the FET gate and drain leads. One end of



Note that the PCB must be carefully spaced from the rear panel, as described in the text.

ATTENUATOR RESISTOR VALUES

Power Input (Watts)	R1+R3	R2
5	820R	6R8
7.5	330R	15R
10	220R	22R
12	180R	30R
15	150R	39R

The table above is intended as a guide. Resistors should be non-inductive. They can be single units of suitable rating, or parallel combinations for increased dissipation.

Table 1.

resistors R6, R7 and R8 and R11, R12 and R13 are soldered on both sides of the board. If the amplifier is to be used on all bands the low-pass filter shown in the circuit should now be fitted - this has a cut off frequency of 22MHz. If operation on lower frequencies is required, refer to next month's section dealing with testing and options. This leaves the board complete, with the exception of T1, T2, T3, L1, L2 and the FETs.

WINDING THE TRANSFORMERS

WE HAVE ALREADY LOOKED AT the construction of the core of T3. The wire recommended for the windings comprises 19 strands of 0.15mm silver-plated copper, with an insulating sleeve of PTFE. This provides a flexible wire with high current capability, it is also resistant to corrosion and high temperatures. While this represents the ideal, any wire of similar cross section will provide identical electrical performance, but only PTFE will have the ability to withstand extreme temperatures. The circuit diagram shows the primary of T3 as a two turn, centre tapped winding, capacitively coupled to the drains of the FETs. In practice, this winding consists of two half-turns of PTFE wire and one turn of brass tube.

The secondary winding is simply three turns of PTFE insulated wire wound through the transformer core. One end provides the RF output to the low-pass filter, while the other is stripped over 5-6mm, passed through the PCB, and soldered to ground on both sides. The balanced drain feed choke T2 is a bifilar winding on a ferrite toroid, constructed by taking a length of enamelled copper wire and folding it in the centre to give two equal lengths. The centre of the wire, now formed into a loop, is held with a pencil. The other ends are placed in the chuck of a hand drill. The wire is twisted by turning the hand drill while pulling gently on the pencil. When the required twists have been placed in the wire it can be removed from the drill and the best (evenly wound) section cut out for use. This twisted pair is next wound carefully on the ferrite toroid. The four ends should be cut approx 30mm from the ferrite and stripped of enamel over the last 20mm.

A multimeter should be used to identify the start and finish of each winding on T2. With the circuit diagram as a reference, select the two wires that are to be joined to form the DC supply end of the choke. Be absolutely sure that the correct wires have been connected, as a mistake at this stage can prove disastrous later! Having made the choke, fit it to the board. Do not allow any point of the winding to touch the PCB's ground plane, as the high RF voltage can arc through the insulation. The construction of T1 is comparatively simple. The primary is twelve turns, and the secondary six turns with a centre tap. Both are wound symmetrically over the entire circumference of the core, starting with the primary and then winding the secondary on top. The centre tap is formed by winding three turns, forming the wire into a small 5mm loop, then winding a further three turns. The loop is stripped and soldered to ground. The earthed end of the primary winding should be passed through the PCB and soldered on both sides. The inductors L1 and L2 can now be fitted to the reverse side of the board in parallel with R7 and R12 respectively. A short length of coaxial cable soldered between the appropriate contacts of the Tx/Rx relays provides a route for received signals, and completes the PCB.

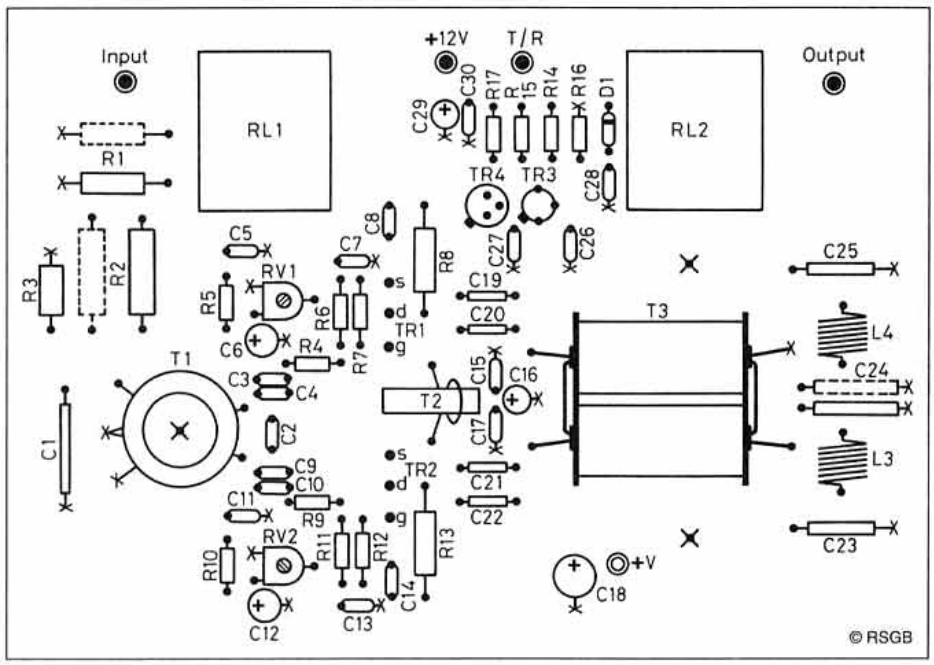
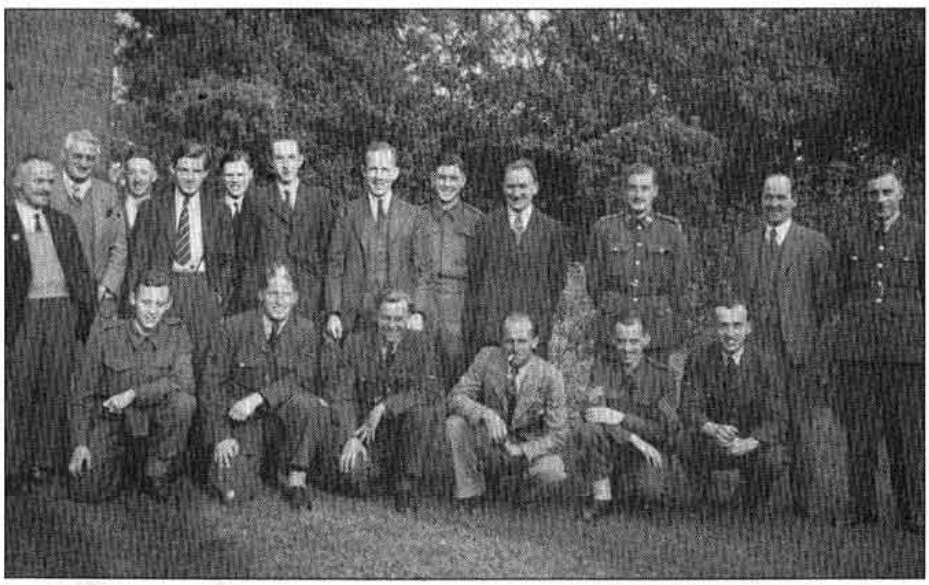


Fig 3: The prototype component layout, shown above, gives stable operation (not actual size).



RSGB members at the Great Orme, Llandudno, in the Summer of 1941 photographed by Frank Wells, G3ATJ. Frank can name only one person - Wyn Cringan, VE4YG (front row, extreme right) - and wonders whether any of the others are still active more than 50 years on. If you recognise yourself or anyone else, let us know and we will pass it on to Frank.

RSGB TELEPHONE NUMBERS CHANGE 28 JANUARY: SEE PAGE 4

MOUNTING THE FETS

ALL THAT NOW REMAINS is to mount the FETs on a heatsink. This is done by bending the leads of the FETs up at 90° so they can pass through the appropriate holes in the PCB. Having determined the correct position for the FETs, drill the heatsink and mount the devices using mica washers and a small amount of heatsink compound. Do not tighten fully at this stage. Place the PCB onto the leads of the FETs and mark the position of the four mounting bolts that support the PCB on the heatsink. Remove the PCB and drill both this and the heatsink. 6.25mm spacers hold the PCB in position, and after the FET mounting bolts are tightened the leads are soldered into place. This completes construction and the amplifier is now ready for testing.

In the final part of this article (next month), I will describe the sequence of test operations, and give details of a suitable power supply unit. A full components list will also be included.

. . . to be concluded

IDEAS FROM ABROAD

TRANSLATED AND EDITED BY ERWIN DAVID, G4LQI

In the 3.5MHz QRP CW rig described by **W (Pim) C Niericker, PA0TLX**, in ***Electron*** (NL) 11 & 12/92, the challenge of **VFO stability** was met by careful thermal and electronic design, solid construction and precise temperature compensation. And with much patience!

A QRP CW transmitter was designed to have a frequency range of 3.5 - 3.6MHz with a stability of 10^{-5} over the duration of a longish QSO, no spurious outputs above -75dBc and no key-up tone in the receiver. No hard-to-get components were to be used and the design was to be capable of duplication by constructors with 'intermediate' skill. These tough specifications were achieved by analog circuitry without complicated frequency stabilization schemes.

To cover the 3.5 - 3.6MHz CW band, the buffered signal from a 2.5 - 2.4MHz VFO is mixed with that from a 6MHz crystal oscillator. The low VFO frequency benefits stability, and by keying the 6MHz buffer there are no chirps and the VFO can be left running continuously without generating a key-up tone in the (separate) receiver.

To meet the -75dBc spurs requirement, the generation of unwanted in-band heterodynes must be prevented as, once established, they cannot be filtered out. Take the 2.4 - 2.5MHz VFO. None of its harmonics is near 3.5 - 3.6MHz but note what the fourth harmonic could do when mixed with 6MHz: 4 x 2.4 - 6 = 3.6MHz! A single-section low-pass filter in the VFO output reduces that 9.6MHz fourth harmonic to a harmless level. Filters are also required in the output of the 6MHz chain, after the mixer and after the 1W power amplifier.

The following describes the VFO - buffer module only. Its techniques can be applied to LC oscillators for other frequency ranges as well.

THE ELECTRONICS

FIG 1 SHOWS an FET oscillator with an FET buffer and the pi low-pass filter mentioned above. To hold the drive level constant, the drain voltage of TR1 is stabilized by a 5.6V Zener diode. Zeners of this voltage have a smaller temperature coefficient than those of other voltages.

The high input impedance of the FET buffer, tapped down on the coil, assures that the oscillator is only lightly loaded. The diode limits the positive excursions of the oscillator gate, which benefits stability.

THE MECHANICS

FIG 2 SHOWS the construction. The enclosure and its dividers are made of double-sided PCB stock, soldered along all seams. Sub-dividing this small unit into even smaller compartments is useful; it imparts rigidity to the structure, it provides shielding, and it impedes air flow from the sources of heat to the tuned-circuit components. All wiring is made as stiff and immovable as possible.

The tuning capacitor requires careful selection. For this tuning range a capacity variation of approx 30pF is required (but if only a larger capacitor is available, plates can be removed to spread the tuning range over most of the dial). It should have small semi-circular plates, ceramic insulation, silver-plated rotor wipers and tight-fitting but smooth shaft bearings front and rear. New Jackson capacitors like the one sketched in Fig 2 (disregard the number and spacing of plates drawn) were excessively expensive, but similar models can be found in military surplus up to 50 years old! Adapt the dimensions of the capacitor compartment to fit. If all else fails, use a single-bearing model (with an extended shaft) and rigidly mount the whole unit, carefully lined up, behind a blind panel with a tight bushing for the capacitor shaft.

The tuning capacitor and the end board on which it is mounted cannot be soldered in until after the installation of the temperature compensating capacitors. Also make sure that the two 120pF capacitors remain accessible; they may have to be changed during tune-up.

A smooth backlash-free vernier drive with a 10:1 or greater reduction ratio is required. [The big old Muirhead 50:1 planetary drive knobs are as good as any. - *G4LQI*]

The oscillator and filter coils are Toko model 85ACS4238 10.7MHz 7x7mm IF transformers from which the capacitors have been removed and the two windings are connected in series. To get enough inductance for the oscillator tank, two of these are used in series. These coils are not ideal, but this compromise was made for reproducibility. The coil cans are soldered to the partitions.

Each compartment has its own tight-fitting lid which can be pushed down a millimetre or two below the top edge of its compartment, but is not soldered in until all work in that compartment is done. The lids above T1, T2 and the output pot have trimming tool holes which can later be taped over.

THE THERMODYNAMICS

AFTER THE ELECTRONIC and mechanical design, three thermal issues remain: the ambient temperature around the VFO must be held as constant as possible and its changes must reach the unit only very slowly; the heat from VFO components must be kept away from the frequency-determining tank circuit; the frequency vs temperature-after-warmup curve must be made as flat as possible by temperature compensation.

The ambient temperature can be controlled only to a limited extent but be aware of sudden changes. A rain shower against a window may drop the shack temperature by half a degree Celsius; you will not notice it but your VFO will. It is useful to keep an inexpensive digital thermometer around; its accuracy may be questionable but its 0.1°C resolution may explain mysterious frequency jumps. Avoid drafts at the VFO position, eg from cooling fans, and keep the big heat producers, power supplies and linear amplifiers, above the VFO.

Within the VFO, the heat-producing components, ie FET, Zener and its resistor, are

continued on page 54 ▶

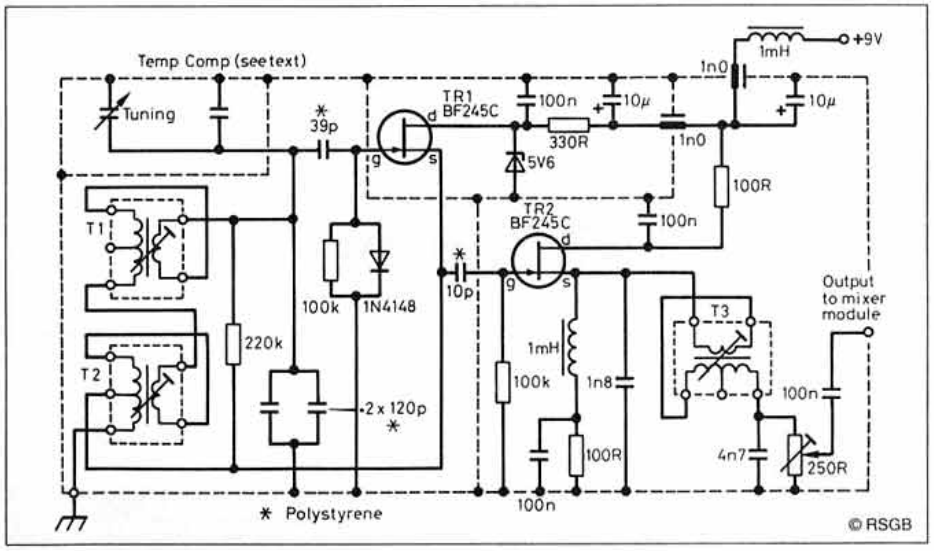


Fig 1: Circuit diagram of the PA0TLX VFO

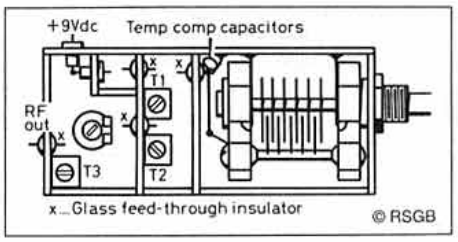


Fig 2: Lay-out of the PA0TLX VFO

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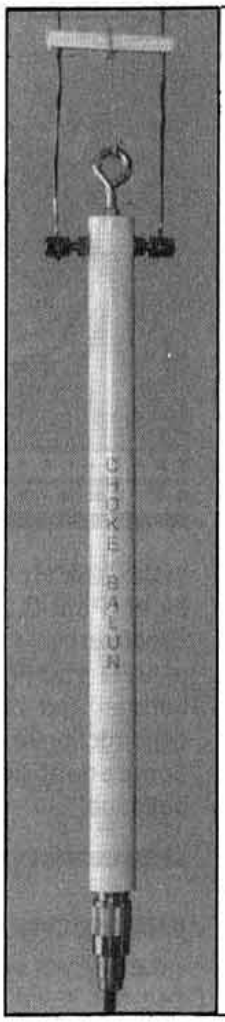

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Pat Hawker's Technical Topics

SATELLITE TV - A SOURCE OF REVERSE TVI

DR BRIAN AUSTIN, G0GSF, recently mentioned that he has been suffering from interference to HF reception and had found the source to be the 'outdoor' 11GHz LNB converter unit of a satellite TV receiver. I had not previously come across this problem but G0GSF has sent me a copy of an article 'In the workshop with the Optoelectronics Handi-Counter 2300' by Rob Mannion, G3XFD, the Editor of *Practical Wireless* in his August 1992 issue.

It describes the use of this hand-held frequency counter as a means of tracking down sources of interference. In particular, one such source affecting the 14MHz band was traced to the UHF modulator used in an early computer in his daughter's bedroom. This was radiating spurious signals on HF, VHF and UHF but the problem was cured by replacing the modulator by one purchased for £1 at a rally. He continues:

"I then recalled a problem I had helped solve for another radio amateur during 1991. This to cut a long and sad story short, involved a satellite TV low noise block (LNB). The amateur concerned could not operate on the higher HF bands at all because of very bad interference. He had tried everything except changing the LNB which fortunately (or unfortunately!) had been installed for the benefit of his disabled and housebound wife. After I suggested that someone with a portable spectrum analyser should be brought in, the culprit was found and changed.

"Remembering the 1991 incident, I walked along the road where I live, taking the Handi-Counter with me. I soon found other LNBs radiating signals on HF strong enough to be locked onto by the Optoelectronics 2300. After some research, I have discovered that the problems are probably caused by the high level of local oscillator injections on satellite LNBs.

"I had also come across the problem in the USA while attending the Dayton HamVention, where the hotel dish feeding the 'piped' TV was just below my bedroom window. With spurious signals making the HF bands virtually useless, even trying to hear the BBC World Service was a painful process!"

It thus seems that this problem is universal and likely to become of increasing importance as the number of satellite-TV installations increases. At present, despite the EC EMC Directive, there appears to be no legal requirements that LNBs (or other similar sources of reverse-TVI) should not interfere with reception on the amateur bands, although G0GSF does point out that his local RA inspector is watching the situation.

ROOF-SPACE DUAL BAND MAGNETIC LOOP

SOME MONTHS AGO, FOLLOWING the publication of a number of items on magnetic loop antennas (both in *TT* and as full-length *RadCom* articles), I began to feel that the subject deserved a rest. What more could be written - it had been shown that such antennas were capable of achieving good results, particularly on the lower frequency HF bands, for amateurs without sufficient space or high enough supports to allow the erection of an antenna providing the higher radiation resistance that makes for good efficiency at low cost. It did seem, at least to me, that the models that had appeared on the market were costly compared with a simple wire dipole, while home-constructed models called for good quality tuning capacitors welded to an extremely low-resistance loop, with the complication of accurate remotely controlled motor tuning. Nevertheless, well made compact transmitting loops do work surprisingly well and represent a valid approach for those without space. From a number of contacts made with stations using small loops, it does appear that they compare well with, for example, trapped verticals mounted on the ground.

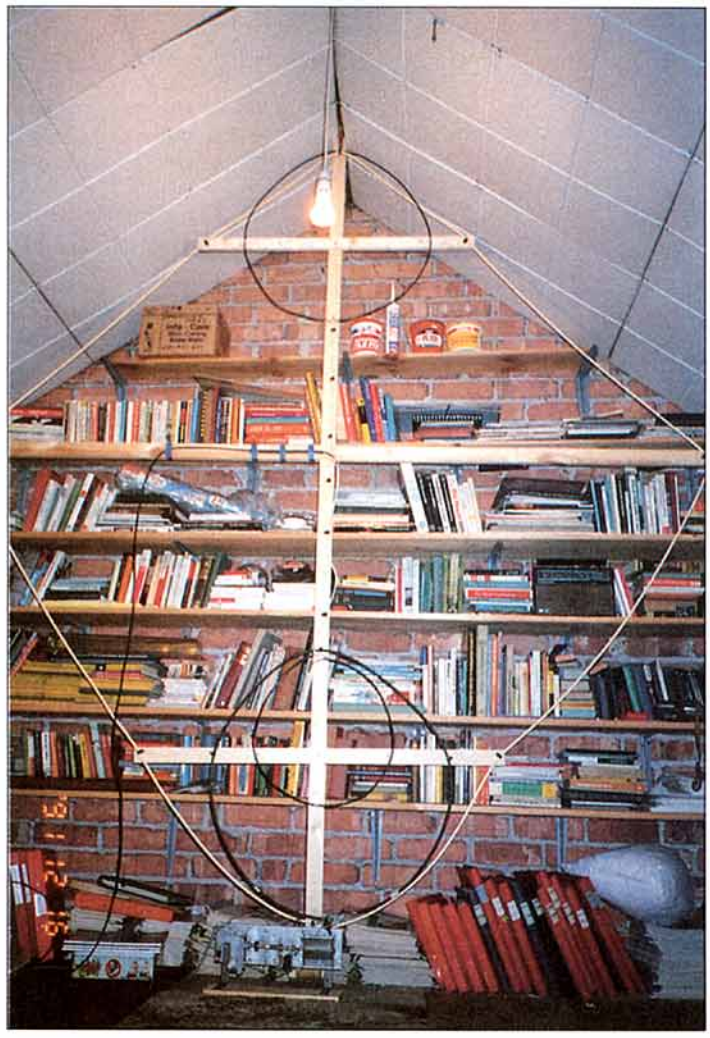
Roberto Craighero, I1ARZ, with much personal experience of using loops, writes: "I confirm once more that the radiation efficiency of a short loop antenna having a circumference slightly less than 0.25-wave approaches the efficiency of a half-wave dipole a half-wave above ground. It is clear that having sufficient space to erect a dipole at such a height provides a more convenient antenna than a compact loop. However, it is clear that most amateurs wishing to work the lower frequency bands find it difficult to erect long dipoles at the required height. In such cases the compact loop is certainly better than a dipole at a very low height in terms of wavelength.

"But I wish to stress once again that to obtain good results with a compact loop, the materials employed must be of good quality. An excellent split-stator capacitor must be used to tune the loop. Welding must be accurate to keep ohmic losses to a minimum.

"In my experience a ground plane improves the overall efficiency of a compact loop even if not directly connected to the antenna. An 80cm loop mounted over the roof of my car, but not connected to the car body, showed a significant improvement due to the ground plane provided by the roof of the car. With my large square loop for the lower frequency bands, I could notice an improvement when the surface of the flat roof is wet following rain. [But is rain water electrically conductive? *G3VA*].

"I can confirm DK5CZ's remarks (*Eurotek*, Oct 1991, p39) that the high loop currents tend to heat and thereby distort the thin metal in vacuum capacitors and consequently detune the loop. With my large low-frequency loop which has a vacuum capacitor, I find that on SSB (about 60W PEP) with its low power factor there is no need to retune the antenna. But when I use CW with its greater power factor, there is a need to retune the loop from time to time.

I1ARZ also drew attention to a loop described by Sergio Clauser, IV3RLL, in *Radio Rivista*, 7/91, using a length of low-loss UHF Heliax cable. This has an external diameter of 41mm after removing the internal nylon spiral and inner conductor to provide a very light but solid copper conductor of large diameter that can be bent into a circle by hand. Such bending is possible since this type of cable has copper tubing with a special knurling that permits bending and increases the electrical surface of the antenna by about



GI2FHN has constructed this dual loop in his roof space.

20%. Such cable is very expensive but it is sometimes possible to acquire short end-of-reel lengths at much reduced cost since short lengths have low commercial value. I1ARZ also mentions the use of 3in elliptical waveguide.

Eric Sandys, GI2FHN, has been making good use of a multiband form of magnetic loop that borrows a dual tuning technique from the Z-match tuner: **Figs 1 and 2**. He writes:

"On 14, 18, 21, 24 and 28MHz, L1 is tuned by C1A and C1B in series. As L3 is high impedance at these frequencies, it can be ignored. On 3.5 and 7MHz, L3 is tuned by C1A placed in parallel with C1B through L1. The coupling links L2 and L4 are connected in parallel and RF is fed in through a 1:1 choke balun. The sizes of the coupling links were

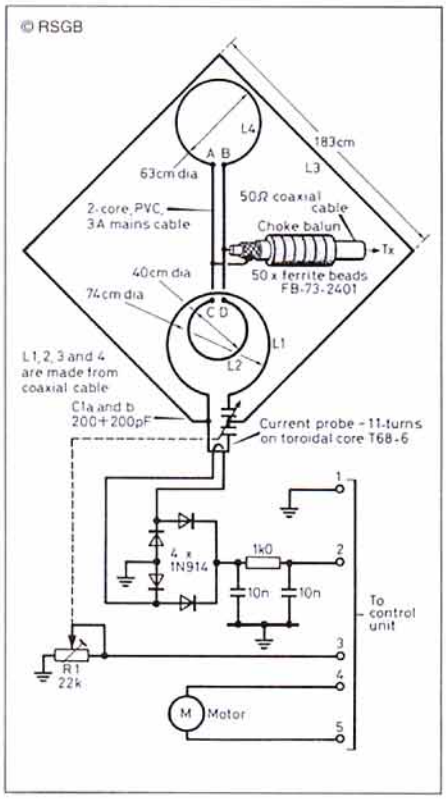


Fig 1: GI2FHN's dual magnetic loop antenna covering 3.5 to 28MHz erected in the roof-space.

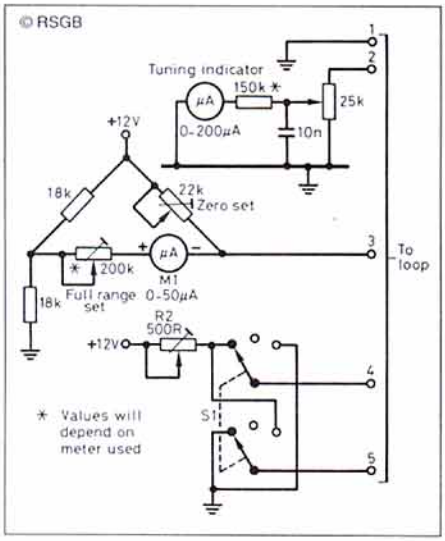
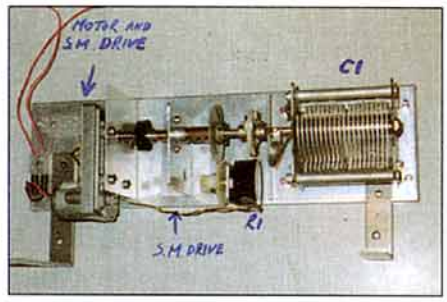


Fig 2: Control unit for tuning the loop antenna.



The loop's tuning unit with slow-motion drives.

selected to give the lowest SWR which is better than 1.5:1 on all bands. If coverage of the 10MHz band is required, L4 needs to be reduced slightly in size.

"The same diameter coaxial cable is used for the loops and coupling links. Note that the connections between the two coupling links should not be transposed. A should go to C and B to D. Failure to observe these points can result in degradation of the SWR.

"The loop is housed in the roof space using a timber framework to provide the necessary support. All functions are carried out from a control box (Fig 9) at the operating position. Changing bands is made easy by using a Wheatstone bridge to give a visual indication on M1 of the travel of C1. The variable arm R1 is gear driven from the shaft connecting the motor and reduction gearing to C1.

"Direction of rotation is controlled by S1, a DPDT switch (centre-off). Fine tuning is provided by a speed control R2. A current probe enables exact resonance to be established at the operating frequency.

"Results have exceeded all expectations and the arrangement can be recommended for anyone who does not have space for a fullsize outside antenna."

MORE ON THE G5RV/ZS6BKW ANTENNAS

THE JANUARY *TT* drew attention to the growing interest overseas in the ZS6BKW/G0GSF antenna developed from the G5RV but offering a reasonable match (without ATU) on five bands: 7, 14, 18, 24 and 28MHz. It is interesting to note that Bill Orr, W6SAI, in his *Radio FUNdamentals* column in *CQ* (November 1992) also presents information on both versions under the heading 'The G5RV antenna revisited - again'.

In addition, he traces some early history, writing: "To go back a bit, the G5RV antenna is an offspring of a 3-band antenna (80-40-20 metres) designed by Art Collins (ex-W9CXX) and L M Croft and described in detail by Croft in the December 1935 issue of *Signal* magazine, the house publication of the old Collins Radio Company . . . . The idea behind the antenna was sound, but the execution was a failure because the antenna used a 300Ω section made of two 82.5ft lengths of aluminium tubing hanging from the centre of the 103ft flat top. The weight of the installation made it heavy and impractical. Signal gain of this antenna was about 1dBd.

"In the early 1950s the antenna reappeared in modified form in England, redesigned and popularized by Louis Varney, G5RV. The Varney antenna functions as a 1.5-wave antenna on 14MHz with a feedpoint impedance slightly over 100Ω. The matching section of heavy tubing is replaced by a 450Ω open-wire half-wave line. This light-weight (Matching section) transformer closely matched the antenna feedpoint impedance to an 80Ω transmission line on 20 metres . . . . it was quickly found that the G5RV would function quite well on other bands if an antenna tuning unit was used at the transmitter. No one worried much about SWR in those days . . . ."

Curiously enough, the highly-respected Walt Maxwell, W2DU, in his book *Reflections - Transmission lines and antennas* (ARRL, 1990) commits one of his very few errors in dismissing as "one of the myths and confusion concerning the G5RV" that it can yield a low SWR [admittedly not 1:1 but below 2:1 - *G3VA*] on bands other than 14MHz. He states categorically that "there is no length of open-wire line of any characteristic impedance Zc that will transform the antenna impedance Za to an impedance that is even close to presenting a match to 50 or 75Ω coax, except on 20 metres". May I humbly suggest to W2DU that before the next edition is published, he should carefully read the various papers by G0GSF mentioned in the January *TT*.

ADVANCES IN HF RECEIVERS

IN THE ERA OF BLACK BOX transceivers, there is a danger that most of us, unless professional design engineers, will gradually lose touch with the finer points of modern HF receivers. There is a pertinent cartoon in the December 1992 issue of the Australian 'Amateur Radio'. It is a drawing of an amateur speaking into the microphone of his transceiver with a 'Black Box Operator certificate' hanging on the wall. He is saying "Yes, I got the certificate. Now I'm going for the fifty knob endorsement!"

It seems that the trick nowadays is to learn how to use the knobs rather than to have any clear idea of what they do and why they actually work - not to mention whether they are really necessary, and whether the facility they provide may be at the cost of more desirable performance characteristics. It has to be admitted ruefully that in many respects, at least for CW operation, the HF receiver of today is unlikely to be significantly better and may be significantly worse than the best designs of over 30 years ago.

On the other hand it has also to be admitted that if a manufacturer were rash enough to attempt to market a replica of receivers such as the Collins 75A4 or 51J4, the Hammarlund SP600 Super Pro or even the 1940s RCA AR88, the price tag would be way up in the stratosphere! Recent articles have shown that in 'real terms' the cost of 'economy-class' amateur HF transceivers has continued to fall although top-of-the-range models with ever more built-in facilities (and even more knobs) have risen significantly. **Fig 3** shows representative block diagrams of modern receivers.

Currently, in the professional and to some extent in the amateur receiver world, the main talking point is the increasing use of digital signal processing as part of the trend towards the true digital-radio. Digitization is still confined to post-detection baseband (audio-frequency) signals as in **Fig 4** or to IF signals at relatively low-frequency by using sub-Nyquist sampling.

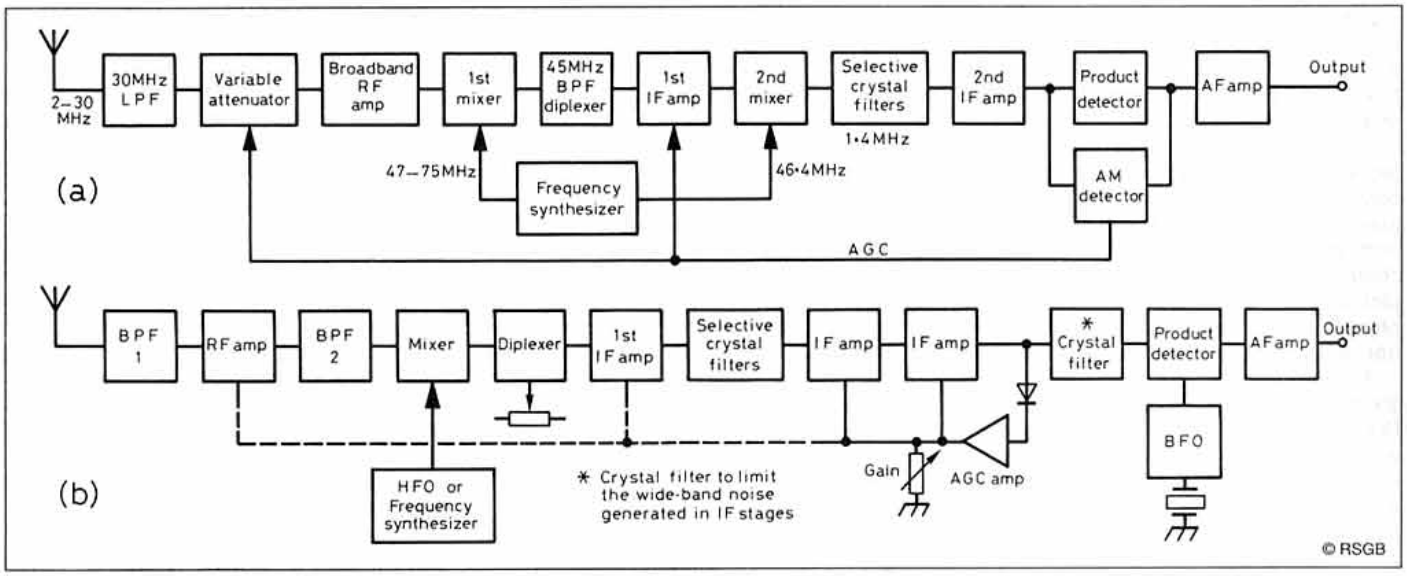


Fig 3: Representative architectures of modern communication receiver designs. (a) General coverage double-conversion superhet with up-conversion to 45MHz first intermediate frequency and 1.4MHz 2nd IF.(b) Single-conversion superhet, typically for amateur bands only, with an IF in the region of 9 or 10.7MHz.

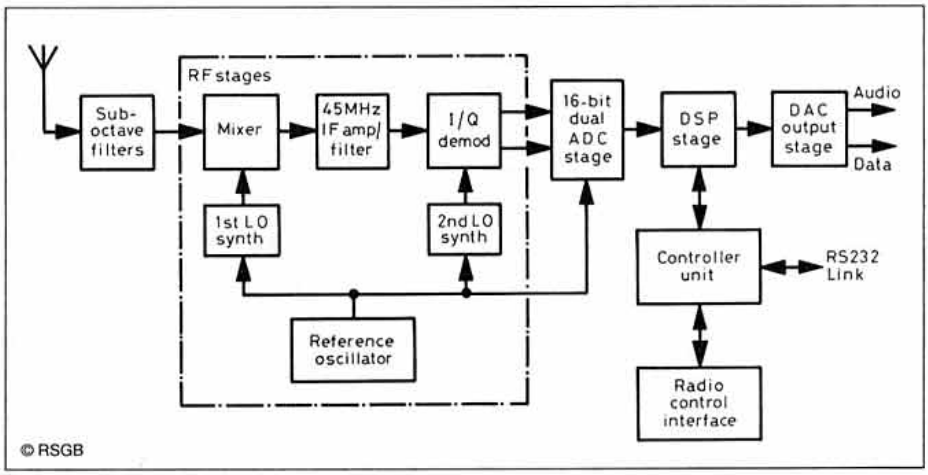


Fig 4: Outline of prototype high-performance analogue/digital professional communication receiver with baseband digitization following a two-phase (I/Q) demodulation. (*Roke Manor Research Ltd*)

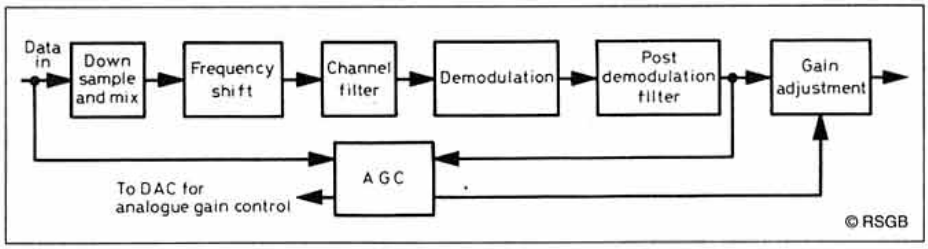


Fig 5: Software structure of the STC receiver.

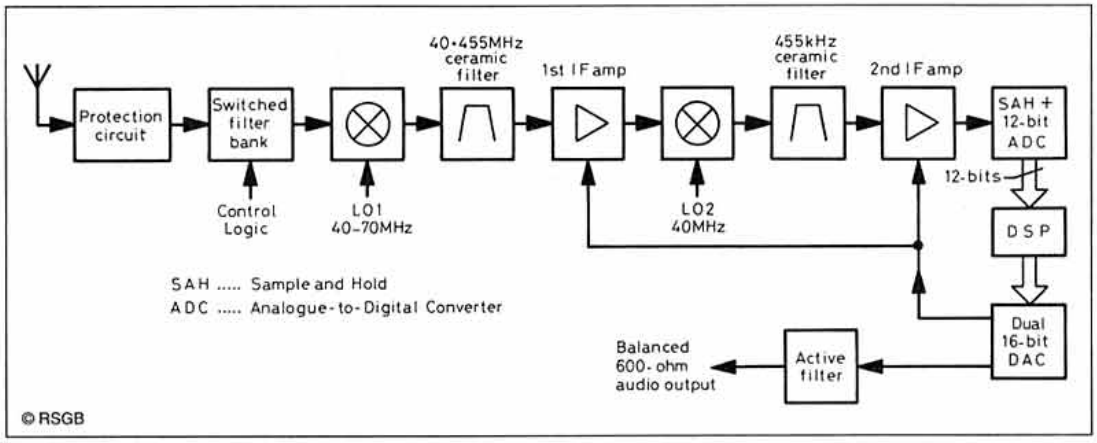


Fig 6: Block diagram of the STC marine HF band analogue/digital receiver with sub-Nyquist sampling of 455kHz IF.

These forms of 'digital' receiver are making progress - for example during 1991, STC engineers described "A low cost digitally implemented marine HF band receiver" of which it was claimed that "Digital signal processing (DSP) has been supplied in radio receivers for a number of years, although mostly for specific military applications where high levels of flexibility are required, and cost is less of an issue .... However, this technology has now reached a stage where all the advantages gained in digital implementation can be realized at a lower cost than using conventional analogue techniques - and on a single PCB.

"This paper reports on one such radio, an HF receiver for maritime use, which combines an analogue RF front end with a digitally implemented IF section performing the channel filtering, demodulation and automatic gain control: **Figs 5-6**. Four operation modes - AM, SSB, CW and FSK - have been programmed, all of which are contained within a single Motorola DSP56001 integrated circuit."

The STC design digitizes the IF signal at 455kHz taking advantage of sub-Nyquist sampling of signals already bandpass filtered using analogue techniques. In practice a 455kHz signal with a bandwidth of 6kHz is sampled at 44kHz. This sub-sampling technique was described in *TT* (Feb 1992) by Collins and Analog Devices engineers for a design with a final IF of 456kHz and 96kHz sampling rate. It was stressed that the key to digital radio lies in improved analog-to-digital converters (ADC).

The STC paper concluded: "The advent of low-cost SP integrated circuits and the development of improved radio algorithms, reducing the computation load, have finally put digital radio in the commercial market place. This radio is cheaper to produce and gives a better performance than its ana-

logue counterpart. However, it will still be some time before an 'all-digital' radio becomes a commercial reality, although research into the parts required to make this a reality is progressing."

Thus, at least for the time being, the analogue front end of high performance HF receivers remains important. It is clear that many of the changes that have stemmed from the substitution of electronic for mechanical technology (except in the most complex and high cost receivers) may have improved some aspects of the specification (eg frequency stability) at the expense of others.

A long article 'Recent advances in shortwave receiver design' by Dr Ulrich L Rohde, KA2WEU/DJ2LR, has been published simultaneously in English and German texts (*QST* and *CQ-DL*, Nov 1992). Dr Rohde has a long-established reputation as a designer of high-performance HF receivers for professional and defence applications, His article stresses that extended dynamic range in amateur MF/HF receivers is particularly important today because receivers are frequently operated in hostile environments like contests, or at antenna sites subjected to extremely strong signals. Novel approaches discussed in his article include:

- Multilevel, microprocessor-driven menus as operator control interfaces.
- Fast, low phase noise, PLL synthesizers, including digital direct frequency synthesis (DDS).
- Analog and digital tracking front-end filters.
- Ultra high-level double-balanced mixers with MOS transistors.
- Low-noise, advanced AGC-controlled feedback amplifiers.
- High-isolation IF-filter-switching stages;
- IF amplifiers with low in-band intermodulation distortion (IMD) properties.
- High-performance sampling product detectors.
- Adaptive squelch circuits.

Dr Rohde notes that "Some signal processing can be implemented digitally, and a few well known ham transceiver suppliers have begun doing so. Such techniques are becoming increasingly important. For now, however, those in the general amateur community who are interested in building their own radio hardware may have more interest in the analogue circuit details on which this article concentrates."

A number of the circuit approaches described are based on their use in high-cost professional receivers made be AEG Telefunken and Rohde & Schwarz. My own feeling is that some of the design approaches used in such receivers are really too complex to be implemented in home-built projects, but that nevertheless the basic design principles would be helpful for those seeking to build even relatively simple high-performance receivers. However, we should not accept them uncritically.

For a number of years, most HF receivers have adopted an up-conversion first mixer with an IF of 40 or even 70MHz since this not only meets the criteria that for a general coverage receiver the IF should be outside the frequency range and high enough to minimise spurious responses including image response, even with broadband input filtering, but also simplifies implementation of frequency synthesis.

My own feeling is that the amateur home-built receiver need not (and possibly should not) follow this approach, since continuous coverage, even in these days of WARC bands, is not an absolute requirement. What is needed is pre-mixer RF selectivity and the absence of the phase noise from a PLL synthesizer. Sufficient stability for most amateur radio requirements can be achieved either by the use of a crystal-controlled HF oscillator with variably tuned IF or, with care, by a free-running band-switched HF oscillator as used for example in G4DTC's 'ultimate' receiver (*TT*, December 1987).

On frequency synthesis, Dr Rohde writes "Another important point I have noticed in recent designs is the trade-off between coherent analog (phase-locked-loop) and digital frequency synthesis. Switching speed and synthesizer signal purity work against each other. The faster a PLL synthesizer must switch, the wider its loop bandwidth must be. It will thereby be 'noisier'. Direct digital synthesis (DDS) is relatively easy, but it must be implemented properly to retain its advantages over traditional PLL approaches."

"In spite of recent advances in shortwave transceiver design, not all possibilities in improving the dynamic-range electrical performance have been implemented by commercial manufacturers . . . . The widespread use of some approaches, like diode switching of input filters and IF filters, has caused more headaches than it has solved."

Personally I feel there is still much to be said for the 'old-fashioned' concept of achieving good pre-mixer selectivity with high-Q tuned circuits using variable capacitors rather than electronic tuning diodes. One reason why this is no longer used is the difficulty of ganging a frequency synthesizer with tuned signal frequency circuits without the introduction of microprocessor-controlled motorised tuning systems.

Dr Rohde continues: "While the concept of having sub-octave input filters is laudable and the filters are necessary, the use of such filters has led to problems because the switching diodes usually used introduce intermodulation distortion that the filters they select cannot cure! There is an easy fix: Replace all the front-end filter switching diodes in a transceiver with Hewlett-Packard 5082-3080 or -3081 PIN diodes. Changing 15 or more such diodes as a cost of $3 per diode makes this proposal less than exciting. But installing these diodes can reduce the intermodulation distortion products traceable to the replaced diodes by 18dB or increase the receiver's input-intercept point by 6dB . . . . Another common approach that works against receiver dynamic range is the use of transmit-only antenna tuners. Check your transceiver's schematic carefully, and you may discover that its automatic antenna tuner is switched out during receive. If an antenna tuner is necessary to match a transceiver to a feed line, it should be used in transmit and receive to add to the transceiver's receiver-front-end selectivity . . . .

"Many articles have been written on how to improve a receiver's input intercept point. The design of low-noise, double-balanced diode mixers (particularly using hot-carrier diodes) and ring arrangements of FETs and bipolar transistors has generated a lot of speculation, technical publications and, at times, emotional reaction regarding actual performance. The four leading contestants are:

(1) Double-balanced mixers using high-level hot-carrier diodes. The highest achieved iP3 values for this topology are about 40dBm, accompanied by 6dB of insertion loss.

(2) Active FET ring modulators using four symmetrical FETS, such as in the U350 quad manufactured by Siliconix. For reasons of cost, and because these mixers are more sensitive than diodes to changes in termination (more to changes in reactance than resistance) at the output for third-order intermodulation (distortion) (IMD3), they have not become very popular. A more popular version of this is a push-pull arrangement with N-junction FETs or dual-gate MOSFETs. Both provide similar performance. The dual-gate MOSFETs have slightly more conversation gain, higher intercept points and higher isolation, but most Japanese manufacturers prefer the single-gate combinations.

(3) High-level ring-type mixer arrangements using bipolar transistors . . . . as implemented by Plessey in the SL6440 IC. Because of its high DC supply requirement, this approach has not been implemented in many designs.

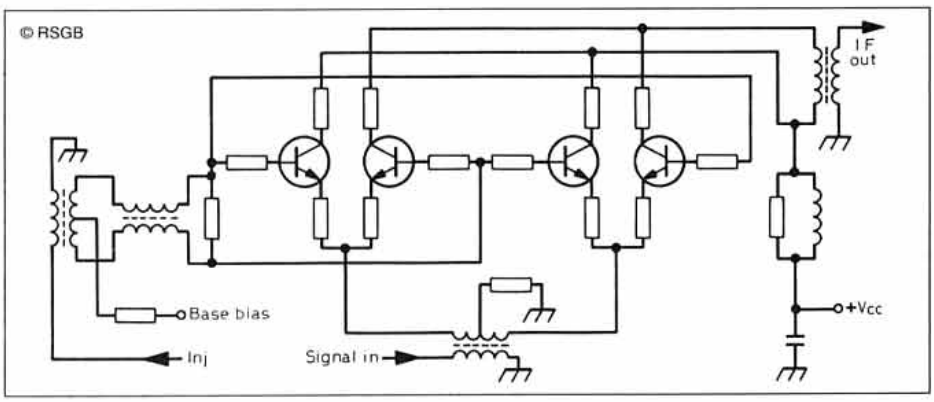


Fig 7: A doubly-balanced active mixer using bipolar transistors in a degenerated version of the balanced transconductance mixer. This approach is used in the Plessey SL6440 high-level IC and in the Motorola low-level MC1596 IC. (*Radio Receivers - Gosling (ed)*)

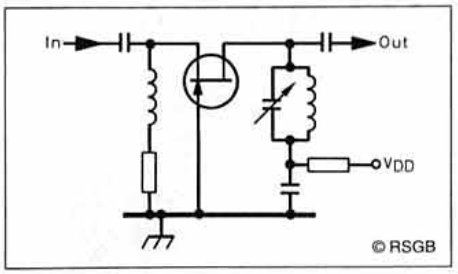


Fig 8: Simple grounded-gate FET amplifier which can provide 2dB noise-figure, 9dB gain in a 50Ω system for a 45, 70 or 100MHz up-converted first IF stage. (*Radio Receivers - Gosling (ed)*)

(4) Use of DMOS switches like the Siliconix SD210. This approach, with wideband termination, has been implemented in commercial radios from AEG Telefunken and Rohde & Schwarz [The complex circuit diagram of the input stage of the ultra-high dynamic range Telefunken E1800 receiver is given in the *QST* and *CQ-DL* articles - it uses four SD210 dual-gate FETs plus a U310 FET plus 8 bipolar devices to form the mixer and first (42.2MHz) IF stage! - *G3VA*].

"Third-order intercept points up to 45dBm have been measured in such circuits. The intercept point depends somewhat on the manufacturing quality of the devices and, of course, their termination. It is important to note that this mixer acts as a switch and exhibits an insertion loss of 6 to 10dB - much as with the high-level diode mixers . . . . The gate signal level required to switch these transistors (several volts) translates into approximately 1-watt of local-oscillator power."

For home-construction, with the virtual disappearance of the 7360 beam-switched mixer valve used by G4TDC, there would seem to be much to be said for the SL6440 IC. In *Radio Receivers* edited by Dr W Gosling and published as one of the IEE's Telecommunications Series 15, a double balanced mixer illustrating the use of bipolar medium power transistors (as in the SL6440) is described (**Fig 7**): "The circuit is that of a pair of transconductance mixers with emitter resistors added for IM improvement. Resistors in the base and collector leads add loss of ultra-high frequencies to suppress parasitic oscillations caused by resonances formed by circuit and transistor capacitances together with the leakage reactance of the associated transformers. Injection is supplied through a balancing transformer to the bases which are overdriven, resulting in signal switching-action.

"Collector supply voltage is applied to the output transformer centre-tap through a parallel resistor-inductor to further suppress oscillation. Although the transistors are operating as injection-controlled signal polarity switches, the impedance ratio between the signal emitters and the IF output collectors results in a modest gain of a few decibels. This can be very desirable when noise figure requirements make the loss of the diode mixer unattractive. Using transistors such as the Motorola MRF517, this active mixer will give a 3dB gain, 9dB noise figure, and +25dBm input intercept over the 2 to 30MHz band as an upconverter to the 100MHz range.

This type of mixer is also available in integrated circuit form, the Motorola MC1596 being a low-level device and the Plessey SL6440 being a high-level receiving mixer."

A practical front-end for a simple 3.5MHz superhet receiver using an SL6440 mixer with 2N5770 local oscillator was given in *TT*, May 1991 as a means of up-grading receivers using the NE602 device as a combined mixer/oscillator chip. An introduction to the SL6440 was given in *TT* as long ago as the combined June/July, 1980 issue based on information from our current RSGB President, Peter Chadwick, G3RZP, who wrote the Plessey Application Note for the SL6440 (AN1007) and presented a number of papers on the device at professional conferences in the UK, USA etc. As a linear mixer the device was stated to be capable of a 30dBm intercept point, +15dBm 1dB compression point, low noise (about 12dB for best IMD performance) and a conversion 'gain' of about -1dB.

It should be noted that with any mixer operating directly on the incoming RF signals without pre-mixer amplification, the IF amplifier that follows the mixer, either directly or after a roofing filter, must have a low noise figure and a high intercept figure (**Fig 8**), with a diplexer arrangement often used to achieve constant input impedance over a broad band of frequencies.

HERE AND THERE

YOU MAY REMEMBER that in November *TT* Jim Cookson, G4XWD, referred to the advice given in July *RadCom*, on carefully checking the heater voltage applied to power valves and rectifiers and offered some advice on dealing with this problem.

A similar facility was required for mobile transmitters and in the 1950s 'quick-heating valves' were marketed with several special forms of heater construction. One form consisted of short, coated ribbon of large cross-section; another a number of thin oxide-coated wires connected in parallel; and a third method thermally bonded the heater to the cathode to allow heat to reach the cathode by conduction. Such valves enabled a mobile transmitter to function within about one second from cold. There was some cost in valve reliability!

G4EIK, as someone who believes in home construction and home maintenance, greatly dislikes the current practice of unnecessary miniaturisation when applied by the factories to such equipment as 144MHz mobile rigs. He writes: "I can see the need to make handheld equipment small and the use of leadless components for microwave applications but why make a 144MHz mobile rig with PCBs that will fit in a matchbox, most of these have to be treated as 'throwaway' items (but not at throwaway prices). The amount of repairs that can be done to surface mount boards is limited even with professional facilities. What should be simple routine repairs can take hours and if done commercially may cost around £50 because of the time they take."

As someone who still builds all of his own equipment, he believes that the limited amount of what he calls 'real amateur radio' carried out by most amateurs is seriously downgrading the regard in which the hobby is held by non-amateurs.

The problem of dealing with surface-mounted chips is well covered in an article by P J Roberts, G1VUV, in *Television* (September 1992, p801): "The need to remove and replace surface-mounted components, especially ICs is becoming more common. Those little flat, square chips with millions of legs are a particular problem. Getting them off the board is hard enough let alone putting them on. Unless, that is, you adopt the correct approach using the right tool - rework spray solder flux, 29SWG enamelled copper wire, solder cream, a hot-air soldering iron such as the Jetmatic Station, and lots of patience.

"Various ways of going about it have been suggested. I've tried them and found them wanting, eventually adopting my own approach . . . . the method I recommend is as follows: Take two lengths of copper wire, each about six inches long. Feed each one through the gap between the body of the chip and its legs (on the sides of the chip with the most pins). Lift the wire ends at one end of the chip and twist them together. Repeat at the other end of the chip then twist all the ends together. Spray around the IC to be removed with rework flux. Apply light tension to the copper wire while using the hot-air iron, set to 360°C, air flow 5 with the small nozzle, to heat the chip's legs and the solder in an even manner. You will feel it when the chip starts to come away from the PCB. At this point reduce the tension on the wire. If you apply too much tension via the wire as the chip comes away you might lift the PCB print . . . . Having removed the faulty chip, use desoldering braid to clean any excess solder from the print lands. When the PCB has cooled down, clean off any flux with a brass pencil (pencil RS No. 514-868, brass refill RS No. 514-880)".

G1VUV then goes on to describe how to fit a replacement chip and to list a number of problems that can be experienced while learning how to use a hot-air soldering iron. To read them you must refer to the *Television* article but I feel that the above extracts underline the difficulties likely to be experienced by anyone attempting to replace multipin surface-mounted components without professional tools - even if they have the necessary patience to, as G4EIK puts it, "fiddle about soldering in components the size of rice grains even when professional facilities are available".

Some time ago, a firm specialising in supplying kits to familiarise constructors with SMT devices kindly sent me a little audio-amplifier board to try my hand at. I must confess that I quickly decided that this form of construction was not for me even with a pair of binocular magnifiers (*TT*, February 1983, p138) to help my tired eyes. Wonderful technology no doubt but everyone to their own taste as the French say! ***G3VA***

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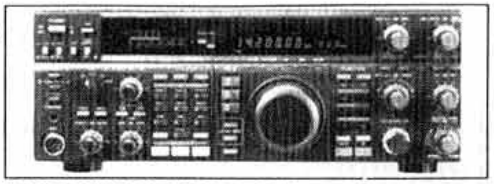

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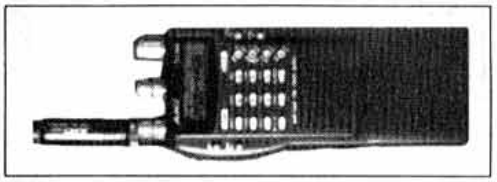

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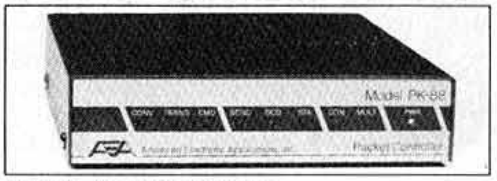

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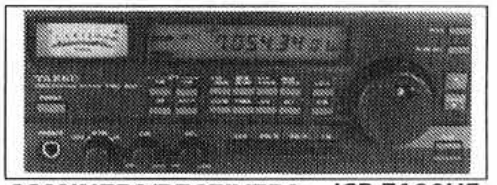

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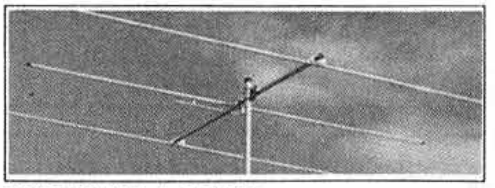

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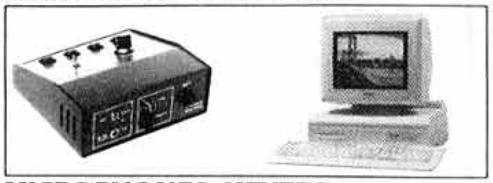

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FROM:- DAIWA, MANSON, HI-MOUND,
MICRO KEY, TURBO LOG

MARTIN'S RAMBLINGS...

I've got some exciting news for all those FT 736R owners out there! I'm not saying any more, but suffice it to say, if you own one, you will not want to use it without this addition. Give me a ring and I'll put you out of your misery!

Entering 1993 with an appointment as the authorised KENWOOD Dealer for London, (from TRIO-KENWOOD UK), is a good start to the new year. I've got a feeling things will go from strength to strength with the KENWOOD brand in the U.K., now we have the actual distributors here as back-up. Attending the official U.K. hand-over from Kenwood to its dealers, I was shown a full 100w H.F. Multimode practically the size of the TR751E -that's small! H.F. mobile operators start queuing now... it won't be available till the spring!

Don't forget my stocks of SECONDHAND EQUIPMENT. I built my business on the used equipment side and it's still going strong. Offering clean, tested and guaranteed items works well, others try and copy, (including my 'SUPPORT' logos), but they don't quite seem to get there.

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1993			
Jan	17	West Midlands	National Motorcycle Museum J6 M42
	23	North East	Northumbria Centre, Washington, Dist. 12
	24	North	Univ. Sports Centre, Calverley St., Leeds
	30	Nottingham	Jesse Boot Centre, University
Feb	6	London	Novotel, Hammersmith
	7	Wales	Univ. Union, Park Place, Cardiff
	13	London	Sandown Park, Esher, Surrey J9/10 M25
	14	West Midlands	National Motorcycle Museum J6 M42
	20	North West	Haydock Park Racecourse J23 M6
	21	Scotland	City Hall, Candleriggs, Glasgow
	27	Hemel H/stead	Dacorum Pavilion, The Marlowes
	28	West	Brunel Centre, Templemeads, Bristol
March	6	Leicester	De Montfort Hall, Granville Road
	7	North	Univ. Sports Centre, Calverley St., Leeds
	20	London	Sandown Park, Esher, Surrey J9/10 M25
	21	West Midlands	National Motorcycle Museum J6 M42
	27	North West	Haydock Park Racecourse J23 M6
April	3	Edinburgh	Appleton Tower, George Square
	4	Scotland	City Hall, Candleriggs, Glasgow
	17	Nottingham	Jesse Boot Centre, University
	18	West Midlands	National Motorcycle Museum J6 M42
	24	London	Sandown Park, Esher, Surrey J9/10 M25
	25	West	Brunel Centre, Templemeads, Bristol
May	1	North East	Northumbria Centre, Washington, Dist. 12
	22	London	Sandown Park, Esher, Surrey J9/10 M25
	29	Leicester	De Montfort Hall, Granville Road
	30	West Midlands	National Motorcycle Museum J6 M42
June	19	London	Novotel, Hammersmith
	20	West	Brunel Centre, Temple Meads, Bristol
	26	North West	Haydock Park Racecourse J23 M6
	27	West Midlands	National Motorcycle Museum J6 M42

Radio Communication

The Journal of the Radio Society of Great Britain

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RADCOM TECHNICAL FEATURE

Simple 160m Phone Transceiver

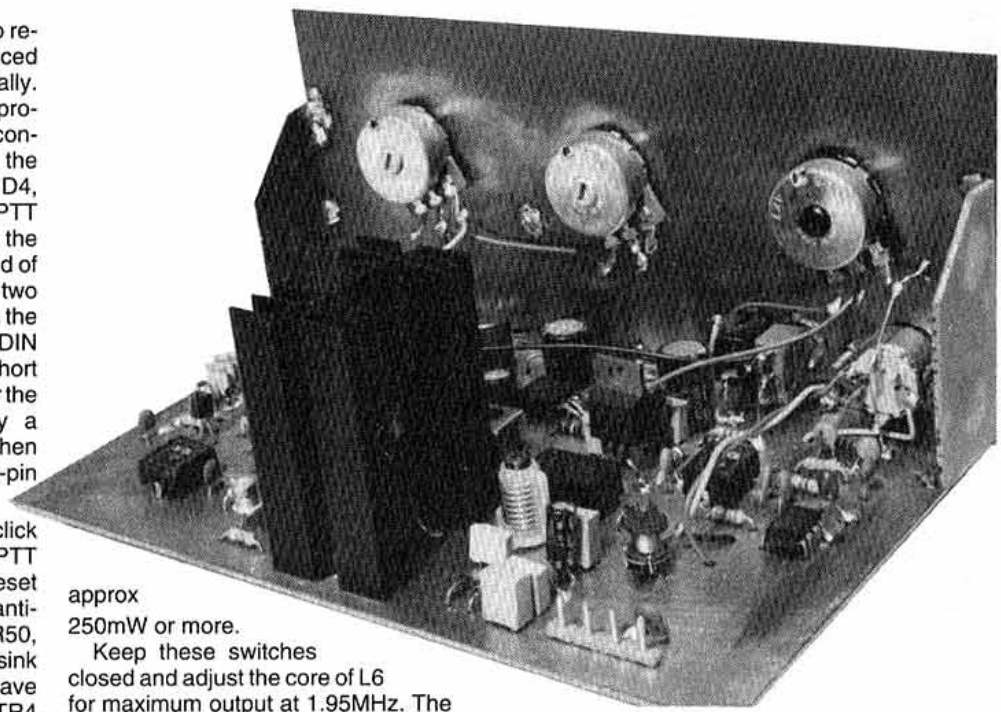
Concluding a two part article by Tim Walford, G3PCJ

FIRSTLY IT IS NECESSARY to remove the two links which replaced the relay if it wasn't fitted originally. Wire up S1 which is used to produce CW for tuning up, and connect TR3, R52, R53, C57. Next install the relay (if not already fitted) and its diode D4, and C65. The main PCB allows for the PTT switch to be wired either in the supply to the relay at points A and B or in the earthy end of the relay lead (points C and D). Connect two short wires from the preferred position on the PCB to pins 3 and 5 on the five-pin 180° DIN microphone socket. Then connect a short wire link across the alternative position for the PTT switch. This switch (possibly a microswitch taped to the microphone) is then connected to the matching pins on a five-pin DIN plug.

With the rig on and the volume low a click should be heard from the relay as the PTT switch is pressed and released. Install preset RV5, making certain that its slider is fully anti-clockwise (at the earthy end). Install R50, R51, C50 to C56, D3, L5 and L6. The heatsink can be fitted either way round but must have the wider gap on the FET side. The FET TR4 is attached to the heatsink with an insulating washer between heatsink and chip. The two are then being held together with a plastic nut and bolt. The two lugs of the heatsink are soldered on the underside of the board so that it is rigid. Solder the FET source lead on both sides of the board. The other power FET, TR5 (used to mute the receiver), is then soldered into the board. This doesn't require a heatsink.

TESTING THE TRANSMITTER

CONNECT A DUMMY LOAD, such as two 100Ω 1W resistors in parallel, to the output. A power indicator should be set to show power output (forward position), and a 1A DC meter is connected in series with the rig's positive supply lead. The PTT switch should be connected. On power up the rig's current should be 50 to 100mA, and pressing the PTT switch will increase this by a further 12 to 15mA for the relay. Note that at this point the transmitter output stage is not drawing current. With the PTT switch closed, slowly turn the preset RV5 clockwise to increase the gate bias voltage. Nothing will happen until this reaches about 4V, at which point the rig's current will increase quickly but smoothly. Set RV5 so that the total rig current is about 500mA which gives a standing current in TR4 of about 400mA - its setting is not critical. Now close the Tune and PTT switches. The power output should rise from zero (or very near) to



approx 250mW or more.

Keep these switches closed and adjust the core of L6 for maximum output at 1.95MHz. The DC supply current will increase as the output rises to about 1.5W RMS or 3W PEP. Releasing the PTT switch should reduce the supply current to the previous figure in the 50 to 100mA range. On receive, the Tune switch should, of course, be in the 'off' position.

TUNING ADJUSTMENTS

THE ANTENNA AND MATCHING UNIT (ATU) can now be connected in place of the dummy load, together with an earth or counterpoise. Pressing PTT and switching to 'Tune' will provide a carrier and enable the matching unit's controls to be adjusted for the lowest reflected power/voltage. Release the PTT and change the matching (SWR) indicator to the forward/power-output position. After checking that the frequency is not in use, pressing PTT with the Tune switch on should give about 1.5W RMS or 3W PEP of CW to the antenna. This unmodulated RF carrier is only suitable for tuning purposes.

TRANSMIT AUDIO OPTIONS

IC4 IS A SPEECH AMPLIFIER whose gain can be set over a wide range to suit microphones of different sensitivities and impedances. Install R54 to R57, C58 to C64, and IC4. Make sure RV6 is fully anti-clockwise. Connect the microphone socket with a short length of wire to the speech amplifier input, and check that the earth pin is connected. The input impedance is 47kΩ, so high impedance microphones will match with no problems. Dynamic microphones need an input impedance of about 600Ω so in this case a 680Ω resistor (R58) is placed between input and earth, as shown.

Some microphones with internal battery operated amplifiers need a low impedance of 1kΩ or so - this should be the value of R58 for these. Electret types need a DC supply, and in this case a resistor between 1k0 and 4k7 at R59 should be used. Sometimes 3-terminal electrets need a positive supply in addition to the usual earth and signal line. In this case run a wire from the +6V end of R59 to the spare pin 4 of the microphone socket and hence to the electret. No isolating or coupling capacitor is needed on the mic input since this follows the RF filter at the input to IC4.

Adjust the audio gain preset RV6 by using a dummy load and output power indicator, initially. Leave the Tune switch off, and if the mic has an internal battery make sure its not flat! Press the PTT switch, and whistle into the microphone while slowly turning the preset RV6 clockwise until the output stops increasing. Then turn the preset back a little to where the output is about three quarters of maximum. The output ceases to increase because of flat-topping or RF limiting in the output stage which must be avoided since it causes interference to adjacent signals. It is

likely that a microphone with built-in amplifier will only need a slight clockwise turn of RV6, dynamic mics will need almost a full turn, while crystal and electret types will need half to three-quarters of full rotation.

FINAL TESTS AND A QSO

THE RIG CAN NOW BE TESTED for real! Before the excitement of the first few QSOs ask a nearby amateur to listen carefully for any sign of distortion or spreading. He should be able to hear upper and lower sidebands equally well - provided the channel is clear. If there is any sign of spreading or flat-topping detected by other stations, particularly those equipped with an oscilloscope, then reduce the microphone gain a little.

PRACTICAL SUGGESTIONS

OPERATION IS VERY SIMPLE - an SSB signal is tuned on receive with the coarse tuning control until it sounds roughly correct. Then the fine tuning is used. When an SSB or DSB transmission sounds right on receive, the transmitter will automatically be on the right frequency.

While whistling can give a useful indication of peak envelope power output, it is not a reliable measurement tool. If there is any suspicion that something is wrong, do a check on CW with the Tune switch. Speech or whistles always give a lower reading than CW. Since the rig has a tuned output stage, it should be unnecessary to fit a low-pass RF filter to remove harmonics. If one is to hand, however, then by all means use it. I strongly recommend the use of a link coupled resonant ATU to improve both transmit and receive performance.

Direct conversion receivers sometimes suffer from microphony, ie audio noises from the loudspeaker when the rig is tapped lightly. It is inevitable to a small degree with such a high audio gain but rigid mechanical construction is the best cure. It may be present only when the antenna is connected. Quite often the problem is caused by a lack of connection between the rig's zero volt line and either mains or RF earth. (If hum problems persist, it's always worth seeing if it is present when running on a 12V battery). The zero volt line should be connected to mains earth on the power supply as well as to the mains transformer screen if there is one.

This line must *not* be connected to RF earth (buried water pipes, rods in ground, radials etc.) as this may reduce the effectiveness of mains protection devices particularly where Protective Multiple Earthing (PME) is used. Enclose real earth terminals so that it is not possible to touch real earth and mains earth at the same time. [See also G4TXG's article 'Improving Direct Conversion Receiver Design', *RadCom* April 1991 - *Ed.*]

AM SIGNAL RECEPTION

IF RECEIVED AUDIO QUALITY is poor and the signal very critical in its tuning, it may be because the signal is amplitude modulated. In this case the VFO must be set exactly onto frequency to avoid a heterodyne. On the other hand it may be another double sideband suppressed carrier transmission. Both types are more critical in their tuning than SSB but communication is quite possible in each case. So don't condemn the other station - he might be using the same type of rig! Of course, normally contacts will be with amateurs using single sideband which presents no problem whatsoever!

INCREASING THE OUTPUT POWER

FOR NOVICE USE THE RIG IS RUN from 12 volt supplies, so that the power output doesn't exceed the Novice licence limit of 3W PEP. Full class A licence holders can use the rig on any higher voltage up to about 25V safely - this will increase the output to about 10W PEP. No modifications are normally required but a little more microphone gain may be beneficial. It is a good idea to wire a 680Ω resistor in series with the relay for 25V, as this component is normally rated at 12V. All other devices can handle 25V safely.

POWER SUPPLY

THE RIG CAN BE RUN FROM A 12 volt battery with a 1A fuse in series or from a mains PSU such as the one in **Fig 4**. Precise regulation of the output voltage is not required so only the transformer, rectifier, reservoir capacitor and bleed resistor are used for 12V operation. The 7812 is a 12V 1A fixed voltage regulator which needs an input in the range 15 to 30V and should be mounted on a heatsink, say a piece of aluminium 75mm square or the wall of a metal box. The tab of the 7812 is connected to the common terminal so this will connect the rig's 0 volt line to the case, but a wire link should also be

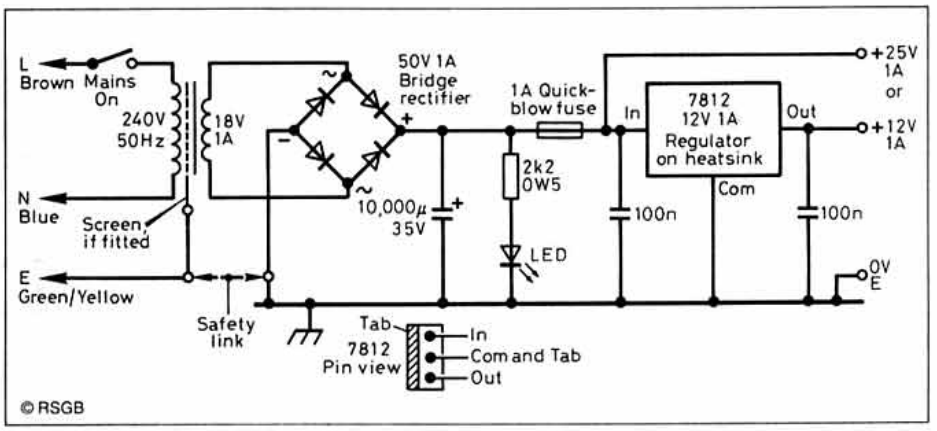


Fig 4: The power supply unit gives 12V for Novice use, or 25V if higher power is required.

COMPONENTS LIST - RECEIVER AND VFO

Resistors

All 0.25W 5% metal film

R1,9	220R
R2,6,11,16	1k2
R3	2k2
R4,7,13	220k
R5	100R
R8	1R0
R10	470R
R12,15, 17	4k7
R14	47k
RV1	4k7 log variable
RV2, 3	10k lin variable
RV4	10k lin preset

Inductors

L1	45µH Toko KANK3333R
L2,3	100mH Toko 181LY104
L4	5.5µH Toko 154AN7A6441EK

Capacitors

C1,3,4,8 22	470nF polyester
C2,23 24,25,26	150pF N150 ceramic
C5,10,13 14,17	220nF polyester
C6,19,21, 28, 31	10nF ceramic
C7	100µF 16V electrolytic
C9,12	47nF polyester
C11	68nF polyester
C15	10µF 16V electrolytic
C16,30	220pF ceramic
C18	100µF 35V electrolytic
C20	330µF 16V electrolytic
C27,29	10pF NP0 ceramic
VC1	22pF variable

Semiconductors

IC1	LM317LZ regulator
IC2	NE612AN (or NE602)
IC3	TDA2030H
D1	BB212 varicap diode
D2, 5	1N4148
TR1,2	2N3819

Miscellaneous

1 Double sided etched and drilled 100 x 160mm main PCB

1 Single sided unetched 100 x 160mm front panel PCB

2 small, 1 large pointer knobs

1 3.5mm jack socket

1 4-way pin and socket PCB connector

1 12mm (0.5in) 6BA nut and bolt

R17,C31,VC1 and D5 are only required for CW operation.

COMPONENTS LIST – TRANSMITTER

Resistors

All 0.25W 5% metal film

R50,54	3k3
R51,56	47k
R52	47R
R53	330R
R55	470R
R57	1k2
R58,59	value to suit microphone
RV5	10k preset
RV6	100k preset

Inductors

L5	10µH Toko 262LYF0080
L6	0.345µH Toko 301KN0700 S18 series (Cirkit part no. 35-10703)

Capacitors

C50	22nF polyester
C51	10µF 35V electrolytic
C52,55	
56,57	
64,65	10nF disk ceramic
C53	470nF polyester
C54	220nF polyester
C58,60	
61,62,63	220pF ceramic
C59	1.5µF 16V electrolytic

Semiconductors

D3,4	1N4148
IC4	TL071CN
TR3	2N2222
TR4,5	IRF510 (Siliconex)

Miscellaneous

S1	Min SP toggle switch
RL1	12V 720Ω relay style BT53/3 DPCO
TO-220	vertical heatsink 5.8°C/W, insulating washer 6BA plastic nut and bolt

180° 5-pin DIN socket (chassis mounting)

Note that R18-R49 and C32-C49 do not exist

A kit of all components (excluding microphone and PCBs) is available from Walford Electronics, Upton Bridge Farm, Long Sutton, Langport, Somerset TA10 9NJ. Price is £36.00 inc p&p.

The main and front panel PCBs are available from Badger Boards, 87 Blackberry Lane, Four Oaks, Sutton Coldfield B74 4JF. Tel 021 353-9326. Price for both is £8.95 inc p&p.

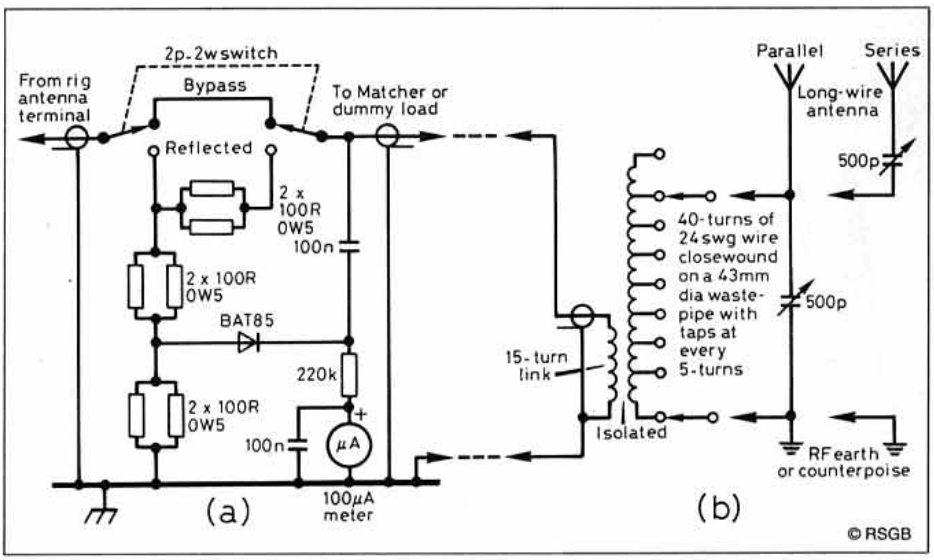


Fig 5: A matching indicator and antenna tuning unit should ensure effective antenna coupling.

connected from 0 volts to mains earth and the metalwork. Any convenient rigid box will suffice to give protection from mains voltages. [If you are constructing a mains power supply for the first time it is advisable to have it checked by an experienced constructor before use - *Ed.*]

ANTENNA MATCHING INDICATOR

IF A MATCHING INDICATOR (also known as a Standing Wave Ratio or SWR bridge) is not already available, the one shown in **Fig 5** is simple to make. In the bypass position, the indicator reads the forward RF voltage. 10W PEP should give 22V peak into 50Ω so a 100µA meter with 220k resistor is suitable. However any high impedance voltmeter could be used instead. In the reflected position, the meter reads the reflected voltage but with a maximum which is half that of the forward value due to the dividing action of the bridge. Always start tuning in the reflected position as this will limit the possibility of damage to the transmitter. The indicator can feed a dummy load or antenna matching unit. The bypass/reflected switch should only be operated with the transmitter off.

Fig 5 also shows a design for a matching unit which should be able to match any random length wire. It is used in conjunction with an RF earth comprising ground rods, radials or a wire counterpoise. The variable capacitor needs to be isolated from earth and have an insulating knob. They can be expensive but it may be possible to salvage one from an old radio - air spaced ones are best. The coil is 40 turns of 24SWG wire close wound on a former made from 43mm diameter plastic waste pipe. For an unbalanced long-wire antenna the primary 15 turn link should be wound over the earthy end of the coil. Separate the two windings with a layer of insulating tape.

It is worth trying both the parallel or series arrangements to see which proves to be the most effective. Tune the capacitor for loudest received signals and if there is no noticeable peak try other coil taps or the other configuration. Then go to transmit and adjust the matching controls for a smooth dip in reflected power. Change to bypass (forward) position and the rig will produce full output to the antenna.

CONVERSION FOR CW OPERATION

IT WILL BE APPARENT THAT the rig can produce CW if a key and waveform shaping circuits replace the Tune switch. In this case, the VFO will need to be offset slightly on either transmit or receive to produce an audible note. This can be done with a small variable capacitor at the source of TR1 and a diode switch. Sidetone can be fed in at terminal ST and semi break-in T/R control could also be incorporated if desired. Of course the VFO coverage would have to be extended to 1810kHz for CW operation.

CONCLUSIONS

FINALLY I WOULD LIKE TO THANK all who helped me in the development of this rig and particularly those members of the Yeovil ARC who assisted with on-air testing. Good luck and I hope you get as much enjoyment out of building and using it as I did in designing it!

RADIO HAMSTORES

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Icom IC-W21E

Simple operation, **lightweight** and **dependable.** The IC-W21E offers easy operation using only a few switches and independent volume/ squelch controls for each band. The **ergonomic, splash-resistant** and tough design makes the diminutive IC-W21E a **snug fit** in the palm of your hand.

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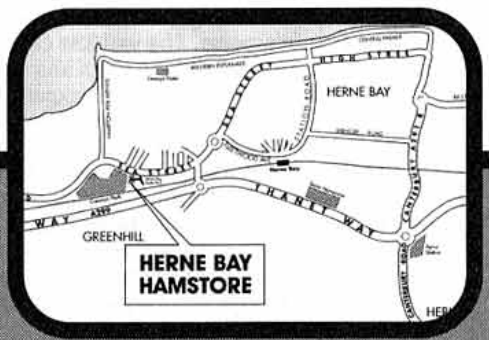

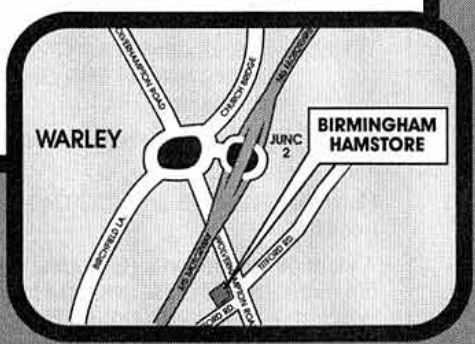

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The Peter Hart Review

Icom IC-3230H

144/432MHz Dual-band FM Transceiver

ALTHOUGH 144MHz IS the most popular band for FM working, 432MHz is also well used, particularly in the more populated areas and is served by an extensive repeater network. A dual band radio is a most attractive way of equipping for both bands and particularly for mobile operation where space in most cars is at an absolute premium. All of the major suppliers include dual band rigs in their product range and Icom in particular have a long history as pioneers in this field. The latest offering from Icom is their IC-3230H. In a tiny radio no larger than the small sized monoband transceivers, Icom have packed two separate receivers, two high power transmitters and a host of features.

PRINCIPAL FEATURES

THE FREQUENCY RANGE covered by the IC-3230H is 144-146MHz and 430-440MHz for the UK version. The range varies slightly in other parts of the world, between the limits 136-174MHz and 400-479MHz. The settings for most of the receiver and transmitter parameters such as step size, repeater offset and transmit power can be independently preset for each band, and the two receivers are equipped with separate volume and squelch controls. A single antenna socket is provided on a flying lead, hence a dual band antenna is needed. The audio from the two receivers is combined through a single internal speaker or routed to separate sockets on the rear panel. Hence with external speakers the two audio channels can be kept separate (or combined as necessary). The IC-3230H will allow full crossband duplex operation, receiving on one band and transmitting simultaneously on the other.

The channel step sizes may be set to 5, 10, 12.5, 15, 20 or 25kHz and there is a 1MHz step fast tune provision. Fifteen memories are provided on each band with two additional stores for programmable scan limits. Tuning and memory selection is done using a conventional small click-step rotary control and there are the usual transfer facilities between VFO, memory and call channel. Each memory position stores frequency, repeater offset and tone access information where these options are fitted. A lithium back-up battery is used to retain the memory information.

Although both receivers are active all of the time, only one band, designated as MAIN, is selected for transmission, tuning and setting of various parameters. If the SUB band function is active then tuning and setting applies to the other band while receiving or transmitting on the main band. When signals are received on both bands, normally the volume control will be turned down on the unwanted channel. When switching back and forth between bands, to avoid turning up and down the volume controls, sub band audio mute can be selected. Another facility is sub band busy beep, which sounds a beep on the main receiver audio when a signal opens the squelch on the sub band.

A call channel facility is provided which allows rapid access to any one frequently used channel. Scanning is also incorporated with either programmed scan between two user-programmed limits or repeated scan of all the memory channels. In this latter mode, memories may be skipped in the scan process. A choice of scan resume conditions may be selected to give different dwell times and pause conditions. Scan operates independently on VHF and UHF.

When operating in the VFO mode, priority watch may be selected. Priority watch has three operating modes - to check a selected memory channel, each memory channel in sequence or the call channel every five seconds. Return to the VFO channel is governed by the selected scan resume condition.

A 20dB front-end attenuator is selectable when needed for strong signal handling. It is useful to select this during scanning so that the scan stops only on the stronger signals. The attenuator may be automatically selected when operating on the lowest RF power output setting.

Other functions include beep tone key press confirmation on/off, variable display illumination and the ability to program the UP key on the microphone to duplicate any of the front panel keys.

The IC-3230H has three transmit output power settings, nominally 5W, 10W and 45W (2m) or 35W (70cm). The powers may be set independently on 2m and 70cm. For repeater operation the receive/transmit offset is independently programmable over the frequency range +/-20MHz on both bands and a 1750Hz toneburst activated from the microphone is included in European models. A pushbutton opens the squelch and allows the repeater input channel to be quickly checked for activity.

The backlit LCD on the front panel continually indicates both the 2m and 70cm frequencies and memory channels, bar graph S-meters for both bands, relative transmit power and various status messages.

The rear panel sports a miniature fan. This operates on transmit and also on receive if the unit is particularly warm. It appears most effective at cooling the rear heatsink.

Some very sophisticated tone operated functions are available with the appropriate options fitted. The UT-67 CTCSS tone squelch unit provides 38 sub-audible tones to access (primarily US) repeaters so equipped. It can also be used to provide a selective end to end link or club net, only opening the squelch on signals transmitting the correct sub-audible tone.

The UT-55 DTMF encoder/decoder in conjunction with DTMF keypad microphone can provide a coded squelch or pager function. This is quite popular in the US. It is based on

transmitting three-digit IDs each time the PTT is pressed to call selectively a station or a group. The DTMF facility can also be used to control the transceiver remotely. This can be done either from the keypad microphone or even over the air and can be linked to the voice synthesiser to open up a host of interesting possibilities.

A third option that can be fitted is the UT-66 voice synthesiser unit. This announces the operating frequency in English or Japanese and even at two different speeds!

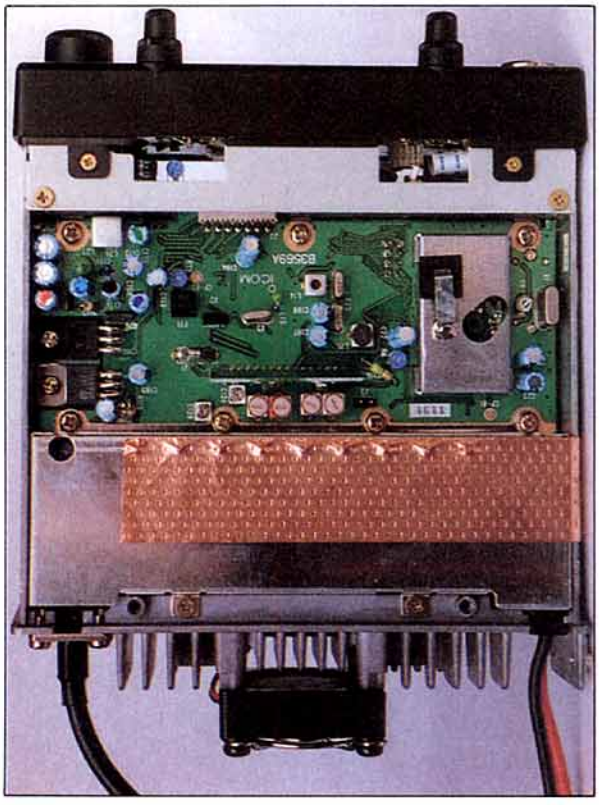
The radio comes complete with a hand microphone, various items of mounting hardware and manual. The 64 page A5 manual covers reasonably well installing and operating the radio and includes a set of circuit diagrams.

DESCRIPTION

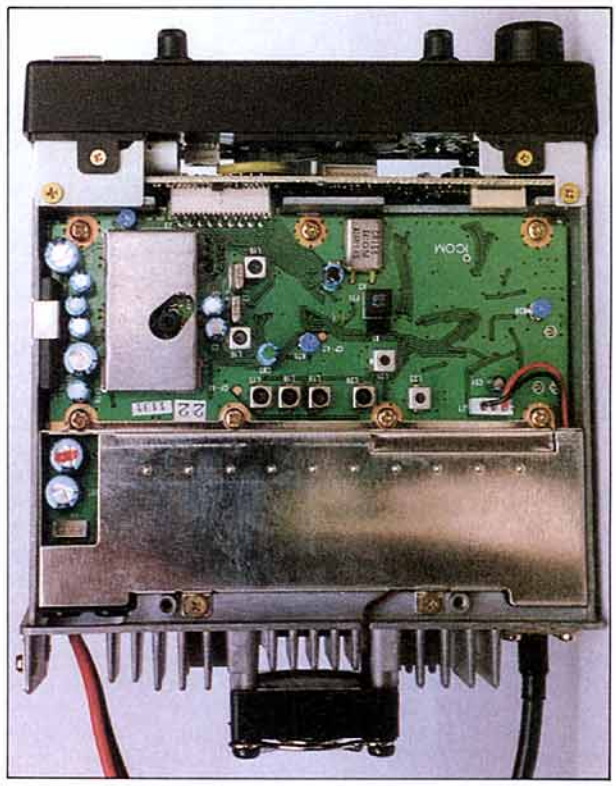
THE IC-3230H SHOULD be small enough to fit into most cars where it can be comfortably used by the driver. The dimensions are 140mm (W) x 40mm (H) x 165mm (D) and weighs 1.25kg. The front panel is about as small as is desirable for mobile operation. Anything smaller would be awkward to use.

The unit is solidly constructed around a diecast frame and integral rear finned heatsink. Removing the upper and lower covers, the 2m unit is seen on the top and the 70cm unit underneath. Two other smaller PCBs are the display and logic unit and the options comprise small modules which simply plug into these boards. Surface mount construction is used to give a very neat and compact layout.

A thin 50mm diameter speaker unit is fitted into the top of the case. The front panel is dominated by the display and there are two twin concentric rotary controls and various small push buttons. All push buttons control two functions, either by a brief press or a sustained press.



Separate RF circuitry is used for the 2m and 70cm receivers and transmitters. The receivers are double superhet with a first IF of 17.2MHz on 2m or 30.85MHz on 70cm. The second IF in both cases is 455kHz. Straightforward single loop frequency synthesisers are used for the Rx first local oscillator and on transmit these are modulated and provide the signal source. PA modules amplify the signal to the output power required. Diode antenna switching is used. Extensive filtering is employed in the antenna feeds to the 2m and 70cm units culminating in low pass sections on 2m and high pass sections on 70cm to provide antenna combining and hence allow crossband full duplex working.



MEASUREMENTS

ALL THE MEASUREMENTS were made powered from a 13.8V PSU and are detailed in the table. Additional comments are as follows.

S-METER CALIBRATION

The figures given in the table are approximate due to the granularity of the bargraph display. S3 and S7 are accorded to the obvious blobs on the display. The S-meter range is rather poor even by FM rig standards, a somewhat limited 14-16dB.

SPURIOUS REJECTION

The receivers were generally very clean, although there were some responses on the 70cm receiver at around -70dB in the lower part of the UHF TV band. IF responses were unmeasurable. Transmitter harmonics and spurii were very low, largely as a consequence of the quantity of filtering included to allow full duplex working.

ADJACENT CHANNEL REJECTION

The 25kHz adjacent channel rejection is limited by reciprocal mixing. The receiver is not really equipped with narrow enough IF filters for effective use of 12.5kHz channelling.

STRONG SIGNAL PERFORMANCE

The IP3 and reciprocal mixing figures are typical of mobiles.

FREQUENCY CALIBRATION

When measured at room temperature the transmit frequency was about 500Hz low on 2m and 1.6kHz low on 70cm.

SUPPLY VOLTAGE VARIATIONS

The receiver continued to function down to a supply voltage of 8V. On transmit, there was no substantial variation in power over the range 11-15V on the low power 1 and low power 2 settings, but on high power at 11V, the power output reduced by 30%.

ON-THE-AIR PERFORMANCE

I USED THE IC-3230H from home in conjunction with a 2m quarter wavelength vertical antenna. This also seemed to function quite effectively as a $^3/_4$ wavelength vertical on 70cm. The radio performed well and was easy to use although the small size of the push buttons may be less convenient in a mobile environment. The receiver sensitivity was good, no strong signal problems were experienced and the audio quality was very readable. The speaker gives a remarkable amount of sound for its size. The transmit audio quality was also reported as being most acceptable, with the higher than average transmit power an added bonus.

Crossband full duplex also functioned effectively with negligible desensitisation of the receiver by the transmitter on most receive frequencies. Transmitting on 70cm even at the highest power had virtually no effect on any of the 2m receive frequencies. When transmitting on 2m, some 70cm channels were unusable for receive, most notably the third harmonic from 2m and with the highest transmit powers, several channels on either side.

CONCLUSIONS

THE IC-3230H IS A useful and effective rig for dual band FM operation. It has a good overall performance, is small enough to fit virtually

ICOM IC-3230H MEASURED PERFORMANCE

RECEIVER MEASUREMENTS

		144MHz	432MHz
Supply current	- unsquelched no audio	830mA	
	- squelched	830mA	
	- with high audio	up to 1A	
Sensitivity 12dB SINAD, 3kHz pk dev.		0.14µV	0.15µV
Sensitivity 12dB SINAD, Attenuator on		1.3µV	2.0µV
S meter sensitivity	- S1	1.1µV	1.3µV
	- S3	1.2µV	1.5µV
	- S5	1.9µV	2.2µV
	- S7	2.7µV	2.6µV
	- S9	3.9µV	3.2µV
	- S9 + 2 blobs	5.2µV	3.9µV
	- S9 + 4 blobs	7.3µV	5.8µV
Squelch operating range		0.1µV-0.2µV	0.1-0.2µV
Adjacent channel rejection	- 25kHz with 3kHz dev.	70dB	70dB
	- 12.5kHz with 3kHz dev.	12dB	12dB
	- 12.5kHz with 1.5kHz dev.	25dB	25dB
Co-channel rejection		6dB	6dB
Image rejection		72dB	86dB
Blocking/reciprocal mixing	- 50kHz offset	80dB	77dB
	- 100kHz offset	85dB	80dB
	- 200kHz offset	88dB	83dB
	- 500kHz offset	90dB	84dB
3rd order intercept	-14dBm	-28dBm	
Max audio before clipping into 8 ohm		2.3W	
Audio distortion up to clipping level		<1.8%	

TRANSMITTER MEASUREMENTS

		144MHz	432MHz
Power output	- high power	44W	37W
	- low power 2	10.9W	12.7W
	- low power 1	5.2W	6.4W
Supply current	- high power	8.1A	9.6A
	- low power 2	4.1A	5.3A
	- low power 1	3.2A	4.0A
Harmonic output		<-80dBC	<-80dBC
Spurious outputs		-75dBC	-75dBC
Max deviation		5.2kHz	5.2kHz
Toneburst frequency		1750Hz	1750Hz
Toneburst deviation		4.6kHz	4.7kHz

NOTE: All signal input voltages given as PD across antenna terminal. All measurements were made with a 13.8V supply.

any car and delivers plenty of transmit power.

The price at the time of writing this review was around £675 inc VAT. The changes in exchange rate which took place at the end of last year have resulted in a sharp increase in price but even so this compares favourably with buying two similar separate monoband rigs.

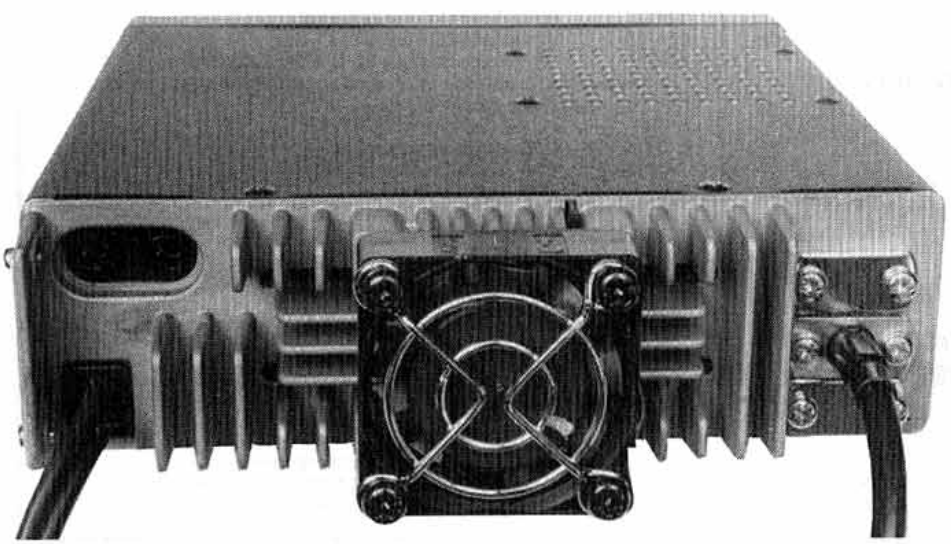
ACKNOWLEDGEMENTS

I WOULD LIKE TO THANK Icom(UK) Ltd of Herne Bay, Kent, for the loan of the equipment.

Peter Hart, G3SJX

FOR A COMPLETE list of *RadCom* equipment reviews during 1992 turn to the index pages in the centre of this edition.

We will be publishing a complete list of recent reviews in a future issue of *RadCom*.



The new Icom Hamstore in Hendon, North London, features a wide range of new and secondhand equipment for the SWL and licensed amateur.

Icom (UK) directors Paul Nicholson, G3VJF, and Dave Stockley, G4ELP, opening the new Hamstore.

Store Manager Doug, G0LUH, and his assistant Paul, G7MNI, at December's opening ceremony.

EUROTEK

Translated and Edited by Erwin David, G4LQI

continued from page 31

kept separate from the oscillator tank in a solder-sealed compartment. Making this compartment very small reduced the warm-up time to ten minutes. Hang the FET between the feed-through insulators; do not stick it to a compartment wall with heat conducting paste as that proved counterproductive.

Firing up without the tuning capacitor, the oscillator coil cores are adjusted to approx 2520kHz. Note that the frequency decreases during and even after warm-up; this is expected because of the positive temp. coefficient of the 120pF polystyrene capacitors. This drift is to be reduced by temp compensation, which consists of placing in the tuning capacitor compartment, from the feed-through to earth, small capacitors with a negative temperature coefficient. This is done with, don't laugh, NP0 (black dot) ceramic capacitors; the grey Philips ones are too good but the brown type worked well. No frequency readings should be taken till the VFO has been running for 15 minutes, and then not until five minutes after any soldering to the wiring or 15 minutes after soldering to a partition. The compensation sequence for a typical oscillator might go like this: Solder in 10pF (low down, as several probably will be required and the final one must be accessible after the tuning capacitor is installed); the frequency still drifts downward. Add 10pF; still going down. Another 10pF makes the frequency slowly drift up, so we replace it by 5.6pF and now install and connect the tuning capacitor, setting it to mid-dial and tuning the coil cores to mid-band.

Check the tuning range. It is possible that the oscillator quits because of the lowered L/C ratio. If so, replace the 120pF polystyrene caps with 100pF and start compensating from scratch. Assuming that this does not happen but the frequency still very slowly drifts up, replace 5.6pF with 4.7pF. If that is too little, the 4.7pF and one of the 10pFs can be replaced by 15pF. The frequency is now stable for 15 minutes within 5Hz. The lids can now be soldered shut and the trimming holes taped.

RESULTS

MOUNTING THE VFO on a common motherboard with the rest of the one-Watt transmitter caused excessive VFO drift. After insulating the VFO from that board and from adjacent modules with Styrofoam, the drift was 35Hz in five minutes at full output, the equivalent of a 15 min CW QSO. If you want better, either the VFO or the PA must be removed from the transceiver.

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Emergency!

RONALD M COWAN, GM4SRL
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A NEW INITIATIVE at this year's British Grand Prix at Donington Park was 'Bike Watch'. It was designed with the motor cyclist in mind, and hopefully gave riders peace of mind while watching the race action at the circuit. Riders were asked to park their machines in officially designated parking areas, and these were watched from high level vantage points by RAYNET members from Leicestershire County, helped by volunteers from other groups in Zone 3 who were all working on behalf of Leicestershire Police.

The action proved a great success with no bikes being stolen from the parks being monitored by Raynet (at the vantage points) and by the Police (on the ground.) In the past there had been many incidents of stolen bikes and equipment, and as a result of this year's experiment, the scheme is likely to be extended in the future.

HAWAIIAN CALLOUT

On Friday 11 September Hurricane Iniki hit the Hawaiian Island of Kauai, which is the furthest north west of the chain of Islands and has a population of 51,000. 7000 houses were destroyed or severely damaged causing over 8000 people to become homeless and there was over $16 million in insured damage to both homes and businesses.

As winds whipped across mountain tops, microwave transmission antennas warped and entire radio towers fell. By mid afternoon, as the storm passed the residents of Kauai could no longer make long distance telephone calls. Amateur radio became the only link between Kauai and its neighbour Oahu with radio amateurs relaying the early messages needed to jump-start emergency operations and set the stage for growing relief efforts. Kauai amateurs banded together both on the air and behind the scenes with tremendous spirit and excellent operating skills.

Public service has always been one of the cornerstones of Amateur Radio and the Radio Amateur Civil Emergency Service (RACES) was created in the US as a means for amateur radio to serve civil defence agencies during times of war and disaster. The RACES programme for the Hawaiian State Civil Defense (SCD) had been dormant for several years until Robin Liu, AH6CP, initiated a dialogue with SCD in 1985 to reactivate. The first fruits of his efforts enabled a team of amateurs to construct a VHF repeater network for use in emergencies. The four-repeater system has repeaters on Oahu, Maui, the Big Island, and Kauai. In addition, a series of 2m packet digipeaters had been installed by KH6GPI, and AH6CP.

Throughout the week leading to the eventful Friday Hurricane Iniki had travelled south of the Hawaiian Islands along a north-westerly path. By Thursday the storm had turned northward and was headed straight for Kauai. Despite the eighty miles of ocean separating Kauai from the main island of Oahu, storm warnings were posted for both islands. That evening AH6CP, activated the state RACES station KH6HPZ from the Emergency Operating Centre (EOC) located in Burkheimer Tunnel within the crater of Diamond Head and passed out the latest information on the hurricane. Net operations ceased at 2300, but resumed at 0530 the next morning.

Cliff Ikeda, NH6HF, the Civil Defence Communications Officer for Kauai County was on Oahu for a series of meetings and had to report to the airport immediately for a return flight when he received a message from the Kauai Mayor, Jo Ann Yukimura.

Ron Hashiro, KH6JCA, resumed the net early at 0430 the next morning and Oahu and Kauai residents awoke to emergency sirens and immediately tuned to the broadcast stations for the latest official bulletin. All non-essential workers were advised to stay at home and in moments the telephone systems on both islands were jammed by a flood of phone calls as workers frantically tried to contact their workplace. From his office at the National Weather Service in Honolulu International Airport, weatherman Mike Morrow, KH6JQM, activated the Skywarn radio net which collected weather observations from amateur radio operators and relayed the latest weather analysis. When the NOAA radio failed later that day, Skywarn turned to amateur radio.

At the Kauai EOC, Communications Officer Ikeda became fully involved with emergency preparation meetings with the mayor and her staff, pausing only to brief state Civil Defence officials on amateur radio VHF voice. Robbie Reneau, KH6JIV, also in Lihue, passed timely reports via RACES to AH6CP, and Pat Corrigan, KH6DD, at SCD in Honolulu.

Community resources continued to fall as the wind increased and at 1135 Kauai Broadcast stations went off the air, at 1222 power became intermittent and at 1312 major structural damage began. At 1504 the telephone service out of Kauai was lost and government radio had failed. Shortly after that the NH6HF RACES repeater on Kauai went down, and voice operations switched to the Hawaiian Tel 2m repeater KH6JPL, located on Oahu. As the storm pressed on, news media on Oahu reported "Ham Radio operators are in touch with Kauai, but we have no additional word on damage or other status." With all services knocked out and people huddling in shelters and homes, reports were scarce. Safe within the basement of the Kauai County Building, and powered by a generator, NH6HF's VHF voice and packet radios became the last remaining links from Kauai.

Telephone and power lines failed as hurricane Iniki struck Hawaii.

By 1930 the storm had subsided enough for people to go outside and move about. All power and water service on Kauai was lost and in the moonlight residents could see the trail of destruction across the island. The majority of the Kauai phone service through GTE Hawaiian Tel remained out of service with the two microwave links between Kauai and Oahu down.

Road crews began to clear the roads and power, water and phone service had to be restored. Two way communications were crucial in identifying the medical emergencies, locating work crews and equipment, developing action plans and establishing meeting points and schedules.

By Sunday, residents were offered the service of passing a short message which went via Oahu radio amateurs. Later that day telephone services were restored.

Thanks to the *ARRL Newsletter* for the story and photograph.

Raynet member G7GEX keeping a look-out from Tower 5 at Donington.

FOR THE PRICE, YOU'D EXPECT THE WORLD.

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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.

It boasts a number of highly advanced features like built-in Digital Signal Processing, 50 Volt MOSFET finals, AIP (advanced intercept point), built-in sub-receiver and built-in automatic antenna tuner. To name but some of its world-leading technical tours-de-force.

Just as important, it's made with Kenwood's traditional attention to detail and reliability, to stand up to a lifetime's use. A fact which your Kenwood dealer will be proud to demonstrate when you visit for a closer look at this world-leading transceiver.

The TS-950SDX is part of a range of Kenwood 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 amateur radio at your command.

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Q R P

REV GEORGE DOBBS G3RJV
St. Aidan's Vicarage, 498 Manchester Road, Rochdale OL11 3HE

QRPP IS OFTEN USED to designate the lower end of the power range, usually 1W or less. An ambitious programme of activity days has been arranged by the OK QRP Club and the editors of the *OK QRP INFO* and *OQI* magazines. This is to motivate interest in very low power transmitting and home construction of QRP equipment. The information I received was quite extensive, so I offer a summary of the programme.

Every third Friday of each month at 2200 to 2400GMT on the 80m (3550 to 3565MHz is suggested) any radio amateur is invited to participate using no more than 1W RF output on CW. They are invited to call "CQ TEST QRPP" and exchange RST + QSO number and power in milliwatts. Only two-way QRPP QSOs count for points. There are multiplier points for every prefix worked, including your own, using the same rules as WPX awards.

No detailed logs are required. Participants should send a report which must contain the name of the contest and date, the callsign and address of the participant, the sum of the points, the sum of the multipliers, the total score, the PA active element, power and brief description of the equipment used. A signed declaration is requested that the rules and spirit of the contest have been observed. The entries should be sent to Jiri Dostalik, OK2PJD, Komenskeho 518, 793 05 Moravsky Beroun, Czech Republic. The full text of the rules can be obtained from me by sending an SASE marked 'OK Activity Day'.

YOUR QRP OPERATING COMPANION

IN THE LAST FEW YEARS the ARRL has published a surprising number of books on QRP. Their latest is an introduction to QRP practice for the beginner and general radio amateur. *Your QRP Operating Companion*, Brad Wells, KR7L, ARRL 1992, ISBN: 0-87259-376-2 has just appeared in the USA and hopefully will be available shortly in the UK.

With the rallying call, "Join the QRP adventure", the book is wide ranging with chapters on Why Run Less Than The Legal Limit?, What Do I Need, Operating Techniques, Maximize Your Signal and A Propagation Primer. The appendix gives information on QRP Clubs, Nets and Contests. Written in an attractive informal style, with lots of cartoons and illustrations, the book would suit the young novice or the more mature radio amateur. The author suggests the book can reduce the learning curve for those who wish to know more about QRP operation.

The book opens with an apologia for low power operation on the HF bands. "Victory goes not to the strongest, but to the smartest". The main points are how QRP offers a real sense of achievement, is capable of excellent results and overcomes problems of TV and other interference. Some mention is given of the challenges and benefits of the construction of equipment, but KR7L is fundamentally a QRP DX operator; he claims to be a member of the group of QRPers who "see themselves as guerrilla operators".

The section on equipment contains useful information on existing commercial gear and possibilities of reducing the power of normal transceivers, though it says nothing of sources for building one's own equipment.

The book comes into its own on operating techniques for the low power station. The advice is sound and comes of experience. Operators using conventional power might learn from reading this chapter. The chapter called "A Propagation Primer" is excellent. I have rarely seem so much information offered in a useful and easy to digest form on this subject. Anyone who feels that their knowledge is thin will find useful information here. It is information that can save a lot of wasted time on the bands.

I like the book and hope that many would-be, or even experienced QRP operators take time to read it. The advice, although simple, is sound and well presented. It talks about the way the hobby should be, "Everytime you turn on the rig and get on the air, it should be a learning experience".

THE SEVENTH YEOVIL QRP CONVENTION

THE 7th ANNUAL QRP Convention organised by the Yeovil Amateur Radio Club will be on Sunday 9 May 1993 at the Preston Centre, Monks Dale, Yeovil. This popular event is being expanded this year to occupy more floor space. It will include lectures, a QRP station, trade stands of kits and components, a "chronological display of working vintage radio with technical commentary" and refreshments.

The lectures booked are: *Propagation for 10 Milliwatt DX* by G3MYM, *Transmitting Aerial Basics* by G3MCK, and *The Yeovil 80 and 20 metre Transceiver* by G3PCJ. The event will also include the Yeovil *Construction Challenge* a novel competition for constructors.

The rules of the 1993 Yeovil Construction Challenge are as follows: Build and bring a device, using passive only components, which will receive and measure the frequency of continuous wave signals radiated between 3.500 and 3.800MHz. The transmitter will have an input power of 1W and use a vertical aerial two feet long.

There will be two separate transmissions, each of five minutes duration, on different frequencies in the band. You will be asked to record your measurement of these frequencies on an entry form provided and submit it to the adjudicators. Entrants will be allowed to position their measuring device anywhere within a six foot radius, 270° wide arc centred on the transmitting aerial. The difference in frequency (higher or lower) from the actual frequency will be expressed as a percentage. The winner will be the entry with the lowest total percentage error for the two transmissions. A description and circuit of the device must be provided for the adjudicators. The transmitter frequency will be measured and monitored by an accurate frequency counter visible only to the adjudicators. No active measuring equipment will be allowed in the test area during the test period.

Further details of the challenge and the convention may be had from Peter Burridge, G3CQR, QTHR or Tel: 0935 813054.

A DOUBLE GOOD WAY TO START . . .

THE LITTLE TRANSCEIVER built by G4EHT reminded me of how many people have begun their QRP operating with a ONER transmitter and in some cases have built the ONER as their first construction project. It is an excellent little circuit for either.

The ONER was designed by George Burt, GM3OXX, and published by the G QRP Club as one of their 'Fun Rigs'. These are little transmitters which cost virtually nothing to make, can be built in an evening and should work first time to provide the owner with a satisfying construction and operating experience. The ONER has really taken off as the G QRP Club's most popular circuit for many years. It is built on a 1" square board, hence the name, but is not so tightly packed as to exclude a beginner as its constructor.

The board will work from 160 metres to 20 metres and requires a crystal and low pass filter to make a tiny transmitter. I used one for many years on 80 metres and it gave me about 3W of RF output. Later boards were added by Ian Keyser, G3ROO, to complete a full transceiver. Although I suspect many ONER builders have just used the transmitter alongside a receiver, or existing transceiver. There are a lot of ONER builders about: well over 1,000 kits have been sold!

The photograph shows a very attractive example of a ONER transmitter built by DJ4SB in a case 47x47x38mm giving him 1.2W of RF output on 40 metres. It is an interesting thought that this little box, with a receiver, can constitute a complete amateur radio station. The ONER transmitter and the OXO transmitter are both available in kit form from Kanga Products, Seaview House, Crete Road East, Folkestone; telephone 0303 276171.

DJ4SB built this ONER transmitter which gives 1.2W on the 40metre band.

KENWOOD APPROVED DEALERS

AXMINSTER
Reg Ward & Co, 1 Western Parade, West Street, Axminster, Devon. Tel: 0297 34918

BELFAST
GM Electronics, 1-3 Evelyn Avenue, Belfast, Northern Ireland. Tel: 0232 471295

BIRMINGHAM
South Midlands Communications, 504 Alum Rock Road, Alum Rock, Birmingham. Tel: 021 327 1497

BIRMINGHAM
Ward Electronics, 422 Bromford Lane, Ward End, Birmingham. Tel: 021 328 6070

BOURNEMOUTH
Lowe Electronics, 27 Gillam Road, Northbourne, Bournemouth. Tel: 0202 577760

BRISTOL
Lowe Electronics, 79 Gloucester Road, Patchway, Bristol. Tel: 0272 771770

BRISTOL
AMDAT, 4 Northville Road, Northville Bristol. Tel: 0272 699352

CAMBRIDGE
Lowe Electronics, 162 High Street, Chesterton, Cambridge. Tel: 0223 311230

CARDIFF
PMR Ltd, Industrial Estate, Gwaelod-y-Garth, Cardiff. Tel: 0222 810999

CLACTON ON SEA
Coastal Communications, 19 Cambridge Road, Clacton on Sea, Essex. Tel: 0255 474292

CORK
Intronic Ltd, Windsor Hall, Glounthaune, Cork, Eire. Tel: 010 353 2135 4422

COUNTY TYRONE
Tyrone Amateur Electronics, 44 High Street, Omagh, Co Tyrone, Northern Ireland. Tel: 0662 242043

CUMBERNAULD
Lowe Electronics, Cumbernauld Airport Cumbernauld. Tel: 0236 721004

DONCASTER
Alan Hooker, 42 Nether Hall Road, Doncaster, South Yorkshire. Tel: 0302 325690

EALING
Martin Lynch, 286 Northfield Avenue Ealing, London. Tel: 081 566 1120

EASTCOTE
Lowe Electronics, 223 Field End Road, Eastcote, Middx. Tel: 081 429 3256

EDGWARE
Haydon Communications, 132 High Street, Edgware, Middx. Tel: 081 951 5782

FIFE
Jaycee Electronics, 20 Woodside Way, Glenrothes, Fife. Tel: 0592 756962

HANGER LANE
A R E, 6 Royal Parade, Hanger Lane, London. Tel: 081 997 4476

HAYWARDS HEATH
Bredhurst Electronics, High Street, Handcross, Haywards Heath, West Sussex. Tel: 0444 400786

HOCKLEY
Waters & Stanton Electronics, Spa House, 22 Main Road, Hockley, Essex Tel: 0702 206835

LEEDS
South Midlands Communications, Nowell Lane Ind Est, Nowell Lane, Leeds. Tel: 0532 350606

LEEDS
Lowe Electronics, 34 New Briggate, Leeds. Tel: 0532 452657

MAIDSTONE
Lowe Electronics, Chatham Road, Sandling, Maidstone. Tel: 0622 692773

MATLOCK
Lowe Electronics, Chesterfield Road, Matlock, Derbyshire. Tel: 0629 580800

NEWCASTLE
Lowe Electronics, Newcastle Airport, Woolsington, Newcastle. Tel: 0661 860418

NEWPORT PAGNELL
Photo Acoustics Ltd, 58 High Street, Newport Pagnell, Bucks. Tel: 0908 610625

NEWTON LE WILLOWS
Amateur Radio Comms Ltd, 38 Bridge Street, Earlestown, Newton Le Willows Merseyside. Tel: 0925 229881

NORFOLK
Eastern Communications, Cavendish House, Happisburgh, Norfolk. Tel: 0692 650077

NORTH HUMBERSIDE
Peter Rodmell Communications, Field Head House, Leconfield, North Humberside. Tel: 0964 550921

NOTTINGHAM
R A S Nottingham, 3 Farndon Green, Wollaton Park, Nottingham. Tel: 0602 280267

PORTSMOUTH
Nevada, 189 London Road, Portsmouth Hants. Tel: 0705 662145

SLOUGH
Lowe Electronics, London Heathrow, 6 Cherwell Close, Langley, Slough, Berks. Tel: 0753 545255

STOURBRIDGE
Dewsbury Electronics, 176 Lower High Street, Stourbridge, West Midlands. Tel: 0384 390063

KENWOOD

HOME AUDIO, CAR AUDIO, COMMUNICATIONS EQUIPMENT, TEST AND MEASURING INSTRUMENTS, TELECOMMUNICATIONS

EMC

MEGAN SMITH, G0MEG
EMC Committee Secretary

WELCOME TO THE NEW YEAR, I hope that you all had a happy Christmas, and that someone gave you radio 'goodies' as presents, perhaps even a copy of *The Radio Amateur's Guide to EMC*!

I have some fairly serious stuff this month, following the publication of the new EMC Regulations: my thanks go to EMC Committee Members Dave Lauder, G0SNO, and Red Robins, G3GVM, for preparing the comments below. In a lighter vein, the EMC Committee Members treated Robin Page-Jones, G3JWI, to a small celebration at the December meeting to mark the launch of the EMC book.

NEW UK EMC REGULATIONS TO REDUCE QRM AND TVI?

THE NEW UK REGULATIONS on EMC have some important consequences for suppliers and users of amateur radio equipment and electronic kits. On 28 October 1992, *The Electromagnetic Compatibility Regulations* were published as a Statutory Instrument SI 1992 No 2372 (available from HMSO). These regulations are the UK's response to European EMC Directives 89/336/EEC and 92/31/EEC. Before the final regulations were published, the DTI published a Green Book of Draft Regulations in July 1992 and comments were invited by 4 September 1992.

As mentioned in the December *EMC* column, the RSGB EMC Committee submitted their comments to the DTI proposing changes to two of the draft regulations. Before explaining what changes we asked for, I shall explain how the new regulations may affect radio amateurs.

After 31 December 1995 nearly all electronic equipment sold in the UK will have to comply with the European EMC directive and will have to carry a 'CE' mark to show that it meets the requirements of all applicable European directives. The transitional arrangements in UK EMC Regulation 11 mean that until 31 December 1995, electronic equipment which is sold in the UK can either be 'CE' marked, in which case it can also be sold in any other European Community country or, if not 'CE' marked, it can be sold in the UK if it meets any applicable UK EMC regulations.

It is likely that some 'CE' marked electronic equipment will appear on the market soon (childrens' toys are already 'CE' marked to show that they comply with a European directive on toy safety). 'CE' marked equipment such as computers will have to meet the BS6527/EN 55022 standard for emissions of interference whereas at present computers sold in the UK do not have to meet this standard.

Although meeting the standard should be an improvement, the standard still allows somewhat higher levels of interference emission than radio amateurs and SWLs would like! For an explanation of how the permitted levels of radiated interference could affect amateur reception, see *RadCom* August 1992 EMC Column p58. Electronic equipment sold in the UK after 31 December 1995 will have to meet various EMC standards including immunity to RF fields and other disturbances such as mains-borne interference. This will not only apply to TVs, video recorders and hi-fi systems, but also to all sorts of other electronic gadgets such as alarm systems, telephones and electronic central heating thermostats, all of which have been known to malfunction in the presence of amateur radio transmissions!

Again, this is most welcome as at present no domestic equipment has to meet any immunity standards in the UK. The new immunity standards are not as high as radio amateurs would like and an important issue is, what happens when equipment is 'CE' marked and meets the immunity standards but is still affected by amateur transmissions? This is why the RSGB EMC Committee proposed a change to draft regulation 5.(3) to mention specifically the use of 'special mitigation measures' (for example fitting filters) to improve the immunity of 'CE' marked equipment or to further reduce emissions of interference from such equipment.

Although this proposed change was not included in the final UK EMC regulations, a similar change regarding measures to improve immunity of 'CE' marked equipment proposed by the EMC Committee was included recently in the Amateur Radio Licence Terms and Conditions booklets BR68 and BR68a/N (See 'EMC and your Licence', *RadCom* January 93 page 8).

AMATEUR RADIO KITS AND EMC REGULATIONS

The other change proposed by the EMC Committee related to kits. Draft Regulation 10 stated, "10. These regulations apply to the supply of kits and to the taking into service of relevant apparatus made from kits".

We proposed that draft regulation 10 should be changed to read as follows, "10.(1) These regulations apply to the supply of kits except in the case of kits of relevant apparatus designed and intended by the manufacturer, (a) for the use exclusively by radio amateurs for the purpose of self-training in wireless telegraphy, or (b) for the use by any person exclusively for receiving signals transmitted by radio amateurs. (2) These regulations apply to the taking into service of all relevant apparatus made from kits."

In the final regulations, Regulation 3, 'Interpretation' defines kits and also 'systems' and says that systems include kits. Regulation 8 refers to certain types of 'educational apparatus' for studying 'electromagnetic phenomena' in educational establishments, but no special provisions are made for amateur radio kits.

After 31 December 1995, electronic kits sold in the UK will therefore have to be 'CE' marked to show that when correctly assembled, the equipment made from such a kit meets the relevant EMC standards for emissions and immunity. The manufacturer or importer of a kit will have a choice of routes to compliance. One route is to meet the relevant product standard but this would only apply to kits such as hi-fi tuners or amplifiers where a product standard exists. For the majority of amateur radio kits, apart from transmitters (see below), the manufacturer or importer will need to produce a Technical Construction File and submit it for certification to an EMC test lab designated as a *Competent Body* by the DTI.

We anticipate that for simple kits, if the manufacturer has done his homework the cost of approval need not be excessive but will inevitably be reflected in the cost of kits. Some kits which are only sold in small quantities may no longer be commercially viable. If it can be demonstrated that the equipment is electromagnetically benign, that is, it is neither liable to cause electromagnetic disturbances nor have its performance affected by electromagnetic disturbance, then it is excluded from the regulations. Straight Morse keys would probably fall into this category!

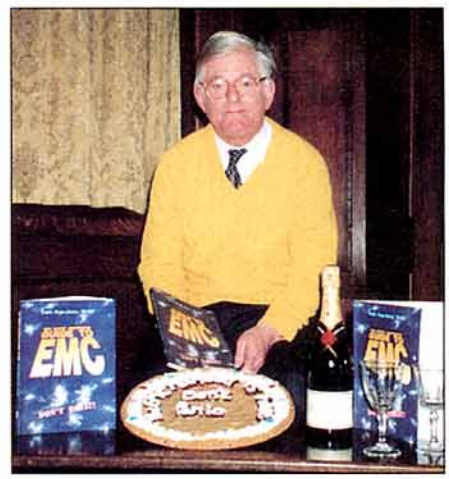
Fortunately, homebrew amateur radio equipment, including transmitters, is exempt from the need to be tested and 'CE' marked if it is not available commercially .

EMC REGULATIONS AND AMATEUR RADIO TRANSCEIVERS

After 31 December 1995, all commercially available radio transmitters and transceivers, including kits, which are sold as new in the UK and elsewhere in the European Community, will have to be 'type approved' whether they are for amateur use or for other use such as PMR (Private Mobile radio).

'Type approval' involves certification by a Notified Body such as the Radiocommunications Agency. UK Statutory Instrument SI 1992 No.2373 sets out regulations which apply to Notified Bodies and quotes charges for approval at £55 per hour with a minimum of £200 and a maximum of £8,500! This comes to £440 per 8-hour day, which is about half the rate currently charged by most professional EMC test laboratories, particularly if a shielded room is used. We understand that for a fairly simple transceiver, type approval might involve 2-3 days work by a Notified Body actually testing it. A sophisticated transceiver could take much longer to test.

PHOTOGRAPH: G4JKS



Robin Page-Jones, G3JWI, author of the Radio Amateur's Guide to EMC, at the EMC Committee's celebration of the book's publication.

If testing had already been done by the manufacturer to the satisfaction of the Notified Body, it would not be necessary for the Notified Body to repeat the tests, but only to examine the Technical Construction File. Like other 'CE' marked products, once approved in one member state, they can then be sold freely throughout the European Community. The standards which will be applied to amateur transmitters are expected to be less strict than those for other radio transmitters such as PMR. Major manufacturers will probably offer type approved European models of transceivers which sell in reasonable quantities but it is possible that some equipment might cease to be available in Europe if it only sells in very small quantities and the cost of type approval is not worthwhile.

WHAT ABOUT SECOND-HAND EQUIPMENT?

Regulation 16 excludes most second-hand equipment from the EMC regulations if it has not been reconditioned or significantly modified.

Equipment which is sold as new before 31 December 1995 and consequently does not need to be 'CE' marked, can still be resold freely as second-hand equipment after that date. After 31 December 1995, we expect that personal imports of non 'CE' marked second-hand equipment from outside the European Community will still be allowed. For example, private individuals who travel to the USA, should still be permitted personally to import most types of non 'CE' marked radio or electronic equipment into the UK, provided it has been bought and used in the USA which makes it second-hand. Restrictions on personal import of certain restricted radio items such as non-approved CB equipment are expected to continue.

Another type of second-hand equipment of interest to radio amateurs is ex-PMR transceivers which can be converted to operate on amateur bands. Such conversion would probably be considered as a 'modification which substantially alters the function or electromagnetic compatibility characteristics of the apparatus' (Regulation 3.(2)) so that if converted by way of trade, they would no longer come within the exclusion for second-hand goods. This should mean that there would be no restriction on traders selling unmodified second hand ex-PMR transceivers but, if they were sold by a trader who had already converted them for amateur use, such converted radios would probably need new type approval.

The new EMC regulations do not appear to place any new restrictions on radio amateurs modifying ex-PMR transceivers for their own use or selling such modified equipment privately.

WHAT DO SMALL ELECTRONICS FIRMS THINK?

The electronics trade newspaper *Electronics Weekly* published a short article on 2 December 1992 indicating that there was concern among small businesses and freelance electronic designers. The paper has started a campaign to see if any changes in the Regulations can be made for small businesses. However, it may well be too late to change anything.

ONE MAN'S INTERFERENCE

GEOFF ELLIS, G3LFZ, has written to me with a very interesting detective story. Geoff was seeking the cause of QRM which had a characteristic form of a 50Hz square wave with amplitude modulation from 1MHz to 10MHz, peaking at 2MHz but detectable between 200kHz and 30MHz on a Sony portable receiver. The times the QRM occurred ruled out time-switches and central heating, but it was obviously mains borne as it appeared to be radiating from every street lamp within three hundred yards.

The problem seemed most consistent at 0715, so Geoff went out on the prowl in the early morning with only the occasional curious postman, milkman or newspaper boy for company. He noticed the net curtains twitching as he walked round the estate with his receiver. As he walked up the path of a house which appeared to hold the source of the QRM, searching the ground for a mains feed, he suddenly realised from the sound of a door latch above his head he was not alone!

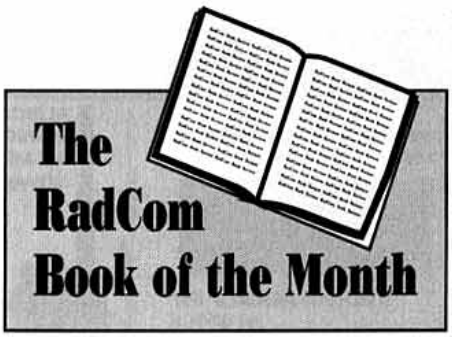
He writes, "As the door opened I found my attention drawn to a pair of slippered feet appearing from beneath a housecoat. My initial conception was of a figure with all the charm and charisma of Norah Batty brandishing an empty milk bottle in one hand. Seconds turned into weeks as I attempted to justify my presence and purpose". Of course as soon as he tried to demonstrate the problem, it disappeared; the time was now 0750hrs. Geoff wrote a letter to the owner of the house explaining the problem, and they duly agreed to run a series of tests where they switched on different appliances, while Geoff checked his receiver. Unfortunately all proved negative and the QRM continued for many months.

Meanwhile, a QRM cancelling device was tried successfully on receive but appeared to be susceptible to RF on transmit. Another line of attack was planned, the amateur arranged to telephone the house owner when the QRM occurred and ask him to switch off his main switch. This was tried a couple of times but each time the QRM stopped after the phone was answered but before the switch could be thrown. Geoff went on the prowl with the receiver again, trying to locate the source more accurately by walking all round the outside of the property, and unexpectedly confronted "she of the slippers".

Fortunately the QRM was strong enough to demonstrate very clearly this time. He was able to ask her to throw the main switch and to show that the QRM stopped and started at the same time the switch was thrown. The neighbour was adamant that nothing in the house was on, not even the music centre or heating. On Geoff's way out he heard a click from upstairs, and at that moment the QRM stopped. "What was that?" he asked. "Only my daughter in the bathroom" was the reply.

It appeared that part of a bathroom modernisation had meant replacing the original lights with four recessed ceiling fittings run from a single transformer in the centre of the room, which was radiating RF. The owner arranged for it to be overhauled by his electrician who enclosed the transformer in a lead-lined box, but with no noticeable effect on the emissions. Geoff took details of the equipment and contacted EMC Chairman Bob Peace who was able to contact the manufacturer, Intram Barwell Ltd. The item was a 105VA Electronic Convertor made by Intram Barwell and supplied to Reggiani Ltd and was designed to comply with BS800:1988 and EN55014:1987, but was clearly faulty. Intram Barwell replaced the unit free of charge within a matter of days to the satisfaction of all involved.

A successful outcome to a long investigation. Sherlock Holmes would have been proud of you Geoff! Many thanks for writing in.



The Latest from the RSGB

THE RADIO AMATEUR'S GUIDE TO EMC

By Robin Page-Jones, G3JWI

117 pages (244 x 183mm) soft covers. Published by RSGB at £6.50 (£5.65 to members) plus P&P.

ELECTROMAGNETIC COMPATIBILITY (EMC) is becoming increasingly important with the new EC regulations and the ever-increasing complexity of many household items. The theme of this down to earth book is "Don't Panic!", a useful phrase cribbed from Douglas Adams' *The Hitch-Hiker's Guide to the Galaxy*, and it aims to discuss the underlying causes of electromagnetic incompatibility so that radio amateurs can train themselves to deal calmly and effectively with present and future EMC problems.

The nine chapters are entitled: Introduction, Radiation - wanted and unwanted, Good radio housekeeping, The EMC detective, Breakthrough, Transmitter problems, Interference to reception, The social side and Some specific EMC problems. Appendices cover: Protective multiple earthing, Simple spectrum analyser, Characteristics of various filters and ferrites for amateur radio use, Investigating interference and Useful data. The book concludes with a glossary of technical terms and abbreviations, and an index.

Each chapter is copiously illustrated and a boxed Summary appears at the end of appropriate sections providing an instant way to look up important information. Flow charts, performance graphs for filters (including filters available from RSGB Sales) and tables add to the book's usefulness as a troubleshooting guide when panic sets in. For those with no crisis to solve (yet!) the *Guide* is a good read, having been written in a humorous and accessible style.

The Radio Amateur's Guide to EMC is an essential shack accessory. It will help amateurs world-wide to avoid the ominous knock on the door, and is vital to have available if that knock comes. Don't Panic!

HF Contests: To Compute or Not to Compute

THE FOLLOWING piece from Chris Burbanks, G3SJJ, was cut from his NFD Report in 1991(!) owing to a lack of space. It still makes interesting reading and we make no apology for dusting it off for publication now.

Whether we like it or not, logging by computer, either realtime or post-event, has become part of contesting. Advantages are many and quite profound. In a recent issue of *Focus*, the journal of the First Class CW Operators Club, N6RA describes contesting from 5W1RA during the 1990 CQWW event, "If I did not have time to keyboard the callsign of the station I was answering, I would manually send the call, (on an MM3 Keyer in parallel with the computer), and then keyboard the callsign while the computer was sending my exchange. This worked so well that I was able to eat breakfast with one hand while running a rate of 150+ at the same time!"

Field Day doesn't require such extreme lengths, but certainly realtime logging can improve the efficiency of the station particularly where dupe checking and band changing are concerned. Paper logging requires six separate dupe sheets to be maintained during the event plus logs which need to be either pre-numbered or collated by frequency. Band changing gets more complex and more paper-heavy as the contest progresses. Computer logging can eliminate this and efficiency is further increased by instant rate per hour information and rapid band changing. At G3ULT/P, full advantage was taken of the latest technology with the computer controlling both transceiver band change and antenna switching.

After the contest, the log file can be exported into a word processor for examination and correction if required before final printing of log sheets and duplicate check lists. Post-contest logging is an alternative and consists of entering the details from the paper log into the computer in the relative quietness of home. Production of scored log and dupe sheets is same as previously mentioned.

This all sounds most exciting you may (or may not) say, but what about the disadvantages? Well, these are also many and profound. Unmarked duplicates were more prominent this year, with several groups being close to disqualification, the HFCC will not be so generous in future years. The major difficulty appeared to be in computerised logs where an operator had changed band on the radio equipment but not on the computer.

Another weak area is where Zero has been keyed in instead of O, as in G00DS/P instead of G0ODS/P. In fairness to John, G3WGV, I should add that his software is designed to detect this problem. At G3TBK/P, we used paper logging with post-contest computer entry carried out on G3WGV LOG by myself, during clean-up on Smartware II word processor an unmarked dupe crept in. Not so smart!

My grateful thanks to those who commented on this subject. Perhaps the extremes were typified by the Edgware club, G3ASR/P, who prefer the traditional methods of scrawling in logs and trying to decipher dupe sheets at 5am. "We feel strongly that the way we go about NFD is truly in line with the self training aspect of our licence. One benefit is that we have a very high turn-out of members, including those who have no operating interest at all. At the other end of the scale was Aberdeen ARS, GM3BSQ/P, using G3WGV LOG realtime, "It went like a dream." Space does not allow me to quote too much from their very lucid two page letter but the following is typical: "The TS930S was keyed by a new CMOS Super Keyer (KC0Q/N0II design) using a Vibroplex magnetic paddle and in parallel with the Morse output from the Commodore PC10-III computer with 32MB hard drive and high resolution VDU. Each contact was printed as we went along on a Star LC24-10 printer in 'Orator' font with slashed zeros and at 4 lines per inch to make it easy to read." The moral is perhaps to tread warily, with trial runs and training sessions before the event. Several groups including G3GRS/P used paper logging by the main operator with the information being keyed into a laptop by a helper. At least this method involves other members of the group. We cannot stop the march of progress; my only regret is that it helps the 'robot' style operators who are unable to think on their feet and exchange a quick "Hi, Chris," making the contest less personalised and more machine-fed.

GB2RS on 50 and 430MHz

THE RSGB's weekly news bulletin service can be heard mainly on 3.5MHz SSB and 144MHz SSB and FM. It is, however, also available on 7MHz CW, 50 and 430MHz FM, and can even be seen on 1.3GHz ATV.

The news service is available in some parts of the country on 70cm repeaters. The latest is GB3PY in the Cambridge area which transmits on channel RB8, 433.200MHz. The following is abridged from a report from Cambridge newsreader Chris Goadby, G8HVV:

"The experiment agreed between the DTI/RA and the RSGB allows an established newsreader to read GB2RS at a time to suit the local users through the local 70cm repeater. Specially designed control procedures ensure that the normal time-out system is defeated during the broadcast.

"The control unit for the repeater was constructed and inserted into the audio path. Initial aims were to enable many complex control functions but it was soon apparent that a simple system to do little but delay the timeout would do for the start of the experiment; other sophistications could be added later if required.

"The Cambridge Repeater Group Technical Manager, G4BIK, fitted the on-site unit to the repeater and first ran a series of tests to establish that it had no effect on the normal use of the GB3PY. Next, work was carried out to ensure that the unit would still work when the newly announced CTCSS system was in place.

"A small unit was finalised that simply plugs into the external control socket on the rear of the newsreader's commercial 70cm transceiver. While the news is being read this generates a separate discrete control signal which is simply switched in for the GB2RS broadcasts by the newsreader.

"Once the parameters for the control system had been tested the unit was trialled during early April 1992. Satisfactory results were achieved and the first GB2RS via a 70cm repeater went out on 25 April. Since then the RSGB news bulletin has been read through GB3PY almost every weekend.

"As part of the experiment it was agreed to vary the time of broadcast. To date this has been limited to using either Friday or Saturday night, but always at 1830GMT. Further experiments are projected to ensure the most satisfactory service for the listeners.

"Reports from listeners have been very complimentary. Comments included: 'Nice to have the news earlier than Sunday'; 'Good idea to use 70cm, especially through a repeater'; 'No-one told me GB2RS was now on 70cm and at this new time, but what a good idea'; and 'Is this experiment being tried elsewhere?'

"There has been no adverse reaction at all, and on the single occasion when users were asked if they minded clearing the frequency in some five minutes for the news, their reaction was surprise and delight that they could listen to GB2RS.

"The average audience to date, with no publicity at all, is estimated at twenty per broadcast, but one occasion it rose to over 50. Listeners from as far afield as Corby in Northants have called in.

"The weekly service is provided by the newsreader but little would have been possible without the active assistance of members of the Cambridgeshire Repeater Group, especially their Technical Manager, G4BIK, and the encouragement of the RSGB Repeater Management Group Chairman G4AFJ."

CONTEST CLASSIFIED

All rules should be read in conjunction with the General Rules published in *Contest News* January 1993

HF RULES

NATIONAL FIELD DAY 1993

This is a portable contest for RSGB members operating in groups or as individuals. This year's event is the Golden Jubilee and a special certificate will be awarded to each group submitting an entry.

The rules are unchanged from those appearing in the February 1992 edition of Radio Communication with the exception of the date, which will be 1500 GMT Saturday 5 June 1993 to 1500 GMT Sunday 6 June 1993. A QRP section will again be available.

Groups intending to participate must send details of the site to be used to Chris Burbanks, G3SJJ, 16 Cotgrave Road, Plumtree, Nottingham NG12 5NX to arrive no later than 1st May 1993. An indication of whether Summary, Band Cover, Log sheets or a full set of rules are required would help to reduce mailing costs.

ROPOCO CONTESTS 1993

1. The General Rules for RSGB HF Contests (January 1993 *RadCom*) apply to these events.

2. Dates & Times.

ROPOCO-1: 0700 - 0900GMT, Sunday 4 April 1993.

ROPOCO-2: 0700 - 0900GMT, Sunday 1 August 1993.

3. Band & Mode. 3520kHz-3570kHz, CW only.

4. Exchange. RST only, do **NOT** send Serial Number. **Other Data:** For the first QSO, the entrant's own postcode. For each subsequent QSO, the postcode received from the previous contact.

5. Scoring. Ten points per QSO. Contacts with stations outside UK will not score.

6. Address and Closing Date for logs as per General Rules.

7. Awards. Certificates to the leading three entrants in both contests. Trophies to the highest-scoring entrant with a perfect (or the most accurate) log; in ROPOCO1 the Verulam Silver Jubilee Trophy, in ROPOCO2 the G3XTJ Memorial Trophy. The G5MY Trophy to the entrant with the highest aggregate score from both events.

LOW POWER CONTEST 1993

1. The General Rules for RSGB HF contests (*RadCom* Jan 93) apply.

2. Date and Time. 0700-1100GMT, Sunday 18 April, 1993.

3. Frequencies, mode and power. 3.510-3.560MHz and 7.010-7.040MHz, CW only. Max power: 5W RF output.

4. Exchange. RST + serial number (commencing at 001) + output power eg:- 559001 3W

5. Scoring. Each QSO with a QRP station: 15 pts; All other QSOs: 5 pts. The same station may be worked for points on both bands.

6. Equipment. The transmitter or final power amplifier stage shall not be capable of RF output power in excess of 15 Watts. A description of any method of power reduction to comply with the contest rules and details of the equipment used to measure power MUST accompany each entry.

7. Awards. The 1930 Committee Cup to the winner. Certificates of merit to the second- and third-placed stations and to the highest-placed entrant using completely 'home-brew' equipment. A further certificate to the highest-placed entrant using 1 Watt (or less) RF output power.

HF CONTESTS CALENDAR - 1992/3.

5 Feb	LF Cums 1.8MHz (Dec 92)
7 Feb	LF Cums 3.5MHz (Dec 92)
13/14 Feb	1st 1.8MHz CW (Jan 93)
13/14 Feb	*PACC*
20/21 Feb	*ARRL CW*
26/28 Feb	*CQ WW 160m (SSB)*
27/28 Feb	7MHz DX
27/28 Feb	*REF SSB*
27/28 Feb	*UBA CW*
6/7 Mar	*ARRL SSB*
13/14 Mar	Commonwealth
20/21 Mar	*Bermuda*
20/22 Mar	BARTG Spring RTTY (rules de G3UFY/G4SKA)
27/28 Mar	*CQ WPX SSB*
3/4 Apr	*SP-DX SSB*
4 Apr	ROPOCO-1 (Feb 93)
18 Apr	Low Power (Feb 93)
24/25 Apr	*Helvetia (Mixed Mode)*

HF RESULTS

LOW POWER FIELD DAY 1992

Activity was high for this event, with 76 stations participating on 3.5MHz and 166 on 7MHz. The band leaders managed to work over half of these.

The fight for the lead in the 3W section (and overall!) was extremely close. G3KAF, operating G6UQ/P, and G3JKS/P each used a TS120V and inverted-vees, while G4ARI/P used a Sugiyama F850 and half-wave dipoles. In the 10W section, G4PZQ and G3XYC (G4FOX/P) used a TS120V and a 240ft dipole. G3HEJ operated the fixed station handing out the greatest number of points.

Special mention is due to G3RIR/P (G3RIR & G4EOF) who would have been the 10W winners with 493/925 points, had they been able to use their outboard PA - as it was they kept to the power limit but could not meet the dissipation requirements and so submitted a check log. Also deserving of a mention are G4OGB and GW3SB, whose logs were error-free.

Check logs were much appreciated from G2HLU, G3CQR, G3GMS, G3HEJ+, G3RIR/P and G4CZB. They proved to be of great assistance.

G3PDL/G3RXP

SECTION A - 10W

Posn		Call	3.5	7	Total
1	*	G4FOX/P	484	679	1163
2	+	G4RCC/P	392	479	870

SECTION B - 3W

1	#	G6UQ/P	599	760	1359
2	+	G3JKS/P	484	865	1349
3	+	G4ARI/P	600	747	1347
4		G0OGN/P	358	867	1225
5		G6KQ/P	290	903	1193
6		G4OGB/P	335	750	1085
7		G4AHG/P	319	632	951
8		G4XUV/P	452	460	912
9		G4EKT/P	355	540	895
10		G3BPM/P	70	714	784
11		G0HIN/P	297	415	712
12		G3YRC/P	251	374	625
13		GW3SB/P	230	335	565
14		G3EAO/P	270	220	490
15		G3IIU/P	299	185	484
16		G0KZO/P	159	286	445
17		G2FKO/P	85	338	423
18		G3OSJ/P	139	268	407
19		G0LTO/P	-	372	372
20		G0JIT/P	214	-	214

ROPOCO 2 1992

The ROPOCO contests, although demanding, are still extremely popular amongst entrants (if not adjudicators!!) with another good turn out for the second leg.

Conditions were reported as being favourable on 3.5MHz, but there was strong evidence that Murphy visited a few shacks during the period. G4BUO says, "A contest of disasters . . .". Dave goes on to say how he got up late, a capacitor in his amplifier burned out, his computer log locked up and so on (there's hope for the rest of us yet!). G0IDE had other problems; "Slow going and rough copy at times. Next door's washing machine was going from the crack of dawn."

Checking this contest is a nightmare. The adjudicator must not only do all the usual checks for dupes and wrong calls, but also has to analyse every digit of every postcode sent and received, which often means deciphering some pretty dodgy handwriting. All this - and cross checking as usual. I averaged about half an hour per log!

One station asked if points are deducted for sending a corrupted postcode. The answer is "No, unless you are the one corrupting it." One station high in the table on several occasions sent on what he received in his previous QSO but corrected HIS log to what he knew the proper postcode to be. He lost the points.

Now for the formal stuff. Well done to Lionel, G5LP, who won by a clear lead over Fred, G4BWP. Congratulations to both. Lionel wins the G5MY trophy for the highest aggregate score in both ROPOCOs and Fred collects the G3XTJ Memorial trophy for the highest-scoring perfect log, quite a feat in ROPOCO.

For an inter-G contest the dipole proved the more successful antenna while the big elaborate efforts, normally associated with DXing or CQWW did not fare as well.

Many thanks to all of you who entered for helping to make both the ROPOCOs a great success. It was especially nice to see a sprinkling of more newly-licensed operators taking the bull by the horns and having a go . . . . very well done, keep it up! *G0HSD*

Posn		CALLSIGN	OSOs	SCORE
1	+	G5LP	72	687
2	+	G4BWP	64	640
3	*	G4BJM	62	611
4		G3HEJ	61	610
5		G4BUO	61	607
6		G3KAF	60	599
7		G3TBK	61	592
8		G4OGB	58	562
9		G4ZFE	56	560
10		G0IVZ	58	554
11		G3KHZ	58	550
12		G3RSD	55	544
13		G4ARI	54	534
14		G3JJZ	53	530
15		G0JQI	54	524
	=	G3JJG	53	524
17		G0LZL	51	510
	=	G3YAJ	51	510
	=	G3IZD	51	510
20		G4CZB	50	500
	=	G3GLL	50	500
22		G3KNU	51	497
	=	G3HJF	50	497
24		G3KKJ	50	484
25		G3JYP	48	480
26		G0IDE	47	470
27		G4XPE	47	460
28		G2HLU	46	457
29		G0JQN	45	450
	=	GM4SID	45	450
31		G3LIK	44	440
	=	G4BLI	44	440
33		GM3UM	44	437
34		G0IBN	45	434
35		G5MY	43	430
36	@	G4FNL	56	427
37		GW3SB	42	414
38		G3JSR	40	400
	=	G0OGN	40	400
40		G3MA	42	398
41		G3GMS	39	390
42		G3MCK	36	360
43		GM4WKN	34	340
44		G4PTE	34	330
	=	G3SQX	33	330
46		G3NKS	28	280

Thanks go to G3XNG for the Checklog

\+ Trophy Winner
* Certificate Winner
@ Unmarked Dupe(s) found

VHF RULES

144/432 MHZ

Date: Mar 6/7

Time: 1400-1400GMT

General Rules apply.

Sections: S Single operator portable, F Single operator fixed, M Multi operator, (fixed or portable), L Listeners. FL Single operator fixed (25W pep output at TX), SL Single operator portable (25w pep out at TX).

Serial numbers start at 001 on each band.

Single band entries will be accepted as long as the 4422 cover sheet is marked 0 points on the band not used.

Adjudicator: GW8GSQ, S Thompson, 8 Nantlais, Corntown, Bridgend, Mid Glamorgan CF35 5SA.

70 MHZ FIXED/ SWL

Date: 28 March

Time: 0900-1500GMT

General Rules apply & rule 24 (1993).

Sections: S Single Operator, M Multi operator, L Listeners

Adjudicator: G4PIQ, Andy Cook, Fishers Farm, Tendring, Clacton-on-Sea, Essex CO16 9AA

1ST 23CM & 13CM FIXED/SWL CONTESTS

Date: 11 April

Time: 1600-2200GMT

General Rules apply.

Scoring: 1 point per Kilometre.

Sections: For each contest, F Fixed Station single operator, M Multi operator fixed, L Listeners

There are two separate contests running concurrently. separate cover sheets and logs please, summary sheet NOT required.

Adjudicator: G4PIQ, Andy Cook, Fishers Farm, Tendring, Clacton-on-Sea, Essex CO16 9AA

432MHZ TO 24GHZ

Date: 1/2 May

Time: 1400-1400GMT

70CM TROPHY

Date: 2 May

Time: 1400-2200GMT

General Rules apply.

Sections: 24 hour, S Single op stations (same call each band), M Multi op, L Listeners, F Single Operator Fixed, P Single Operator Portable, O All Others

The 70cm Trophy will run for the first 8 hours, stations can enter both the trophy and the 24h event but please separate copy of 427 for each entry.

Scoring: Radial ring 432 and 1296, 1pt per kilometre all other bands.

Adjudicator: G4DHF, D Johnson, 65 West Street, Bourne, Lincs PE10 9PA

144 MHZ AND SWL, SINGLE/ALL OTHERS

Date: 15/16 May

Time: 1400-1400GMT

General Rules apply. Rule 14 applies. County & Country Mult. **Sections:** F Single Operator Fixed, S Single Operator Portable, O Others, L Listener

Subsection: Single Operator Fixed (SS) (operation for any continuous 6 hour period, (no breaks, continuous 6 hours) starting at any complete hour ie 1400-2000 or 0000-0600 not 0823-1423!). Only one such entry per station.

Entry to both the full 24 hour and 6 hour sections is not allowed, choose one or the other, NOT both.

Adjudicator: G4DEZ 110 South Avenue, Southend, Essex SS2 4HU.

70MHZ CW

Date: 7 June

Time: 0800-1100GMT

General Rules apply.

Full QTH and QRA required to be exchanged. Rule 24.(1993) **Scoring:** radial ring

Sections: S Single Operator Fixed, O All others, L Listeners

Adjudicator: G4DHF, D Johnson, 65 West Street, Bourne, Lincs Sea PE10 9PA

50MHZ TROPHY SINGLE/MULTI-OP

Date: 13 June

Time: 0900-1700GMT

Multi/Others: General rules apply, especially rule 16!, M Multi-op Fixed or Portable, S Single op Fixed or Portable, L Listeners.

Scoring: Max score 25 points per QSO. County and country multipliers as per rule 14 apply.

Award: The Telford Trophy will be awarded to the highest scoring entrant.

Adjudicator: G0FCT, I Pawson, 3 Orion, Bracknell, Berks RG12 4YX.

432MHZ FM FIXED AND OPEN

Date: 19 June

Time: 1800-2200GMT

General Rules apply.

Sections: F Single Operator Fixed, O All Others, L Listeners.

Adjudicator: G4XUM, M J Platt, 451 Newcastle Road, Shavington, Cheshire CW2 5JU

VHF FIELD DAY

Date: 3/4 July

Time: 1400-1400GMT

Rules will be published later.

144MHZ LOW POWER/SWL

Date: 24 July

Time: 1400-2200GMT

General Rules apply. Plus rule 14. County & Country Mult. 25W PEP output from TX

Sections: F Single operator fixed, S Single operator portable, O All others, L Listeners.

Adjudicator: G4XUM, M J Platt, 451 Newcastle Road, Shavington, Cheshire CW2 5JU.

432MHZ LOW POWER/SWL

Date: 25 July

Time: 0800-1400GMT

General Rules apply. Plus rule 14. County & Country Mult.

25W pep output from TX

Sections: F Single operator fixed, S Single operator portable, O All others, L Listeners.

Adjudicator: G4XUM, 451 Newcastle Road, Shavington, Cheshire CW2 5JU

432MHZ FIXED/ SWL

Date: 22 August

Time: 1600-2000GMT

General Rules apply plus rule 14. County & Country Mult.

Sections: S Single operator fixed, O Other fixed, L Listeners

Adjudicator: G4OUT, I Cornes, 6 Haywood Heights, Little Haywood, Stafford ST18 0UR

144MHZ TROPHY/ SWL

Date: 4/5 September

Time: 1400-1400GMT

General Rules apply

Sections: F Single operator fixed, S Single operator portable, O All others, L Listeners

Scoring: IARU contest. Please score 1pt per kilometre for IARU entry and also radial ring for RSGB. Entries scored by kilometres will be entered into IARU contest. Please duplicate cover sheet and logs if entering IARU.

Adjudicator: G8HHI, J Pilags, 43 Bartons Drive, Dungells Lane, Yateley, Camberley, Surrey GU17 7DW

144MHZ CW CUMULATIVES

Date: 31 August
15/30 Sept
15 Oct
1 Nov

Time: 2030-2300 Loc

General Rules apply.

Scoring: Please use 4422 summary sheet to show scores for each day, best three days will be totalled, please send all logs. Single 427 cover sheet for entry. Rule 10 applies.

Sections: F Single operator fixed or portable, L Listeners

Adjudicator: G4DHF, D Johnson, 65 West Street, Bourne, Lincs PE10 9PA

VHF CONTESTS CALENDAR

17 Feb	432MHz Fixed/AFS/SWL (Dec 92)
21 Feb	70MHz Cumulative (Dec 92)
28 Feb	70MHz Cumulative
6/7 Mar	144/432 MHz (Feb 93)
14 Mar	70MHz Cumulative
28 Mar	70MHz Fixed/SWL (Feb 93)
11 Apr	1st 23cm and 13cm Fixed/SWL (Feb 93)
1/2 May	432 to 24GHz

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 the 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 (1993).

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 sub-committee 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 RESULTS

432MHZ LOW POWER 1992

Activity was well up on previous years. Maybe the committee are getting things right at last, or maybe it was due to the fact that I was getting married that weekend and was unable to operate! Most people like the format and the 25W limit. Congratulations to all section winners and runners-up. Checklogs from Victory CG; G4SVD and G0CRW/P. *G4XUM*

ALL OTHERS SECTION

Pos	Callsign	Score	QSO	Mult	Loc	Best DX	km
1	GW4MGR/P	20418	75	48	83JA	G0JBA	320
2	G4VIX/P	19624	62	44	01IT	GI4TAJ/P	552
3	G4ERG/P	18354	58	38	93PX	GU3EJL	484
4	GW8AWM/P	17045	73	35	81KS	PE1MPI	488
5	G0GJV/P	14035	64	35	80ST	G0EHV	472
6	GW1VDF/P	11130	59	30	81KW	PE1MPI	500
7	G4SSD	10836	51	28	80FI	G4ERG/P	447
8	G0RTL	10642	45	34	92WU	EI1CR	403
9	GM0MGR/P	8786	31	23	74TQ	G0JBA	502
10	G6ARC/P	6510	46	31	92FM	PE1MPI	395
11	G6CTU/P	6496	50	29	91XG	G4ERG/P	304
12	G3GXI/P	4048	30	23	93AO	G7AZP	315
13	G4DDL/P	3496	50	23	91MP	GW4MGR/P	216
14	G0BRA/P	1395	63	34	92GB	PE1MPI	389

SINGLE OP PORTABLE SECTION

Pos	Callsign	Score	QSO	Mult	Best DX	Pol	
1	G1GHA/P	16852	77	44	92BN	PE1MPI	430
2	G3UAX/P	15211	81	41	91GI	GM0MGR/P	419
3	G8ZOB/P	13840	63	40	92ML	GM0FML/P	441
4	G8VOI/P	9792	66	32	90MX	GM0MGR/P	472
5	G3SFG/P	8580	66	30	91MA	GM0MGR/P	467
6	G8DDY/P	7714	52	29	90JO	G4HSG	346
7	GI4TAJ/P	960	8	12	74BU	G0JBA	

SINGLE OPERATOR FIXED SECTION

1	G4WKN	15036	65	42	92OG	GI4TAJ/P	442
2	G8HHI	8382	60	33	91OH	GM0MGR/P	446
3	G0JBA	7155	35	27	01II	GI4TAJ/P	586
4	G0JRB	7124	36	26	93QM	G4SSD	405
5	G1RDX	6780	57	30	91OO	GM0MGR/P	417
6	G7AZP	5778	38	27	90AS	G4ERG/P	366
7	G8JXV	1566	21	18	91VE	G4SSD	252
8	G5UM	784	14	14	92MP	GM0MGR/P	
9	G3KZE	636	14	12	92VD	G0GJV/P	214

432MHZ FM JUNE 1992

This contest was well supported, but unfortunately clashed with the PW QRP contest. Some nice distances were worked, and the entrants obviously enjoy the event which is becoming more popular each year. For those of you who requested it, note the antenna polarities used - it makes interesting reading. There is definitely a case of having both polarizations. Congratulations and certificates go to Geoff, GW1ATZ/P, and Richard, G4WKN, and also to the runners-up in both sections. See you next year!

ALL OTHERS SECTION

Pos	Callsign	Score	QSO	Mult	Best DX	Pol
1	GW1ATZ/P	171	39	82KX	343	H
2	G0RSB/P	84	44	92BN	145	V
3	G1KEA/P	51	25	92BN	106	V

SINGLE OP FIXED

Pos	Callsign	Score	QSO	Mult	Best DX	Pol
1	G4WKN	90	22	92OG	186	H
2	G4WYJ	84	38	91VH	295	H
3	G6DBX	73	17	90WX	303	H
4	G1RDX	67	31	91OO	220	H
5	G1UFL	36	22	91UJ	105	H
6	G3ZPB	35	19	91WH	187	V
7	G0NVZ	31	13	91UR	323	X
8	G8GPA	20	8	92NF		V
9	G3ZMF	15	11	91VH	67	V
10	G4WKS	5	3	92FG	51	H

70MHZ TROPHY 1992

No it was not a mistake in *Radcom* nor on the part of the VHFCC. QRA as far as I am concerned is the funny old number system like AM34J or the newfangled JO01IN (Maidenhead system), QTH is the address or 10k W of Whatsit. All I wanted was QRA and County. ie JO01IN ESX (or ESSEX).

Yes Geoff, G3NAQ, you have won the fixed section. When I start an adjudication I first separate all the different sections, then place each pile into 'claimed' order. This is what I did with this contest. In the Open Section I was surprised to see G4SEU/P in first place. SEU lost QSOs and multipliers which brought down their claimed score to just a little above APA's. I checked through all the logs, some were perfect, some lost a few contacts, even VHFCC members lost points. Then I came to tabulate the results. Something was amiss! SEU claimed 814 pts.

I looked at their computer printout, this showed 383 pts! I added them up and made it 384, re-checked it and found that I was correct, deducted lost points, and lost multipliers and came out with a total of 18432 instead of over 43000. Nice try fellas, but I'm not that doddery!

Congratulations to the Trophy winners GM4APA/P to G3NAQ for the Single Operator section, and to the runners-up. Certificate also to G0AEV for single operator 25W or less and single yagi.

* 10% deducted. Power not stated, 2 X 4CX250B, did not make any difference to position in table.

** Added 4 multipliers. You forgot countries, however please use VHF and not HF log sheets, and use current cover sheet in future, yours is now regarded as a museum piece! *Bryn Llewellyn, G4DEZ.*

OPEN SECTION

Psn	Call	Pts	Mult	Pwr	Ant	Best Dx	Km
1	GM4APA/P	38410	46	130 1X3	2X8	G0JBA	599
2	GM4DSP/P	32164	43	100	2X8	GJ7AOG/P	637
3	G3UAX/P	27984	53	160	4X5	GM4APA/P	520
4	GW3TCU/P	24859	55	*	2X6	GJ7AOG/P	378
5	G4ZTR/P	24582	51	75	2X5	GM4APA/P	560
6	G4ZAP	23903	53	160	2X5	GJ7AOG/P	428
7	G4CWH/P	23822	44	160	2X5	G4ADV/P	524
8	GD7HEJ/P	22386	39	20	5	GJ7AOG/P	568
9	G4SEU/P	18432	48	150	8	GM4AFF	—
10	G4ADV/P	16555	35	80	2X7	—	568
11	G8EIK/P	15972	44	25	8	GM4APA/P	503
12	G1EHF/P	15609	43	30	6	GM4DSP/P	468
13	G8FMC/P	10108	38	35	5	GM4APA/P	510

SINGLE OPERATOR FIXED

1	G3NAQ	20139	49	90	8	GM4APA/P	508
2	G3FDW	17999	41	110	8	GJ7AOG/P	549
3	G8BFL	15696	48	150	6	GJ7AOG/P	381
4	G0AEV	12556	43	10	5	GM4APA/P	485
5	G4FOH	9396	36	25	5	G4ADV/P	344
6	G8DDY	8153	31	60	5	GM4DSP/P	512
7	G0JBA	7656	29	100	5	GM4APA/P	599
8	G0EHV	6723	27	50	HB9CV	G4ADV/P	557
9	G3LVP**	6479	31	25	3	GM4APA/P	444
10	G4OUT	4727	29	10	3	GM4APA/P	360
11	G8PNN	3652	22	150	3	G4ZTR/P	409
12	G3JDM	2728	22	15	2X5	GM4APA/P	360

DIRECTION FINDING

SOUTH MANCHESTER QUAD NIGHT EVENT

Date: 13 March 1993
Maps: 109 and 110 (half of each map - east of 800 on map 109 and west of 200 on map 110)
Assembly: 1900 for start at 1920GMT
Location: Car park at Werneth Low Country Park, NGR 960936 (map 109)
Competitors requiring supper should notify Colin Matcalf, Tel: 0457 854563, no later than 8 March.

THE DARTFORD HEATH RSGB QUALIFYING DF HUNT 1992

The hidden station sites chosen this year were 'Horseholders Wood' on the North Downs near Halling and 'Hempstead Forest' in mid-Kent, near Biddenden.

Station 'A'. G0PVH/P at Horseholders Wood was 16km NNE from the start and station 'B', G4BDF/P at Hempstead Forest was about 30km ESE from the start. By 1pm most teams had arrived at Shipbourne and, at 1.20pm, sixteen teams set off. Up came the two stations with split second timing, each sending TEST DF in Morse code. Half the teams went for station 'A' first while the other half opted for station 'B'.

Kim and Ian were beginning to wonder if their 'A' station transmitter was still working, since their site remained unvisited until 2.45pm. Phil Cunningham was the first to be signed-in just before 3pm after completing a 1km hike.

Phil Cunningham's and Mike Hawkins' teams must have crossed paths somewhere near Maidstone en-route for their second transmitters. However, Mike beat Phil by ten minutes to win first prize. Five other teams found both hidden stations before 4.30pm. Ten teams found one transmitter (five found each TX).

Pos	Name	Club	TX A	TX B
1	M Hawkins	Colchester	16.12	14.46
2	P Cunningham	Colchester	14.52	16.23
3	A Mead	Colchester	14.52.5	16.24
4	C Collett	Colchester	15.05	16.24.5
5	R Gray	Mid Thames	16.28	-
6	G Nicholls	Banbury	14.52	-
7	M Mallinson	Banbury	14.53	-
8	G Foster	Mid Thames	14.53.5	-
9	T Gage	Mid Thames	14.56	-
10	D Brocks	Colchester	-	15.25
11	A Simmons	Mid Thames	-	15.36
12	C Wells	Mid Thames	-	15.37
13	G Whenham	Coventry	-	15.37.5
14	B Bristow	Mid Thames	-	15.38
15	M Standen	Mid Thames	16.29	-

One competitor failed to find either transmitter.
Mike Hawkins and Phil Cunningham qualify for the National Final to be held in September.

SOUTH MANCHESTER RADIO CLUB TOP BAND DF QUALIFIER

Seventeen teams arrived at the start at Teggs Nose Country Park near Macclesfield, and were ready for the off.

It turned out to be a tough one and only 5 teams found both transmitters. The A station, run by Mike, G0CAR, and John, G6LCS, was located in a densely overgrown area of woodland on the banks of the River Dane. 600m of antenna round fields, parallel with power lines and along the canal kept many confused and investigating the wrong end of the aerial in the brambles for some time. The run in here was at least half a mile, some came a mile. The B transmitter, run by Chris, G3ZDM, and Tim, G7GFW, with decoys Malcolm, G0MFC, and G8APB's junior op Colin, G7LYS, was perched on the edge of a very steep valley on the edge of the Country Park at Consall woods near Wetley Rocks. The aerial here was 350m long and grounded at both ends, a counterpoise was provided by the bottom wire of a barbed-wire fence.

Congratulations to the winners and Dave Yorke and John Hall who qualify for the National Final, John for the first time.

RESULTS OF SMRC QUALIFYING EVENT DIRECTION FINDING COMPETITION

POS	NAME	CLUB	TX A	TX B
1	Andy Collett	Chelmsford	14:52:52	15:57:00
2	Brian Bristow	Mid Thames	14:55:19	15:59:00
3	Dave Yorke	S Manchester	14:56:43	16:02:00
4	John Hall	Ripon	14:56:57	16:05:00
5	Trevor Gage	Mid Thames	16:30:00	15:20:00
6	George Whenham	Coventry	—	15:04:00
7	Paul Tyler	Mid Thames	—	15:06:00
8	Bob Grey	Mid Thames	—	15:17:00
9	Colin Metcalf	S Manchester	—	15:19:00
10	Graham Nicholls	Banbury	—	15:21:00
11	Paul Cunninghamm	Colchester	15:31:18	—
12	Geoff Foster	Mid Thames	—	15:32:00
13	Dave Holland	S Manchester	15:36:38	—
14	Graham Blomeley	S Manchester	15:37:55	—
15	John Drakeley	Slade	16:03:05	—

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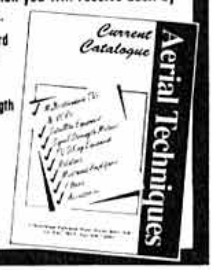

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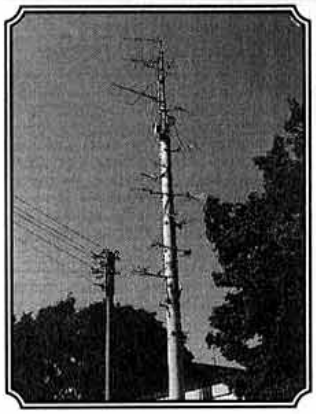

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DEWSBURY supa-tuta plus and set of seven 'leq' Morse training tapes: £60 or will split. (Solihull) 021 704 2393.

DRAKE R4C, matching speaker: £200. KW2000E power supply, Shure 444: £150ono. Palomar HF preamp: £50. Metal lathe: £100. G4WJB. (Peterborough) 0733 343021.

DRAKE R7 updated R7A, five filter N/B, excellent condition, cost over: £1200 bargain: £650. Collins 390A, VGC full W/S manual: £375. (London) 081 813 9193,

EDDYSTONE 770R VHF Rx: £75. 8-el 2m quad, tatty: £15. 28MHz half wave vertical: £15. Homebrew 2m linear QQOV640 PA: £15. BW TV: £15. Buyer inspects and collects. G3XZS (Tonbridge) 0732 361456.

ERA microreader CW/RTTY, CW Tutor: £75. Katsumi EL Key EK121: £50. Yaesu FRT7700 Rx Amp/Tuner: £35. G3PTN (Leeds) 0532 654644.

EX PMR, high quality RF amplifiers, will work on 2 mtrs without adjustment, 10W in, 40W output at £15, and 70-watt output version at £20 each. All tested. Discount for 5+ of either type. All +p&p (large heatsink) Abingdon (0235) 532653.

EXCELLENT VHF/UHF QTH Orpington; large det house, 4 beds, large lounge, separate dining room, kitchen, two bathrooms, single garage. Some improvements reqd. Near station and gd schools. Vacant possession. No chain: £120,000ono. G8GEA QTHR 0323 423330.

FIVE band vertical: £110 ovno. Butterfly HF beam: £120ovno. 40W VHF-HF transverter: £160ovno. All ants down, buyer inspects and collects. (Glos) 0285 650656.

FRG-7700 CW FRT-7700 antenna tuner and FRV-7700 model B converter, covering 50-59MHz, 118-130MHz, 140-150MHz, bxd: £295. TR-2500 CW, three battery packs, hard leather case, mobile stand and speaker mic, bxd: £195. Buyer inspects and collects. Alan G4YCJ. (Nr Lechlade) 0367 860402.

FT101 MKII, gd cond, mic fan spare 12BY7A matched pair 6JS6C. Also G3LLL RF clipper, h/book, old friend but want to upgrade: £220. G4PAC QTHR (Hants) 0635 298537.

FT101ZD 9band FM, boxed, instruction manual: £450. Professionally built 2M amp 600W, 2x250B valves: £375. (Herts) 0707 265025.

FT101ZD with WARC bands, fitted with CW filter fan and desk mic, gd condx, gd wking order: £410. FT575GX all solid state with mic and manual: £400. FT227R 10W FM mobile with mic, manual etc, works well: £110. (Newport, Gwent) 0633 880146.

FT102 Yaesu tcvr, mint cond: £475. (N Somerset) 0934 742326 (day) or 0934 743636 (eves).

FT270R Yaesu 2M mobile, small CW mobile mount, boom mic, switch unit, service manuals: £160. G7HCA. (Shoreham by Sea) 0273 455984.

FT650 triband, new July 91, little use: £800. PX for FT767 or similar. UHF Tait T500 eprommed all simplex repeater, packet channels: £100. AEA AT300 ATU 80M to 10M: £85. All plus postage. (Prudhoe) 0661 834229.

FT736R unused, immaculate condition, last piece from silent key sale: £900. Unused Tonna aerial, 23ele 1296MHz: £30. A200 amplifier 'E' band: £35 inc post. Watford dual disk drive 3.5", little used for BBC: £60. Gerry eves and w/ends. (Preston) 0772 814200.

GALVANISED 40' pole with external rings to climb up! Laying in garden, buyer collects. Offers! Phone G4OII. (Grimsby) 0472 813450.

HD141 complete with 8555A and 8552B plug ins: £2000. HP8410 complete with 8414A and 8411A: £2000. Both units complete and working. (Goggeshall) 0376 562108.

HEATHKIT HW8 QRP tcvr, manual and mods h/book: £75. Eddystone EC10 MkII: £65. Two Farnell G6-40 6 volt 40 amp power supplies, one working with faulty circuit board: £20 for both. Tom G3VSR QTHR. (Crosby) 051 924 8663.

HEATHKIT SB101 HF tcvr, PSU, speaker, manual and spare valves: £100. Prefer Buyer collects. G4GRN QTHR. (Waltham Cross) 0992 31698.

HELL printers (two): offers Eddystone Fly Wheel dial; £12. Another geared with band calibrations: £10. EMI Angel pick-up arm. G4RWL (Carlisle) QTHR.

HRO 5T superb example 9GC 4B/SP coils, offers; Command Rx's 190-550KC 3-6MHz .52-1.5MHz 2 dynamotors ideal renovation, offers. G3ESB QTHR (Derby) 0332 671536.

IBM-AT style mother boards, 1MB RAM, serial/parallel ports, new, tested + data + technical support: £45. Jeremy 2E1AQI. (Harpenden) 0582 462337.

IC735 HF TX filter, mike: £540. Kenwood MC35S mike: £15. BNOS 12 20E power supply: £140. Pair 6146B RCA, new: £25. Kent twin paddle key: £35. SEM iambic keyer: £25. Coax 40yds UR67: £20. BN86 balun: £15. TT20 + base: £10. L/P filter Medco: £15. Welz ATU AC38M plus SWR PWR meter SP15M: £90. Londex VHF relay: £10. G3SIO QTHR. (Kingswinford) 0384 400727.

ICOM 25IE Mutek + desk mic: £350. Also Icom 32E + accessories: £275. Both excellent. G0RMA (Trowbridge) 0225 755451.

ICOM 725, mint condx, used on receive only, still bxd: £600. Matt, GM7LWC (nr Dumfries) 0387 69598.

ICOM AT-100 automatic ATU, bxd, h/book, leads, excellent: £220 plus carr. Wanted: compact solid state HF comms Rx; unmodified case for BC221 (complete unit considered); pre-1985 equipment brochures to expand collection. John Teague, G3GTJ (Castle Cary) 0963 24319.

ICOM HF auto antenna tuner, AT-150 with manual, mint condition, hardly used. G0RVX, Ken. (Hazel Grove) 0625 873659.

ICOM IC 24 ET dual band handheld: £275. Icom Icr 7000 receiver: £650. Icom IC471 70cm multimode tcvr: £450. Mutek TVVF 144A 28/144MHz transverter: £150. SSB Electronics LT2 S 28/144MHz transverter: £300. SSB Electronics PM1300 RF power meter: £150. SSB Electronics DX 144 unswitched masthead pre-amp: £50. HF400 relay with auxilery contracts: £50. Tail twister heavy duty rotator: £350. Please contact Tim 071 274 2415.

ICOM IC255E 2m FM mobile 25W output, complete with orig packaging, h/book and circuit diagrams. (Gt Yarmouth) Daytime 0603 698621.

ICOM IC745 HF tcvr, FM board fitted with seperate mains PSU, bxd wth manual: £700.ono. Trio TS700G 2M multimode with fitted pre-amp, an oldie but goodie: £150.ono. Buyer collects or delivery for cost of diesel. G4XBL QTHR. (Aspatria) 06973 22412.

INSTRUMENTATION EIP 351D 18GHz frequency counter, perfect with H/B: £600. Ferrograph RT52A testset, comprises AF sive precision oscillator, THD meter, W&F meter and AF voltemeter: £75. TM6221 AF balun: £5. (Portsmouth) 0705 596836.

KANTRONICS data engine: £275; DVR2 2m 2 chan h/speed Tx/Rx for Packet: £145; D410 Tx/Rx for 70cm: £305 (all mint, unused). Kenwood MC40S and MC43S hand mics (new): £18 ea. Tokyo Hypower 2m 170W (type HL120V) PA: £170. HL16V 120W+ 70cm PA: £280. Sony KX14CPI Trinitron monitor TTL/Comp/Analogue (mint): £240. JVC CX60GB 6" monitor Rx (mint): £195. Paul, G4XHF QTHR (Crawley) 0293 515201 (eves).

KENPRO 600RC rotator plus support bearing:

£95. Hy-Gain tri-band beam: £75. Fibreglass spreaders and spider to construct HF boomless quad: £75. CP5 diamond vertical: £50. Pye Westminster W15FM 4M: £35. (Swansea) 0792 817957.

KENWOOD 440S CW/SSB filters ATU hardly used, bxd: £900. Epson Laptop computer 640K twin 3.5 disks: £400. G0OQF (Derby) 0332 44979.

KENWOOD 950SD, packing etc. As new. G3GHS QTHR. (Cornwall) 0726 843487.

KENWOOD PS53 heavy duty power supply unit, unwanted 'free gift' with new rig, list price £249, bargain at: £125. G6EHM. (Norfolk) 0603 429269.

KENWOOD R2000 general coverage receiver, fitted YG455C 500Hz CW filter, perfect, manual: £365. ICS FAX-1 weather map decoder, all leads, manual: £250. Also advance OS2 scope, working just: £10. G3RDG QTHR. (NW London) 081 455 8831.

KENWOOD SM230 monitor, VGC: £525. Also matched pair Sylvania 6146B: £17.50 plus part carr. G3GNR (Highampton, Devon) 0409 23301.

KENWOOD TH45E 70cm tcvr, as new, unused, 1100mA bttry & original. Offers please. 0473 311665 (after 7pm).

KENWOOD THZ7E 2m Handy, soft case, spkr/mic, extras, as new, under half price: £165. Alinco DJ100E 2m Handy LCD. Ten memories, many extras: £115. Yaesu FT301S digital 8-band solid state HF tcvr, vgc, manual, mic etc: £310. FT-ONE, as new, all extras, scanning mic, manuals, gift at: £695. FT101, vgc, manual, mic: £199. DRAE 12amp PSU: £65. G4JXK QWTHR (Fareham) 0329 230737.

KENWOOD TS-140S HF tcvr with matching PS-430 PSU, ex condx: £650 (no offers). G4EHT QTHR (Lichfield) 0543 251133.

KENWOOD TS120S 100W tcvr, matching spkr, vgc: £310. Ray G0CGQ QTHR (Wilmslow) 0625 529713.

KENWOOD TS140S HF all band tcvr, 100W, excellent condition, little used, never used mobile: £595. G0MZZ. (Batley) 0924 474548.

KENWOOD TS140S HF tcvr, mint: £550. Kenwood TM241E 2M tcvr, mint: £225. MC43S mic: £15. HS5 headphones: £25. EP925 3-15 volt 25amp PSU: £75. JIL SX400 scanner, matching PSU: £190. AKD HF wavemeter: £35. John G4YDM QTHR. (Washington) 091 416 2606.

KENWOOD TS140S, 100W tcvr, matching PS430 PSU, with manual and MC60 desk mic, immac, no split - no offers please: £700. SEM Tranzmatch with Eazitune: £70. Daiwa CN620A SWR/PWR meter 1.8-150MHz, 0-1KW: £50. Kenwood 215E 2m h/held, immac, in bx with power pack and chrgr: £170. Buyer collects. (Leeds) 0532 609456.

KENWOOD TS440S with auto ATU and PS50 PSU, in perfect mint condition, CW filter fitted: £850. G4HBD. (Poole) 0202 767583.

KENWOOD TS680S HF + 6M: £650. Trio TR9130 2M 25W multimode + mobile mount desk stand: £300. Both immaculate + manuals. 2M linear, 25in 150out: £90. G0RZG. (Nr Ipswich) 0728 746741.

KENWOOD TS830S, GWO: £550. Kenwood low pass filter, LF30A, new: £20. Alinco spkr mic, EM58, new: £20. Yaesu freq counter, YC355D 30-200MHz: £75. Kenwood TS820S with CW filter, ex deceased SWL like new, not used, on transmit: £500. Kenwood VFO-120: £75, original FT101 valves Toshiba 6JS6C: £20 each. Brand new Yaesu FT726 HF unit, 21-28MHz: £200. Carriage extra. G3IDW. (Swindon) 0793 822055.

KENWOOD TS850SAT, mint, bxd, manuals: £1275. Yaesu FT1: £500. Both general coverage 0-30MHz. Drae 24A PSU: £55. All ono. Dennis GW0JLA. (Caehopkin) 0639 730647.

LAPTOP 286 80MB hardisk, plenty of software: £450. Swop for HF equipment for either WHY. Wanted: TinyTwo TNC beam for 17e 12m (3ele). Ron G4YRR QTHR. (Stoke on Trent) 0782 395017.

LINEAR home brew 2x813 grounded filament, full power gain, 15W PEP, 900W PEP out stab screen supply, separate 3KV power supply, variac built in: £150. G4FKR. Will not split. (Winchester) 0962 880411.

MARCONI synthesised signal generator, 10-520MHz: £260ono. Packet radio xtals, suitable for Pye Europa PMR spec for 2 and 4 metres: £10 per channel. Phone G4OUB QTHR. (Smalley) 0773 761412.

MAST 'A' frame, 20' scaffold poles plus 14': £35. Wanted: 2M rcvr for car (FM). G3OWB QTHR. (Cambridge) 0223 358601.

MICROWAVE counter, EIP autohet model 351D, zero to 18GHz, perfect: £600. Chris G8JFJ. (Portsmouth) 0705 596836.

NATIONAL NCX5, Yaesu FT101 100 watt tcvrs, Hallicrafters HT37 valve TX for sale. All require some work, plenty spare tubes all round. Offers after viewing any time. G3BFC QTHR. Space required, any reasonable offers accepted. (New Milton) 0425 610611.

PROJECTION TV and screen, pre-war type, collectors item. Probably not working - I've never dared try it!: £75ono. G0MPS (Bournemouth) 0202 291548.

RACAL MA79: £175. 20M 3-el beam: £75. 70cm liner: £150. Portable mast, 40ft: £40. Eddystone receiver 1837/2: £200. 1.8M dish and stand: £120. Ten Tec power supply: £75. Wanted: 2-3M dish. (Thame) 0844 213381.

RADCOM 1989, 1990, 1991: £5 plus carriage. GW4CFC. (Menai Bridge) 0248 712944.

RADIO Communication magazines - 1968 - 1992, gd cond. Make me an offer! Paul G8CBM, eves only. (Witham) 0621 893233.

RECEIVER R1147 in case. Also period portarama Mk 2 with manual, offers! (Purley)081 660 7517.

RECEIVER Type Marconi CR300/1 with power supply: £70ono. Buyer collects. G0III (Waterlooville) 0705 264587.

SCANNER PRO-37 30MHz-960MHz, brand new with box: £165ono. Trio TR-3600 70cm portable hand mic car adptr bat case spr bats case manual ideal for novice: £125. Sinclair micro TV (FTV1): £20. Sony micro cass recorder M-750V with VOR, small fits in pocket: £25. G6MJA QTHR (Lee Common) tel.fax 0494 837546.

SILENT KEY sale - G3XOM. Kenwood TS950-SD: £1995. KW1000 amplifier: £200. PRO2006: £170. Hameg 20MHz oscilloscope: £80. Fluke 8024B multimeter: £180. Honda E3500 generator: £600. Buyer can inspect and collect from Bob Treacher. (London) 081 850 1386.

SILENT KEY sale - G4MKO. FT720 2M FM mobile: £125. FT767GX + 6 metres and 2 metres: £1200. FC901 ATU: £125. Tono RTTY terminal 0-9000E: £150. Daiwa DC7011 rotator: £50. Stolle rotator: £20. FT203R FM handheld: £100. Datong Morse tutor: £40. G4UXE QTHR. (Evesham) 0386 831508.

SILENT Key sale G3EPE. FT902DM: £600. FL2100B linear: £400. SEM tranzmatch + ezitone: £190. Diamond SWR/PWR meter: £95. MC60A mic/amp: £80. Kenwood hdphones H5-5: £48. Eagle transistor tester: £15. Eagle RF4 field indicator: £20. Burns TC101 wavemeter: £100. FT901 service manual: £8. SOAR DMM 3020: £20. Sony TCM818 cassette recorder: £19.99. All prices ono. Contact Jack Duddington, G4BFH, QTHR (Blackpool) 0253 853554.

SKY Videocrypt decoder: £50. Psion LZ64 PWS 32K RAM PAK, personal finance II, datapak RS232: £150. Pair of Mission leading edge Model 700 spkrs: £80. Panasonic NV333 needs attention: £20. Tatung BSB satellite system: £50. Yamaha PSR37 electronic keyboard with stand: £150. G0JCG (Sth Wirral) 051 339 9599.

SOLATRON CD1400 scope 15MHz twin beam (valve), gd condx. Prefer buyer inspects collects: £35. G3NSU (Leeds) 0532 630661.

SONY ICF PRO 80 rx, 150kHz-220MHz, AM/FM/SSB: £210. ERA Microreader II: £110. ERA audio filter BP34: £75. 2x Jaybeam 23cm, D15 yagis, new in boxes: £55 each. All items in good condition and carriage at cost. Mike G1HWY QTHR. (Steyning) 0903 814154 after 7pm.

SPECTRUM comms 144.10-50W pre-pwr amp, minimal use, new Oct, cost £95: Offers! Oskerblock HF-VHF SWR-PWR meter 20-200-2kw twin meter, mint. GW4RLP QTHR. (Caernarfon) 0286 675264.

SWAN 350 HF Band tcvr AC PSU/spkr and VFO: £175. G3TWJ QTHR (Purley) 081 668 3408.

SWAN 350 tcvr 10-80M, 400W PEP, professionally re-valved and re-aligned + PSU: £165. Ken G3WB. (Eastbourne) 0323 720059.

TAIT T348/01 15 amp PSU for base station, also Tait T296/11 PSU - Offers! Would exchange for TX or RX units (high band FM) of same make. Bird 43 Thruline meter: £50 or swap for Bird elements. Wanted good 160M mobile antenna. (March) 0354 741168.

TELEREADER CWR-610E CW, RTTY and ASCII decoder with 12" Philips computer monitor80: £150. Yaesu FT203R 2M FM handheld with battery chrgr, case: £125. Daiwa RM940 infra red mobile microphone system, extra sensor: £35. BBC-B computer, DFS, 5.25in diskdrive 40/80T, mounted in screened solidisk CPU and keyboard case, datacorder, software includes minioffice-2, database, satpack, RTTY, disk cabinet: £130. All VGC. G3ZJK. (Rugby) 0788 810535.

TENTEC Century 22 CW Tx/Rx, nice condx: £195. Eddystone 730 Rx 480KHz 30MHz: £70. (Maidenhead) 0628 664689.

TOKYO HL-66V 6M linear 60W GasFet preamp, mint, bxd, manual: £80. Datong 2M receive converter, VGC: £25. Spectrum 6M receive preamp, 20dB gain, VGC: £20. Buyer collects or pays postage. Patrick G1TMD QTHR. (Beckenham) 081 650 6596.

TRIO 9500 70cms multimode, mint, boxed with manual: £325. Icom 271E 2M multimode, fitted Mutek front end. Boxed with manuals: £450. Icom BC-35 battery chrgr, new: £40. Dartcom Meteosat down converter 1691/137MHz weather proofed: £115. Timestep PCSAT3 software and PCB for IBM compatible: £35. John G6RHL after 1800 hrs. (Shefford) 0462 812739.

TRIO PS30 20A PSU for 13.8V, shack use: £95. FRG7700 0-30MHz rcvr with FM: £275. Microwave modules, 2M to 10M and 10M to 2M: £55 each. FRA7700 active receive antenna: £40. FT690I 6M: £240. (Abingdon) 0235 532653.

TRIO R1000 general coverage receiver: £150. Micropatch MP-64E Morse baudot RTTY hardware and software including Commodore 64 computer and peripherals (disk drive etc): £100. (Burgess Hill) 0444 246463.

TWO Capco magnetic loops 3.5/30MHz with control box: £300+. No offers of less accepted. Raymond G0HHJ. (Rugeley) 0889 584983.

TWO Tektronic 502A dual beam 'scopes: £25 each. QQVO3-20A valves, one with ceramic base, offers? Many other valves, octal, loctal 7BG etc. Ask for wants! EMI Electron multipliers 9734A with bases, offers! Transformer mains in 6V 500A, 12V 250A, 24V 125A: £30. Many HIFI speakers. Variable PSU HT & LT, 3 years RadComs, offers? Philips B&W remote control: £10 Many other parts etc, just ask? (London) 081 455 0540.

YAESU FL2000B HF linear, recent new valves: £375. Also Yaesu FTV901R transverter 2mtrs and 70cm, modules fitted: £250. G3NDC QTHR. (Stanmore) 081 954 1309.

YAESU FT290R II, carrying case, strap, nicads, chrgr, bxd, ex cond: £325ono. Also FL2025 matching linear with mobile mounting bracket: £85ono. (Wilmslow) 0625 531154.

YAESU FT290R portable m/mode, Mutek F/End, .25 wave whip, nicads, soft case, 2 mics, orig box: £220. John (Sheffield) 0742 443797.

YAESU FT480R, almost as new: £250. HP41CX calculator and cardreader: £200. Buyer collects, offers considered. (Cobham) 0932 865579.

YAESU FT708R 432MHz FM handheld with speaker mic: £100. 386SX PC 2 meg RAM 40 meg HD, SVGA graphics, mouse: £625. G7LZR. (New Milton) 0425 611835.

YAESU FT767 GX, bxd, gd cond: £1400ono. Poss PX FT736R. Cushcraft A3 triband, gd cond: £150. Jim M-100 pre amp TX/RX 100-500MHz: £25. (Worthing) 0903 877254.

YAESU FTV901R transverter with 144MHz and manual, Yaesu FV901DM scanning VFO with manual: £100 each. Please phone G0JEE QTHR. (Burton on Trent) 0283 63667.

ZETAGI MODB300P wideband HF linear, FWO spare output transistor. 5W/120W 13.8V 20 amp instruction book: £130. Wanted: Transformer for oscilloscope telequipment D61. (Aylesbury) 0296 681109.

WANTED

ONE WORKING earpiece, type DHR No. 5 for restoration project. Also Heathkit GC1U Mohican rx in restorable condition. CCTS emers or other info receiver, type 328R. GI8AYZ QTHR. (Lisburn) 0846 665034.

RACAL RA1217 rcvr, must be clean, will collect if possible. Also required: Technical information on USA VHF/UHF receiver, type CE1 775-3. Brian GW4KYT QTHR. Please phone after 5pm. (Swansea) 0792 846014.

RACAL transmitter unit, TA127 or parts thereof consisting: TA99, PU99, MA79, cabinet and telescopic slide rails. Also looking for TA349E units, complete in cabinets with wiring trays and ATU. Also seeking Racal cabinets, table top and free standing. Would like to hear from anyone who collects Racal radio equipment. Nigel Boyd, 2 Church Close, Lower Willingdon, Eastbourne, East Sussex, BN20 9QY.

SIX METRE Module and Yaesu MD IB8 base station mic and a Yaesu SP-102 spkr for Yaesu FT726R tribander. John, 2E1BCF not QTHR (Rowlands Gill, Tyne & Wear) 0207 542194.

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20 PIN IC for Fidelity Wanderer cordless telephone. (Weymouth) 0305 761092.

600OHM dummy load or high wattage carbon resistors to make up 600ohms. (West Sussex) 0903 883839.

70CMS FM mobile with mt bracktet, Kenwood, Icom, Yaesu etc. gd cond. (Nottingham) 0602 392667.

ATU with SWR meter, 100W min, FC707 or similar. G4PPC QTHR. (Bloxwich) 0922 479737.

CIRCUIT/manual for Marconi TF995 B/5 signal generator. Photocopy/borrow. Expenses paid. For sale KW1000 linear, VGC: £300ono. G4EUK. (Lancing) 0903 753139.

COLLINS 30L1, mics. WHY? Eddystone 40 Post Office interference Rx. 150 kc-30Mc. Accurate measurement of signal and field strength. All solid state. Exchange or WHY? No handbook. G4KDV (Otley) 0943 463083.

DRAKE R7A receiver or late R7 with all options, service manual. Also Drake UV3 tcvr + P53-PSU, PK232 terminal, Datong FL3 filter. (Notts) 0602 609345.

FDK 750E for spares - repair. (Batley) 0924 470667.

FDK multi-700AX 25W FM tcvr for SEM, KW Transmatch ATU in GWO or purchase if reasonable price. Norman G0IRK QTHR. (Surbiton) 081 390 2650.

G2DAF 144MHz SSB/FM tcvr, PCB layouts and any helpful construction info please. G0MTY QTHR. (Preesall) 0253 810102.

GREEN painted elstone MP/T transformer, SM/C choke, and Lissen white cased intervalve transformer. Mr Litherland.G4IMT QTHR. (Chippenham) 0225 891254.

HEATHKIT HW8, gd condx. Gary (Wilmslow) 0625 530200.

HELP. Casio AQ-2000 calculator and calendar watch. Details wanted for setting the date and time functions. All expenses refunded. QTHR (Sark) 0481 832210.

INSTRUCTION manual for general radio GR1606-A R-F bridge, for cash or photocopy. G3UFZ. (Brixham) 0803 845304.

IS IT possible to transceive AMTOR using AMT-3 and C64 or Spectrum +3? Modest fee paid for useful info. G3VRU QTHR (North Notts) 0909 722133.

KAM all mode TNC, also FTV107 70cm module. G4VZR QTHR. (Dursley) 0453 860773.

KENWOOD VFO230 external VFO for TS830. Must be GWO with leads. Stephen, 061 881 1850 (9am-6pm).

MATCHING loud speaker, also mic plug for TS520 range (4 pin). Peter. (Ripon) 0287 634397 (day) or 0677 60302 6-8pm.

MIZUHO MX-2 2M SSB/CW tcvr in working order. Will pay fair price and postage. (N Yorks) 0677 423349.

MOBILE FM tcvr, Kenwood TM241E 144MHz or TM741E 144/432MHz preferred. Other makes and models considered if pristine and boxed. (Wilmslow) 0625 531154.

RACAL 1792 bits, WHY? Watkins Johnson VLF RX type 340 A7 or 357 tuning heads for 217 RX type VH13, VH12, VH14, UH11, UH12. Also DMS 105A demod, also require Drake MSR 2 RR3, any cond and HP 8640B sig gen. Thanks. (Shrewsbury) 0743884858.

SCOPEX model 4D10. Need service manual and mains transformer. G3NWU. (Hartlepool) 0429 274842.

SMALL transformer wanted, convert 110V AC to 240V AC or thereabouts. Needed for British European components for use in USA. Roger G4GPB. (Esher) 0372 468109.

TECHNICAL manual with circuit diagram for Marconi AM/FM signal generator TF995A/5 to loan or purchase. G4LIT QTHR. (Ringwood) 0425 479923.

TONO 5000E in first class condition with all leads and handbook. Might consider 9100E IF with compact reliable monitor. Full details to G3ADZ, 6 St Marks Avenue, Rugby, Warks, CV22 7NP, tel 0788 815222.

VHF converter 432 in, 28M out ? Microwave modules. WHY? (Boston) 0507 568327.

WANTED: GR 1606A (or B) RF bridge. G3WDY QTHR. (London) 081 653 4738.

WANTED: photo copy of FV-102DM VFO, manual, pay all expenses. KW ATU with E Z Match. Also Drake filter, model TV3300LP. (Neath) 0639 813431.

WW2 ex service equipmnent, German, resistance, cipher machines WHY. Will collect, cash or swap. For sale: Collins 51 JY W/3 mech filters. OZ8RO Mr R Otterstad, Hosterkobvej 10, DK-3460 Birkerod, Denmark. Tel no. 011 45 42815205.

YAESU FT690R Mk 1 with power supply, in vy gd condx. Will pay £225. 081 531 6649 (eves/wkends).

EXCHANGE

486DX PC, 33MHz, 4MB RAM, 108Mb hard disk, SVGA graphics and monitor, 6 mths old, perfect condx, exchange for IC7100 Rx, IC1275, or TS790/FT736 with 23cm. Cash adjustment if necessary. (Wirral) 051 678 1035.

BORED with packet and want to try HF? Then swop your PC/AT for my Yaesu FT101Z, WARC, CW filter, FM, fan, spare valves and desk mic. Boxed, one owner from new, or will sell: £375. Buyer collects. G3VKM QTHR. (Norfolk) 0502 77622.

OLYMPUS OM40 Prog. C/W F1.4-50, F1.8-50, F2.8-28, 28-70, 70-210, zoom lenses, T20 or 732 F/Gun, exchange for recent base 2m/70cm tcvr. Cash adj either way. G3PTN QTHR (Leeds) 0532 654644.

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As space is limited please contact Nicky, G0PVC, on 0532 555488.

Radio Society of Great Britain
Lambda House, Cranborne Road, Potters Bar, Herts. EN6 3JE

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CLUB NEWS

DEADLINE - Items for inclusion in the April 1993 issue must be sent to HQ marked "Club News - DIARY", to be received by 19 February 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 - 22, talk '10GHz Narrowband Operation' by Ted, G3JMY. Details 0272 672124.

SOUTH BRISTOL ARC - 10, magazine exchange evening; 17, 70cm ATV Challenge; 24, soldering iron competition. Details 0275 832222 on a Wednesday evening.

BERKSHIRE

MAIDENHEAD & DARC - 4, talk 'The History of GB2SM (Science Museum)' by Geoff, G3JUL. Details 0628 25952.

NEWBURY & DARS - 24, mini lecture night. Details 0635 63310.

READING & DARC - 11, talk 'The Computer in Amateur Radio' by John Linford, G3WGV; 20, help with Girl Guides Thinking Day; 25, talk 'Digital Modes and Equipment' by ICS Electronics Ltd; Mar 11, club quiz v Maidenhead Club. Details 0734 262949.

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 3, talk 'BT and Cellnet' by R Biltcliffe; 17, visit to Bletchley Park Museum; Mar 3, RSGB video evening. Details 044 282 6651.

CHESHAM & DARS - 10, talk 'EMC' by Dave, G8KBV; 17, CW practice and discussion; 24, talk 'TVI' by Ian, G3OHX. Details 0923 283911.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 5, talk 'Eastern Electricity Communications' by John, G0GKP; 12, Rally preparation for Sunday 14 Feb; 19, talk 'Analog Circuit Evaluation Using a PC' by Gerald, G0HEM; 26, visit by RSGB RLO Mike Brooke, G8HXR. Details 0763 260811 (daytime).

CHESHIRE

CHESTER & DARS - 2, Radio ideas and discussion; 9 talk 'Test Equipment for Radio Amateurs' by G3EWZ; 16, surplus equipment sale; 23, video 'History of Radio' by G3ETH. Details 051-355 2833.

MID-CHESHIRE ARS - ***NEW SECRETARY*** Mike Baguley, G7LQD, QTHR, tel: 0606 331210. 10, talk 'Testing Portable Equipment' by Rob, G8XMZ; 17, construction night; 24, general meeting. Details from the Secretary.

CLWYD

CONWAY VALLEY RC - 4, talk 'Successful Fault Finding' by Gwyn Hughes. Details 0492 530725.

INTERNATIONAL POLICE ASSOCIATION BRC - ***NEW SECRETARY*** Mr C W Seward, GW0PJX, Moel Deg, 10 Caer Gog, Pantymwyn, Mold CH7 5EX.

WREXHAM ARS - 2, projects night - bring along your latest project; 16, video night - amateur television; Mar 2, talk. Details 0978 845858.

COUNTY ANTRIM

CARRICKFERGUS ARG - 2, talk '70cm and Upwards' by Ian Kyle, GI8AYZ. Details 0232 835650.

CO DOWN

BANGOR & DARS - 5, visit to the Electronics Department, Bangor Technical College for practical demonstration 'Curing TVI' (2nd part); Mar 5, talk 'Medical Electronics' by Jim Brown, GI4BXB. Details 0247 460251.

CORNWALL

CORNISH RAC - 4, further talk by St John Ambulance Service; Mar 4, talk 'Power Supplies' by Bert, G3VWK. Details 0209 820836.

DERBYSHIRE

BOLSOVER ARS - 10, cheese and wine evening; Mar 10, quiz night. Details from G0RXT, 0246 822856.

BUXTON RA - 9, Basic PC construction; 23, video night; Mar 9, Fox Hunts explained. Details 0298 25506.

DERBY & DARS - 3, junk sale; 10, video show; 17, talk 'The Radio Data System' by Richard Buckby, G3VGW; 24, talk 'Packet Radio' by Ed, G0INA, SysOp of GB7BAD and GB7NOT bulletin boards; Mar 3, junk sale; 10, illustrated talk 'The Robin Hood & Ivanhoe Line Schemes' by Stuart Smith of Regional Railways. Details 0773 852475.

DEVON

APPLEDORE & DARC - 15, talk by Bob Short, G3GNR, plus Morse class and construction demonstration. Details 0237 477301.

TORBAY ARS - 19, Annual General Meeting. Details 0803 526762.

DORSET

SOUTH DORSET RS - 2, Extraordinary General Meeting and discussion 'A Code Free HF Licence'; Mar 2, bring, buy and barter. Details 0305 773860.

EAST SUSSEX

HASTINGS E&RC - 17, talk 'Weather Recording' by G4ITM. Details 0424 830454.

SOUTHDOWN ARS - 1, talk 'PMR Problems' by Keith, G8HGM. Details 0323 412699.

ESSEX

BRAINTREE & DARS - 15, G3PEN/G0DEC - PMR conversion - practical. Details 0376 327431.

CHELMSFORD ARS - 2, talk 'Amateur Packet' by John Gilliver, G6JBG; Mar 2, talk 'Radar II' by Stan Woods. Details 0245 260831.

VANGE ARS - 4, junk sale; 11, round table discussion. Details 0268 762496.

FIFE

DUNFERMLINE RS - 11, talk 'Making Waves (or How Aerials Work)' by David, GM4ZNX; 25, talk 'HF Packet DX Clusters' by John, GM0OPS. Details 031 331 4340.

GRAMPIAN

ABERDEEN ARS - 5, junk sale; 12, The Great Morse Debate; 19, talk 'Electrotherapy' by Bill, GM3FRI; 26, talks 'How I Got Started in Amateur Radio' by various speakers; Mar 5, junk sale; 12, talk 'PC Public Domain Software Giveaway' by Graham, GM8FFX. Details 0224 706619.

GREATER LONDON

ACTON, BRENTFORD & CHISWICK RC - 16, talk 'WAB' by G0HHP. Details 081 749 9972.

BROMLEY & DARS - 16, talk 'Introduction to Fibre Optics' by Alan Ogden. Details 081-462 2689.

CLIFTON ARS - 5, talk on Scanners; Mar 5, film evening. Details 081 859 7630.

EDGWARE & DRS - 11, talk 'Model Rockets' by Bob, G4CQF; 25, Morse training by club members. Details 081 953 2164.

HAVERING & DARC - 10, talk 'A Purpose-built Shack' by Oliver Tillett, G3TPJ; 24, talk 'Electrickery Majyc' by Dave Bull, G8YSK; Mar 10, club debate 'The Case for Morse'. Details 0708 445135.

KINGSTON & DARS - 17, talk 'SWR Bridges, ATUs etc' by G Cripps, G3DWW. Details 081 398 1128.

RS OF HARROW - 5, demonstration of latest AR equipment by Mike Haydon of Haydon Communications; 19, Annual Dinner; 26, junk sale. Details 0895 632377.

SOUTHGATE ARC - 11, multi-mode action on the air; 25, inter-club darts match; Mar 11, Rig Check evening. Details 081 360 2453.

SILVERTHORN RC - 19, preparation for Thinking Day on the Air event. Details 081 529 4489 (eves and w/ends).

SURREY RCC - 1, talk 'Interference' by Peter Burton, G3ZPB; Mar 1, surplus sale. Details 081 660 7517.

SUTTON & CHEAM RS - 18, constructional contest; Mar 6, annual dinner at Sutton United Football Club. Details 081 644 9945.

WIMBLEDON & DARS - 12, vertical antenna adjustments; 26, talk 'The History of Cameras' by Chris, G0KEB; Mar 12, SWR measurements. Details 081 397 0427.

GREATER MANCHESTER

ECCLES & DARS - 2, discussion 'Club Stand at the Norbreck Rally'; Mar 2, talk 'PDP-11 Assembly Language' by G8KRG. Details 061-773 7899.

SOUTH MANCHESTER RC - 5, quiz night; 12, Audiology - talk and test; 19, talk 'Globe Trotting, Part 2' by G3SVW; 26, factory visit. Details 061 969 1964

GWYNEDD

DRAGON ARC - 1, talk by Geoff Spencer, GW4DRR on a technical subject; 15, talk 'A Rough Guide to QRP' by Stewart Rolfe, GW0ETF; Mar 1, St David's Day 'Radio' Eisteddfod - look out for the list of competitive events. Details 0248 600963.

HAMPSHIRE

BASINGSTOKE ARC - 1, talk 'Repeater Construction' by G8JIP; 28, 2m Direction Finding Competition - OS175 - Fox: Janet, G6JDP

HORNDEAN & DARC - 4, junk sale; Mar 4, talk 'Control and Communications/First Action First aid' by Hampshire Ambulance Service. Details 0705 472846.

ITCHEN VALLEY ARC - 12, photography updates (includes close-ups and restoring black & white prints) by Bob Thomas; 26, open meeting. Details 0703 736784.

SONY BROADCAST ARTG - 22, talk 'Digital Signal Processing - What Will it Cost?' by Nigel Gerdes, G7CAW. Details from Stephen Harding, G4JGS, QTHR.

SUBMARINE ARC - 11, Annual General Meeting. Details 0703 898887.

HEREFORD AND WORCESTER

BROMSGROVE & DARC - 12, talk 'Photography'. Visitors welcome. Details 0562 710010.

HEREFORD ARS - 5, Annual General Meeting; 19, talk and demonstration 'Heart Start' by John Ashton-Jones; Mar 5, talk 'Magnetic Loop Antennas' by Bert Mills, GW3LJP. Details from Errol G Robinson, 29 Folly Lane, Hereford HR1 1LX.

VALE OF EVESHAM RAC - 7, magazine and junk swap night - anything goes. New members always welcome. Details 0386 41508.

HERTFORDSHIRE

CHESHUNT & DARC - 3, members' forum; 10, junk sale; 24, talk and demonstration 'Amateur TV Repeater' by Adrian, G0OJY; Mar 3, members' forum; 10, quiz nite hosted by Alvin, G1VXD. Details 0992 464795.

DACORUM AR&TS - 16, talk 'Aerial Design, Part 2' by Mike Goodwin, G0NJI. Details 0442 259620.

HODDESDON RC - 18, visit by RSGB General Manager, Peter Kirby. Details 081-804 5643.

STEVENAGE & DISTRICT ARS - 2, HF rig checking and alignment; 9, non radio talk and demonstration 'Woodturning' by Frank, G4ISO; 16, practical night - on air practice and procedures; 23, talk 'The American Experience - Take 2' by Tony, G0DVO. Details 0438 724509.

HUMBERSIDE

BRIDLINGTON & DARS - 4, talk 'CW and Raynet' by Brian, G4XBU; 19, talk 'Computer Programming' by Keith Goodyear. Details 0262 673635.

GRIMSBY ARS - 4, talk by Barry, G8RIW; 18, construction evening; Mar 4, visit to West Burton Power Station. Details Grimsby 825899.

KENT

DARENTH VALLEY RS - 10, talk and demonstration 'Fast Scan TV' by Peter Martin, G0GIR; 24, surplus equipment sale; Mar 10, crystal set construction contest. Details 0474 703322.

MAIDSTONE YMCA ARS - 5, RAE and Morse class; 12, talk and demonstration 'Packet Radio' by Steve, G6URJ; 19, RAE and Morse; 26, Rally '93 meeting; Mar 5, RAE and Morse. Details 0622 670936.

SOUTH EAST KENT (YMCA) ARC - 3, NOAA evening; 10, talk 'Raynet' by Ken, G0FAK; 24, talk 'An Introduction to Packet' by Andrew, G7IXL; Mar 3, NOAA evening; 10, South Foreland Lighthouse Operators' meeting and discussion. Details 0304 372656.

LANCASHIRE

ROSSENDALE ARS - 1, talk 'AMSAT' by Dave, G1IOO. Details 0706 227182.

LINCOLNSHIRE

GRANTHAM RC - 2, talk 'Electric Shock' by member of the St John Ambulance Brigade; 16, talk 'ATUs' by John, G3VSX; Mar 2, talk 'Fire Prevention in the Shack'. Details 0476 65743.

SPALDING ARS - 12, talk 'Communications and Motor Sport' by G7HNM; Mar 12, talk 'Hospital Radio' by G6ADG (provisional). Details 0778 425367.

STAMFORD & DARS - ***CHANGE OF ADDRESS*** RAF Club, St Paul's Street, Stamford PE92BH.

MERSEYSIDE

HESKETH ARC - 2, talk 'Types of Batteries and Charging Circuits'; 16, QRP on the air; Mar 2, bring & buy. Details 0704 63344.

LIVERPOOL & DARS - 2, talk 'Homebrew Test Gear' by G4GEB; 16, talk 'Weather Satellites' by G3PDC; 23, surplus sale. Details from Ian, G4WWX, QTHR.

NORFOLK

NORFOLK ARC - 3, talk 'EME 1296 Receiver' by Mike, G4EOL; 10, talk 'Archaeology and Metal Detectors' by John Davies; 17, talk 'Science for All' by Arnold Tomalin, G3PTB. Details from G0KWP 0603 618810.

NORTHAMPTONSHIRE

KETTERING ARS - 23, talk 'Gas Distribution and Radio Links' by a speaker from British Gas. Details 0536 514544.

NORTHAMPTON RC - ***NEW SECRETARY*** K Zak, G0OQI, 33 Greenfield Road, Spinney Hill, Northampton NN3 2LJ. Club meets every Thursday at 2 Hervey Street, Northampton, at 8pm.

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM - 4, forum; 11, talk 'Generating your own Power'; 18, construction evening and preparation for TDOA; 25, talk 'The Lundy Is DXpedition' by Lionel, G5LP; Mar 4, forum/foxhunt forum; 11, talk 'Batteries'. Details 0602 232604.

MANSFIELD ARS - 4, RSGB video evening VU - DXpedition to the Laccadives. Details from G0NZA, 0623 755288.

SOUTH NOTTS ARC - 5, open forum; 12, construction (Fairham College); 19, talk 'The Secret War' by Henry Balen, G4MHB; Mar 5, open forum. Details 0602 211069.

SHROPSHIRE

TELFORD & DARS - 10, nostalgia night; 17, talk 'AMTOR' G0CNG/G7ELD; 24, under-a-fiver construction competition. Details 0746 761203.

SOMERSET

TAUNTON & DARC - 5, talk 'So you think you know your Amateur Radio?' by Peter Crosland, G6JNS; 19, visit to Somerset County Archives. Details from G3WNI, QTHR.

YEOVIL ARC - 4, talk 'Satellite Working' by G4JBH; 11, talk 'Vintage Radio' by G7LNJ; 18, club project 20/80m transceiver theory by G3PCJ; 25, talk 'Don't be afraid of CW' by G3GC; Mar 4, 20/80m transceiver final testing with G3PCJ. Details 0258 73845.

SOUTH GLAMORGAN

BARRY ARS - *SECRETARY* Ann MacKay, callsign now GW0SQT.

CARDIFF RSGBG - 8, annual radio quiz with South Glamorgan Raynet Group; Mar 8, discussion on the future direction of the Group. Details 0446 773212.

STRATHCLYDE

WEST OF SCOTLAND ARS - 12, talk 'Vehicle Electronics - Old and New' by Joe, GM3HOM; 26, vintage radio on film (those were the days!) by Tommy, GM3EDZ; Mar 13, debate 'Has CW had its Day?'. Details 0698 350926.

SUFFOLK

LOWESTOFT DISTRICT & PYE ARC - 4, surplus equipment sale; 18, slide presentation 'Visit to SU Land' by Charles Cudmore, G0FIY; Mar 4, talk/demo by Jim Bacon (subject TBA). Details Lowestoft 564325.

SURREY

ECHELFORD ARS - 11, talk 'Intruder Watch' by J Cleeve, G3JVC; 25, construction contest evening - bring your latest project; Mar 11, talk 'Radio with Computers'. Details 0344 843472.

TAYSIDE

DUNDEE ARC - 2, construction night; 9, talk 'My Father and I' by Leslie MacKenzie; 16, construction night; 23, talk 'A Holiday in South Africa' by Sam Hall, GM2AOL. Details from GM4FSB, QTHR.

WARWICKSHIRE

STRATFORD UPON AVON & DARS - 8, talk 'Trials and Tribulations of an OWL' by Stan, G4AXW; 22, test equipment evening with Terry Downing, G3MXH; Mar 8, talk 'RF Problems Associated with Motor Vehicles' by Tom Dobedoe and Mike Nielsen. Details 060 882 495.

WEST MIDLANDS

SOUTH BIRMINGHAM RS - video night. Details 021 458 1603.

WEST YORKSHIRE

HALIFAX & DARS - 16, junk sale - Queens Road Neighbourhood Centre. Details Halifax 202306.

KEIGHLEY ARS - 25, visit to West Yorks Fire Service HQ; Mar 11, talk 'The Sky, The Beauty and The Wonder' by Mr L M Dougherty. Details 0274 496222.

NORTHERN HEIGHTS AR&ES - 17, Mr Dougherty's lecture. Details Halifax 360574.

TODMORDEN & DARS - 1, Annual General Meeting; Mar 1, talk 'Getting Started in the Thirties' by Leslie, G3UI with help from John, G0DWL. Details Halifax 882038.

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'.

7 FEBRUARY

SOUTH ESSEX ARS Radio Rally - Paddocks Long Road, Canvey Island (at the end of the A130). Doors open 10am. Trade stands; bring & buy; home-made refreshments; free parking plus parking outside main door for disabled visitors. Talk-in on S22. Details from Ken Hendry, G0BBN, 0268 755350.

14 FEBRUARY

CAMBRIDGE & DARC Radio and Computer Rally - Addenbrookes Hospital Ambulance Station. (Easy access from M11/A604 via ring road). Doors open 10.30am. Entry £1 (concessions 50p); trade stands; bring & buy; refreshments; free parking. Talk-in on S22. Boot pitches will be

EVENTS DIARY

available. Bookings and details from George on 0954 719273.

2ND NORTHERN CROSS Rally - Rodillian School, A61 between Leeds and Wakefield (near jnct M1/M62). Opens 11am (10am for disabled visitors and bring & buy). Usual dealers; ample parking; bar and refreshments; Morse test; talk-in S22. Details from Dave Gray, 0532 827883.

21 FEBRUARY

EAST COAST AR&C Rally - Leisure Centre, Vista Road, Clacton-on-Sea. Doors open 10.30am. Major suppliers of radio and computer equipment; bring & buy; ample car parking; easy access for disabled; fully signposted from A12. Sports facilities and children's adventure playground; bar; cafe. Details from CLPK, 0255 474292.

KIDDERMINSTER & DARS Rally - Harry Cheshire School, Kidderminster. Opens 10am; usual traders; flea market; bring & buy; refreshments. Details G8JTL 0384 894019.

TRAFFORD Rally - Greater Manchester Exhibition Centre, Manchester. Doors open 10.30am (disabled visitors' priority queue). Admission £1.50. Usual traders; RSGB stand; bring & buy. Morse tests (apply via RSGB HQ). Free cash draw; licensed bar; refreshments; ample car parking. Talk-in on S22. Details G Oldfield, G1IJK, 061 748 9804.

WELSH MOBILE RALLY - Barry Leisure Centre, off Holton Road, Barry, S Glamorgan. Doors open 10am (9.30am for disabled visitors). Details Colin, GW0LBJ, 0222 530070.

27 FEBRUARY

RAINHAM Radio Rally - Parkwood Community Centre, Deanwood Drive, Rainham, Gillingham, Kent. M2, jnct 4. Traders; bring & buy; snacks; bar; talk-in on 2m & 70cm. Details G0AMZ, 0634 376991.

TYNESIDE ARS Annual Rally - Temple Park Leisure Centre, South Shields. Doors open 11am (10.30 for disabled visitors). All usual visiting trade stands will be in attendance, together with some new ones and we believe the Rally will have much of interest for electronic hobbyists and computer users as well as amateur radio enthusiasts. For those not wishing to partake in the Rally itself, all the amenities of the Leisure Centre are there, including heated leisure pool and gymnasium. Plenty of free parking for visitors, and the Centre is readily accessible from all parts of the Tyne & Wear area as well as outside. Talk-in station will be operational on S21 to provide guidance for visitors. Details from Jack Pickersgill, G0DZG, tel: 091 265 1718.

28 FEBRUARY

6th TAW & TORRIDGE Rally - Bideford Halls, Bideford, N Devon. Doors open 10.30am; plenty of free parking in adjacent car park; trade stands; bring & buy. Details from Mike, G3PGA, 0271 860930.

6 MARCH

VHF Convention - Sandown Park Exhibition Centre. Stand bookings to Les Hawkyard, G5HD, 0409 281 342. Details from Geoff Stone, G3FZL, 081 699 6940.

13/14 MARCH

LONDON AR&C Show - Picketts Lock Centre, Picketts Lock Lane, Edmonton, London N9. Large trade presence, free parking; lectures; facilities for the disabled; bring & buy; Special Interest Group section. Talk-in on 2m/70cm. Details 0923 678770.

14 MARCH

WYTHALL RC Radio Rally. - Wythall Park, Silver Street, Wythall (nr Birmingham, on the A435, 2 miles from jnct 3/M42). Opens 11am, closes 5pm. Usual traders in three halls; bar and refreshments; bring & buy stall run by the club. Talk-in on S22. Admission still only 50p. Details Chris, G0EYO, 021 430 7267.

21 MARCH

NORBRECK Radio Rally - Radio, Electronics & Computing Exhibition - Norbreck Castle Hotel Exhibition Centre, Queens Promenade, North Shore, Blackpool. Doors open 11am - 5pm; (10.45 for disabled visitors through ramped entrance); admission £1.50, over 65s £1, under 4s free; Free car parking and free shuttle service; Novice Licence details and practical demonstrations; bring & buy stall; radio talk-in on S22; competitions for NARSA associated club stands; your home constructed items and an inter-club quiz; hotel accommodation; bars and restaurants; assistance for disabled visitors; RSGB stand. Details from Peter Denton, G6CGF, 051 630 5790.

TIVERTON RC Annual Rally - Pannier Market, Tiverton. Easy access, only minutes from jnct 27 on M5. Doors open 10am; free parking; two halls of trade stands; bring & buy; mobile snack bar. Further displays and full refreshments facilities in the club room bar. Talk-in on S22. Details from G4TSW, Mid Devon Rally, PO Box 3, Tiverton, Devon.

28 MARCH

BOURNEMOUTH RS - 6th Annual Sale - Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth. Doors open 11am to 5pm; talk-in from G1BRS on 2m S22; amateur radio and computer traders; clubs and specialised groups; excellent refreshments. Admission £1 including free raffle ticket. Details from Ian, G2BDV QTHR, 0202 886887.

MAGNUM Rally - Magnum Leisure Centre, Irvine, Ayrshire. Usual traders; bring & buy; lucky programme prize; raffle etc. Details from Peter, GM0FCI 0294 72253.

PONTEFRACT & DARS 13th Annual Components Fair & Spring Rally - Carleton Community Centre, Carleton, nr Pontefract. Admission by prize programme - 3 prizes plus free prize draw for lady visitors; traders; bring & buy; bookstall etc; licensed bar; hot & cold snacks; 2m talk-in. Car boot spaces available. Details from Colin Wilkinson, 0977 677006.

4 APRIL

LAUNCESTON 7th AR Rally - Launceston College. Doors open 10.30am. Two large halls; well-known traders; large bring & buy; official Morse test (applications thro' usual channels); hot snacks from 7am. Talk-in on S22. Details from Maggie 0566 777027.

WHITE ROSE ARS Radio Rally - Change of venue to: Allerton High School, King Lane, Leeds 17. Four large main halls plus catering and bar facilities. Detail from A A Bartram, G7ELS, PO Box 73, Leeds LS1 5AR.

12 APRIL

CENTRE OF ENGLAND Easter Rally. (Date subject to change). Details from Frank Martin, G4UMF, 0952 598173.

18 APRIL

CAMBRIDGESHIRE RG AR Rally - Philips Telecom PMR Catering Centre, St Andrews Road, Chesterton, Cambridge. Doors open 10.30am; trade stalls; bring & buy; auction; hot food and drinks. Details from Mike, G6COQ 0223 358985 x 3310

MARSKE-BY-THE-SEA Radio Rally - Marske Leisure Centre, High Street, Marske-by-the-Sea. Doors open 11am; usual traders; bring & buy; refreshments. Talk-in on S22. Details from Mic, G7ION, 0287 610030.

SWANSEA ARS Rally - Swansea Leisure Centre, on the Swansea-Mumbles A4067 coast road. Doors open 10.30am; trade stands; bring & buy; bookstall; RSGB area representatives, Repeater groups; VHF demo stations; full catering. Talk-in on S22 via GB2SWR. Details from Roger Williams, GW4HSH, 0792 404422.

24 APRIL

MARCONI Birthday Exhibition - Puckpool Park Wireless Museum, Seaview, Isle of Wight. Free admission to public and plenty of free parking. Details from Douglas, G3KPO, QTHR 0983 567665.

25 APRIL

BURY RS Hamfest - Bury Leisure Centre, Bolton Street, Bury. Details from Laurence, G4KLT, 061 762 9308 (eves).

2 MAY

ANGLO-SCOTTISH Rally - Tait Hall, Kelso. Details 0573 224654 (eves).

BATC Rally - Harlaxton Manor, Nr Grantham. Details: Paul G8MJW, 0522 703348.

3 MAY

MID CHESHIRE ARS Rally - Civic Hall, Winsford. Details: David G4XUV, 0606 77787.

9 MAY

MARS/DRAYTON Mobile Rally. Details: Peter G6DRN, 021-443 1189. Traders bookings Norman G8BHE, 021-422 9787 (eves).

9th YEOVIL QRP Convention - Preston Centre, Monks Dale, Yeovil. Details: G3CQR, 0935 813054.

16 MAY

RSGB'93 Exhibition - NEC Birmingham. Details from Norman Miller, G3MVV, 0277 225563.

30 MAY

17th EAST SUFFOLK Wireless Revival - Maidenhall Sports Centre, Ipswich. Details: Bob Baal G7HZV, 0394 271257.

MAIDSTONE YMCA Radio Rally. Details 0622 743317 for pre-Rally booking of camping/caravanning facilities. Trade bookings etc 0622 750709 (before 9.30pm).

6 JUNE

25th SPALDING Mobile Rally. Details: Mr T Kettlewell, G4TWR, 0775 722940.

13 JUNE

24th ELVASTON CASTLE National Radio Rally. Details from John Robson, G4PZY, tel & fax: 0332 767994; trade enquiries: Peter Neal, G3WFU, tel & fax 0332 700265 (eves).

33rd RNARS Annual Mobile Rally - new venue Sports Field, HMS Collingwood, Fareham. Details: Cliff G4UJR, 0703 557469.

20 JUNE

DENBY DALE & DARS Annual Mobile Rally - Shelley High School. Details from Phil, G4FSQ, 0484 644827.

NEWBURY & DARS Annual Car Boot Sale - Ackland Hall, Cold Ash. Details: N Jaques, 0635 863310.

27 JUNE

36th LONGLEAT AR Rally. Details from Shaun, G8VPG, QTHR 0225 873 098.

4 JULY

KINGS LYNN ARC Rally. Details 0553 841189.

YORK Radio Rally. Details from Andy Suter, G0GXI 0904 708164.

11 JULY

SUSSEX AR&C Fair. Details & traders' booking: Ron Bray, G8VEH, QTHR 0903 763978 (H) 0273 415654 (W).

18 JULY

10th McMICHAEL Rally and Car Boot Sale. Details 0628 25952.

25 JULY

COLCHESTER Radio & Computer Rally. Details: Frank, G3FIJ, 0206 851189.

SCARBOROUGH Radio Electronics & Computer Rally. Details from Ross Neilson, G4ZNZ 0723 514767

8 AUGUST

DERBY & DARS Mobile Rally. Details from Martin Shardlow, G3SZJ QTHR 0332 556875 or via packet @ GB7LTN.

22 AUGUST

WEST MANCHESTER RC Summer Rally. Details: G1IOO, 0204 24104 (evenings).

5 SEPTEMBER

BRISTOL Radio Rally (incorporating Bristol Computer & Electronics Fayre). Details from Muriel Baker, G4YZR, 62 Court Farm Road, Whitchurch, Bristol BS14 0EG, tel: 0275 834282.

12 SEPTEMBER

LINCOLN SWC Hamfest. Details from Denis, G1XZG, 0522 684214.

19 SEPTEMBER

CENTRE OF ENGLAND Autumn Rally. Details: Frank Martin, G4UMF, 0952 598173.

PETERBOROUGH R&ES East of England Rally. Details from Mike, G0CVZ 0733 222588.

25/26 SEPTEMBER

RSGB International HF Convention - Old Windsor, Berks. Details from G4BWP, 0638 552080.

26 SEPTEMBER

9th NORTH WAKEFIELD RC Rally. Details from John, G4RCG, 0924 362144.

6/7 NOVEMBER

7th NORTH WALES Radio & Electronics Show. Details from B Mee, GW7EXH, 0745 591704.

14 NOVEMBER

BARNSLEY & DARC AR Rally. Details Ernie, G4LUE, 0226 716339 (6pm-8pm please).

MARS/STOCKLAND Radio Rally. Details from Norman, G8BHE 021 422 9787.

21 NOVEMBER

WEST MANCHESTER RC Winter Rally. Details 0204 24104 (eves).

GB CALLS

The list below shows all special event stations licensed for operation during this month. It was taken from the HQ computer on 6 January. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

1 FEBRUARY

GB2COH	Conquest Hospital
GB2GMM	Guglielmo Marconi Memorial
GB2SCB	Scouts Communication Badge

13 FEBRUARY

GB2UMC	Urmston Mens Club
GB5TT	PACC Contest

14 FEBRUARY

GB0OSH	Great Ormond Street Hospital

16 FEBRUARY

GB0HLC	Harrogate Ladies College
GB1HLC	Harrogate Ladies College

20 FEBRUARY

GB1GMX	G-Mex Exhibition Centre
GB2WPC	Ware Parish Church

28 FEBRUARY

GB2MSR	Manx Scout Radio

SILENT KEYS

WE HAVE BEEN advised of the deaths of the following radio amateurs:

Major-General Eric Stuart Cole, CB, CBE, G2EC

It is with regret that we announce the death of Past RSGB President Eric Cole, G2EC, on 19 December at the age of 86.

His expertise in the design and development of communications equipment led to his appointment as the Army telecommunications and radio specialist who planned the signals part of the Normandy invasion. He was to become a Major-General and Director of Telecommunications at the War Office.

He designed some of the specialist radio equipment used by amphibious and airborne forces and, as a result of this, became Chief Signals Officer in Mountbatten's combined operations headquarters in December 1942. His career then escalated rapidly as he was sent to take charge of the signals section of the 6th Airborne Division throughout the Normandy battles.

After WWII he became Chairman of the British Joint Communications Board in London and Washington, and was later appointed to the War Office. Eric retired from Government in 1961 and started a new career in the commercial sector.

He was a life member of the RSGB, having joined in 1930. As SU1EC in the thirties, Eric was one of the best known amateurs in the world. He became an enthusiastic contester and won the Senior BERU Contest in 1935 whilst operating from Cairo. He became President of the Society in 1961.

He will be sadly missed by his many friends.

G0DAQ	Mr D Moore	Oct 92
G0GLF	Mr LS Fox	
G0HYK	Mr RH Owens	23.12.92
G0IVL	Mr RJ Hartley	14.11.92
G0NTS	Mr WS Douglas	9.06.92
G2ABC	Mr R Ledgerton	18.11.92
G2EC	Maj Gen E Cole	19.12.92
G3HW	Mr L W Dymond	28.09.92
G3HZG	Mr L Hickingbotham	
G3UQZ	Mr DEGC Sanderson	2.10.92
G3WXQ	Mr E Morgan	5.09.92
G3ZOV	Mr CS Cuthbert	22.11.92
G4FHX	Mr R Smith	
G4GKJ	Mr LA Glover	
G4HLC	Mr J Cox	2.01.93
G4MLH	Mr A McKenzie	14.12.92
G6YOF	Mr JL Ratcliffe	26.10.92
G7AVC	Mr WE Wilkinson	
G7BOI	Mr J Edwards	
G7MYU	Mr T Robson	29.11.92
GI4FGB	Mr N Ashwood	23.06.92
ZS1GZ	Dr A Tronson	11.12.92

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TEN-3	10m 3 element Beam
A4S	20-15-10m 4 element Beam
A3S	20-15-10m 3 element Beam
A3WS	17-12m 3 element Beam
D40	40m Rotary Dipole
D4	40-20-15-10m Dipole
D3	20-15-10m Dipole
D3W	30-17-12m Dipole
R7	40-10m H/W Vertical
R5	20-10m H/W Vertical
AP8	80-10m Vertical
AV5	8 Band HF Vertical
AV3	20-15-10m Vertical
A50-6S	6m 6 element Beam
A50-5S	6m 5 element Beam
A50-3S	6m 3 element Beam
AR-6	6m Ringo Vertical
17B2	2m 17 element Beam
13B2	2m 13 element Beam
124WB	2m 4 element Beam
A144-7	2m 7 element Beam
A144-11	2m 11 element Beam
A144-20T	2m 10 element X Oscar
AR-2	2m Ringo Vertical
ARX-2B	2m Ringo Ranger II
AR-270	2m/70cm Vertical
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KT34-XA	20-15-10m 6 element Beam
6M-7LD	6m 7 element Beam
6M-5	6m 5 element Beam
2M-20LBX	2m 20 element Beam
2M-16LBX	2m 16 element Beam
2M-13LBA	2m 13 element Beam
2M-22C	2m 11 element X Oscar
2M-14C	2m 7 element X Oscar
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432-20LBX	70cm 20 element Beam
435-40CX	70cm 20 element X Oscar
435-18C	70cm 9 element X Oscar

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B108G	2m 10-80w g/f rx
B215G	2m 2-150w g/f rx
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D1010N	70cm 10w-100w
D15N	70cm 2w-20w

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KP-2/70	70cm Masthead unit

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204BAS	20m 4 element Beam
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155CA	15m 5 element Beam
153BAS	15m 3 element Beam
105BAS	10m 5 element Beam
103BAS	10m 3 element Beam
TH7DXS	20-15-10m 7 element Beam
TH5MK2S	20-15-10m 5 element Beam
EXP14	20-15-10m 4 element Beam
TH3JRS	20-15-10m 3 element Beam
TH2MK3S	20-15-10m 2 element Beam
DX88	8 Band HF Vertical
12AVQS	20-15-10m Vertical
14AVQ	40-10m Vertical
18VS	80-10m Vertical
66DX	6m 6 element Beam
64DX	6m 4 element Beam
215DX	2m 15 element Beam
216SAT	2m 8 element X Oscar
7031DX	70cm 31 element Beam
7030SAT	70cm 15 element X Oscar

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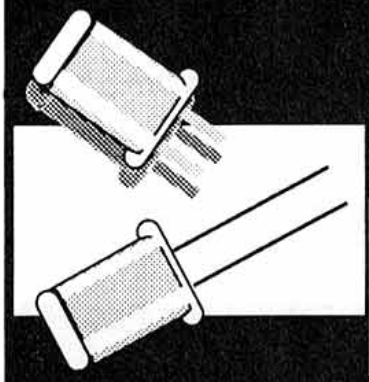

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Tiny 2, MKII (Le Euro-Tiny?!)

The Tiny 2 MK II is available NOW! The UK's best selling dedicated packet TNC now sports exciting new extras including: 64K eprom (including the famous PacCom PMS) plus an additional rom such as DED Host mode, TheNet/NetRom or we'll even give you a second language such as French, German or Spanish etc); Current firmware now implements TAPR 1.1.8 features; 6MHz CMOS CPU with 10MHz option; low power consumption for portable operation (<40 mA); 300 to 38,400 computer baud rate, optional 9600 add-on modem. What's more we'll supply the Tiny-2 MKII complete with free software, ready made radio cables and computer leads for YOUR setup.
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We finally have the PacComm PacTor units in stock. This is a licenced version of the original German design but with an optional packet upgrade option. Modes supported also include AMTOR ARQ (mode A), FEC (mode B) and FEC plus RTTY. For a full technical rundown of PacTor please call or write.
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Kantronics PACTOR (!?)
Yes, Kantronics KAM owners will also be able to benefit from an exciting new Kantronics upgrade that sports PacTor. This should be available from Siskin (bugs permitting!) sometime in December. (phone us around Mid-December).

Our range of amateur data products has grown to such an extent over recent months we just can't cram it all into a tinyad like this. We also have excellent support programs for not only the PC range but also the Amiga, ST, Archimedes, BBC B, Spectrum (all models), CBM 64 and the MAC to name but a few. Please feel free to call or write for more information. Our telephone support lines are generally manned from 8am to 8pm most days including weekends!

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The LAST WORD

FLIGHT OF THE NAVIGATOR

I was disappointed to read the rather negative approach to aeronautical mobile operation from G4OCU (*The Last Word*, January). As a licensed avionics engineer he expresses due concern with regard to the installation of radio equipment into an aircraft; however, as he stated this is already covered by existing legislation in that it can only be done in accordance with laid-down procedures and by a licensed engineer.

Interference to navigation equipment is often cited as an argument and it is well-known that any equipment containing a low frequency oscillator can cause spurious indications on a MF/LF radio compass, whilst digital equipment such as compact disc players and laptop computers have been shown to cause spurious readings on VHF navigation equipment. For these reasons the use of amateur radio equipment by passengers on public transport aircraft is never likely to be approved, and in any event is contrary to the amateur licence.

Despite these problem areas, there is certainly no reason to dismiss the principle of /AM out of hand. There are numerous occasions when such operation is possible and can be performed in a perfectly safe manner. In any event it is necessary to consider the problems of operating from large (complex) aircraft and light aircraft in an entirely separate way.

Some light aircraft still do not carry radio at all nor any form of electronic instrumentation. Interference is therefore of no relevance and neither is communication with air traffic control. Light aircraft can operate under two separate regimes, the traditional Certificate of Airworthiness with its stringent controls including all work to be performed by licensed engineers, and the 'Permit to Fly' issued for aircraft below a certain weight with a maximum of two seats including the pilot. The latter category accounts for an ever increasing proportion of the private flying fraternity and includes microlights. Aircraft in this category are licensed for visual flight only and normally only require radio for entry into controlled airspace in the immediate vicinity of airfields. Amateur radio operation by a second person on such aircraft is perfectly feasible and is likely to be less hazardous than aerial photography, glider towing or parachute dropping. Amateur operation from balloons seems eminently suitable and would be possible with such a licence.

Amateur radio /AM operation is not a new idea. It has been practised by a small number of amateurs since the 1930s; /AM operation is a privilege included in the FCC (US) amateur radio licence and to my knowledge has never proved to be dangerous. I have heard and worked many such /AM stations on the HF bands over the last 20 years, and as the holder of both a FCC amateur radio licence and a FAA pilots licence I can operate /AM in the UK whilst flying a US registered aircraft.

I have been a radio amateur for nearly 30 years, a professional aviator (flight navigator) for 25 years, hold a commercial pilot's licence and currently instruct to PPL level. I have always considered /AM operation to be a missing facet to the UK amateur licence and applaud the current attempts to rectify the situation. As with everything else in aviation, safety is paramount, but let us not hide behind negative legislation.

M J Grierson G3TSO

VALUE FOR MONEY

There have been many letters published over the years complaining about the high cost of equipment. But, as a professional engineer first of all in the broadcasting business and now as a manufacturer and distributor of specialist RF equipment I can only marvel at the price tags on modern HF or VHF rigs which are by now very sophisticated pieces of equipment. Similar amounts of money buy very little in the professional area where even relatively simple devices such as directional couplers, SWR bridges and the like with no active components can cost several hundred pounds and 20 year old used signal generators can cost £2000.

It is also remarkable when you look back to the 50s and early 60s when an AR88 (a big ex-military receiver made by RCA) would cost £50, representing several weeks wages for most people. The equivalent amount in today's money would probably buy two brand new sophisticated HF rigs.

I would guess that design and development costs for a new transceiver may now be in the millions and have to be recouped from what is even on a global scale a relatively small market compared to domestic equipment. It is no wonder that there are only three major manufacturers left, each completing for world-wide sales.

Brian Clowes GW4HBZ

A PERSONALITY NEEDED

Whilst passing the time in the dentist's waiting room I chanced to pick up an amateur astronomy magazine. Astronomy is a hobby for which I have never felt a great deal of affinity. I had always visualised visits made to expensively equipped observatories, with arrangements to reserve operating time therein, hoping that the night in question would be reasonably cloud-free. Surprisingly, I found this not to be the case. In fact, the cost of entering the field of amateur astronomy turned out to be about the same as that involved in becoming a radio amateur.

Two other similarities also struck me. Firstly, the knowledge and practical expertise appeared about the same in both hobbies so that the amateur astronomer would be aiming to reach his professional counterpart's standard, much as a (good) radio amateur would attempt to emulate the professional. Secondly, I got the impression that the number of amateurs presently active in the field is roughly comparable with radio amateurs.

The one difference - and the point of this letter - was that amateur astronomy seems to have become 'popular' in a way that amateur radio has failed to do. I'm thinking especially of the programme *Sky at Night* which, dealing as it does with aspects of astronomy mainly from an amateur angle, has remained a regular feature for a number of years. I find it hard to believe that our own hobby can be so much less exciting, challenging or stimulating!

Could one reason for the much greater appeal of astronomy be the presence of a personality like Patrick Moore, with his ability to popularise such a technical subject so expertly? Would a similar amateur radio personality, if one existed, perhaps succeed in the same way? Is our fraternity too inward-looking, and are we perhaps contributing to this by confining the weekly GB2RS news broadcasts to amateur bands? I wonder what the effect on the popularity of amateur radio would be were this to be transferred, suitably edited of course, to a regular slot on Radio 4.

J Hossack GM3DKW

RE-CALLED

May I through your columns thank all those who replied to my advert in the 'Wanted' section of Members Ads. I received several phone calls offering assistance, including an offer of a copy of the 1968 Callbook in which I discovered my callsign which I had forgotten after many years as DL5XG. My sincere thanks to all who have helped me reactivate G3UNK today.

Ray Wakeman G3UNK

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.

HOUSES FOR SALE

I note that G0MGI objects to the presence of house ads (*The Last Word*, October 1992); please do not change your policy on accepting such ads from amateurs.

With the possibility of returning to England after many years overseas, I have found that not only were the house for sale ads very interesting, but that the advertisers when contacted freely provided all the information that an amateur from overseas requires. Information on antennas or tower permits, geography of the area, electricity available and so on. In two cases the amateurs advised that the responses to the ads from amateurs was excellent, in fact one was already sold by the time I made contact.

I am sure that *Daltons* is a useful magazine but, if it is anything similar to our houses for sale magazines in the USA, it is only useful if one is very familiar with the area one plans to move into.

One final point probably because of the wonderful spirit I have found world-wide among amateurs, those who have advertised houses in *Radcom* volunteered all sorts of information that one would probably have to drag out of a real estate company. Please keep accepting such ads from amateurs.

Brian D Coyne AA6NM/G3DCO

A WORTHWHILE PRECAUTION

As a business advertising in *RadCom*, we were interested in 'A Buyer's Guide to Mail Order Purchase' (*RadCom*, January). But one very important point has been omitted, and we have never experienced the problem because we automatically safeguard ourselves against this.

Please point out to your readers that by law, once a parcel has been put into the hands of the Postal Service, it is no longer the responsibility of the sender. No claim can be made on the sender for loss or damage.

It is advisable for all purchasers to insist that parcels be covered by insurance. It may cost the purchaser a little extra, but it is a worthwhile precaution. In Britain a mere 65p will insure goods for quite a considerable sum. This only applies to parcel post, but registering smaller mail is not really expensive.

G M Crowhurst G4ZPY

NOVICE HOOKED

I would like to take this opportunity to try and encourage any 2E1s to get out the Morse key and give it a try. Buy the 5WPM tape from the RSGB and you are on your way. I have had my 2E0 call for four months and I have worked the USA, Italy, Sweden, Holland, Germany, Spain, Norway, Czechoslovakia, Poland, Belgium, Scotland, Ireland, Wales and all over England all on my three Watts, and all on CW. So give it a try - you won't regret it. Once you start to learn CW you will be hooked on it, just like me.

Also thank you to all the hams I have had a QSO with on 80m and 15m who have been so patient with me, especially Ian, 2E0AAU, who was my first QSO on 80m. Last of all, I would like to say thank you to Chris, G0JTN, who got me interested in amateur radio and for all his help over the past year.

Thomas Cannon 2E0ACY

NO POLICING?

Often I hear people using frequencies outside the 'gentlemen's agreement' bandplans, such as using FM as far down as 144.450 and not using any callsigns at all! When I ask if they realise that they are using the wrong mode for this part of the band, the replies are obscene or offensive. Is it necessary to use such language if someone comes up on the radio with a question? I feel that the bands are not policed at all.

Frank F Jensen G1HQQ

[Reports of poor or illegal operating should be made to the RSGB's Amateur Radio Observation Service Coordinator Geoff Griffiths, G3STG, QTHR - Ed]

AL'S MISSED

News of the passing of Al Slater, G3FXB, came as a severe shock. My log records numerous QSOs with Al, including during just about every major CW Contest, as well as the occasional phone QSO. BERU will never be the same without Al's commanding signal coming through on top of everyone else. The phone bands will never again hear 'Fox X-Ray Baker'. Truly, there has been a death in the family.

Brian Summers VE3JKZ

RSGB BOOK CASE

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Cris Henderson, G4FAM
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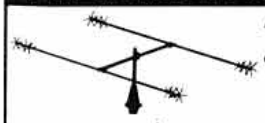

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