100 PAGES

Radio Communication

The Journal of the Radio Society of Great Britain

April 1993

Volume 69 No 4

THE VOICE OF AMATEUR RADIO FOR 80 YEARS

RSGB Patron Visits GBØOSH at Great Ormond Street Hospital

Kantronics **the digital leader**

announces the availability of **Pactor** for the KAM (Kantronics All Mode). Maintaining its "state-of-the-art" status, Kantronics, in cooperation with the German developers of **Pactor**, has made the newest digital mode available as an option for KAM owners.

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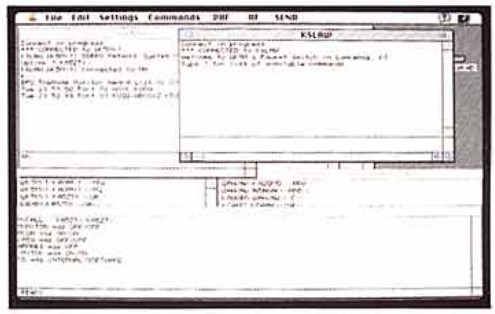
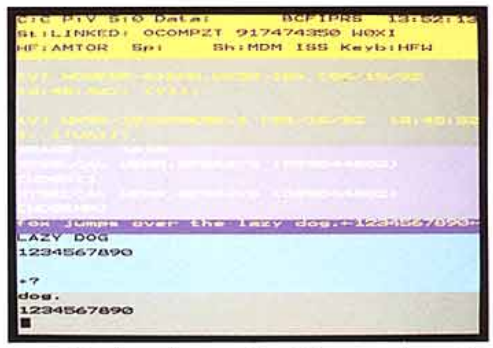


Hostmaster on the Mac



Hostmaster on the Commodore 64

Kantronics 1202 E. 23rd St, Lawrence, KS 66046 913.842.7745 TELCO BBS 013.842.4678 FAX 913.842.2021

IN th U.K.:

HEAD OFFICE:
CHESTERFIELD ROAD,
MATLOCK, DERBYSHIRE,
DE4 5LE
TEL: 0629 580800
FAX: 0629 580020

LOWE ELECTRONICS LTD

Managing Editor
Mike Dennison, G3XDV

Assistant Editor
Marcia Brimson

Production Editor
Sid Clark

Technical Editor
Paul Lovell, G3YMP

Technical Illustrator
Derek Cole

Editorial Assistant
John Davies, G3KZE

Production Assistant
Jennifer Preston

Editorial Secretary
Erica Fry

All contributions and correspondence concerning the content of *Radio Communication* should be posted to:

The Editor
Radio Communication
Lambda House, Cranborne Road
Potters Bar, Herts EN6 3JE

Tel: 0707 659015
Fax: (Editorial *only*) 0707 649503
E-mail (Telecom Gold) 87:CQQ083

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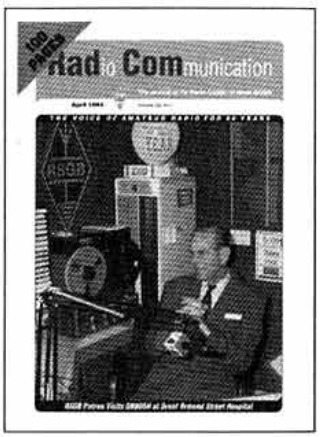

COVER PICTURE:
When RSGB member Justin Johnson, G0KSC, invited the Duke of Edinburgh to help him raise money for Great Ormond Street Hospital, he was pleasantly surprised when he said 'yes'. Story: page 5.

Photograph: Great Ormond Street Hospital.

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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.

Headquarters and registered office:
Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE
Telephone: 0707 659015 - Members Hotline and book orders
Fax: 0707 645105. Telex 9312 130923 (RSGB)
Electronic Mail Via Dialcom/Telecom Gold: 87 CQQ083

General Manager: Peter Kirby
Company Secretary: John C Hall, OBE, G3KVA

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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

RSGB Main Switchboard:
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The RadCom Leader

An Even Better RadCom: 2

THE CONTENTS OF THE January *RadCom* listed three improvements made to your magazine from that month, and promised more later. Wait no longer: From this month RadCom is bigger and even better.

One of the recommendations made at the RSGB's Business Strategy Conference last year was an increase in size for the Society's magazine. Following a careful look at the cost, Council agreed earlier this year to add another sixteen pages with effect from this edition. And these are all editorial pages, not advertisements. This represents a 30% increase in the number of pages we can devote to amateur radio, and particularly to the technical aspects of the hobby.

The additional space has enabled us to introduce some new columns, employ yet more excellent columnists, to increase the number of technical construction and theory features, and to broaden still further the range of articles which we can publish. The highlights are:

- **100 pages** minimum every month.
- **New column:** Each month, *In Practice* will provide technical advice from the knowledgable and experienced pen of Ian White, G3SEK.
- **New column:** Every month, *Simply Silicon* presents data about a useful chip.
- **New column:** Top VHF and HF contester Andy Cook, G4PIQ, will conduct a *Contest Exchange* each month, covering the lighter side of contesting.
- **More** about computers in amateur radio. From next month, the scope of the *Datacoms* column will be broadened to include the many other ways in which a computer can enhance your station.
- **More** information about RSGB volunteers and services. *At Your Service* will provide that vital phone number when you need help.
- **More** equipment reviews. There will be at least one a month.
- **More** *Product News*. This previously occasional feature will now be monthly.
- **More** *Helplines*. Also to be monthly.
- **More** *HF News*. The column is 10% bigger.
- **More** *VHF/UHF News*. This one's also 10% bigger.
- **Bigger** *QSL* column, now including UK awards.

This substantial improvement to the monthly magazine is just one of the ways in which the Society is aiming to provide you with a better service and better value for your subscription.

Peter Kirby
General Manager

NEWS & REPORTS

● THE DUXFORD Radio Society is located at the Imperial War Museum, Duxford, near Cambridge. New members are sought, especially those with experience and knowledge of the radios and radars installed in the museum's aircraft. Further information from: Mrs Beryl Pope, 95 Northolt Avenue, Bishops Stortford CM23 5DS.

● STOLEN from Brunel University ARS shack in Feb: Yaesu FT101Z (S/N OM230118); Heathkit SB220 linear; Honda 300E petrol Generator and an Icom IC275H 2m transceiver. Information to Brunel University Security on 0895 274000.

● THE LONDON Group of the RNARS will activate GB2RN from *HMS Belfast* in the Pool of London, 10 - 18 April. Frequencies: 1970, 3660, 3740, 7090, 14190, 21360 and 29333kHz, and 2m SSB, FM and packet (via GB7HSN).

● THE WELSH Scout Jamboree in July will include an amateur radio station. Would anyone wishing to help please contact Mike Rowles, GW4WWN, QTHR or tel: 0639 639745.

● THE RA has announced a reciprocal licensing agreement between the UK and Pitcairn Island. The reciprocation is between the UK Class A and the Pitcairn 'full' licence.

● FIVE SPACE SHUTTLE flights in 1993 will involve amateur radio (SAREX). STS-55, scheduled for launch 23 March, has five amateurs in its crew.

● RAF FINNINGLEY ARC celebrates the 20th year of Newark Air Museum on 25 April. GB2AMN will be run from the inside of a Varsity and a Shackleton aircraft.

● THE FCC HAS fined a Tennessee amateur for using indecent speech on 20m at a time "when there is a real likelihood that children may be listening."

● RON LEDGERTON, G2ABC, has retired as a GB2RS newsreader for the South West England area, having read over 620 scripts!

Operate in ZL

THE NEW ZEALAND New Zealand government has signed the CEPT T/R 61-01 agreement, which may now extend to *participating* non-CEPT countries. This means that a reciprocal licence is no longer required for UK amateurs to operate in New Zealand, and vice versa.

RSGB Patron helps radio amateurs raise money for Great Ormond Street Hospital

GOSH! Prince Philip is on Two Metres

HRH Prince Philip, Duke of Edinburgh, KG, sits at the Radio GOSH console at great Ormond Street Hospital ready to be patched into the GB0OSH HF station manned by Dave Wallace, G0BDC.

WHEN RSGB MEMBER Justin Johnson, G0KSC, heard that Gary Lineker's young son, George, was suffering from leukemia, he was particularly moved because his own healthy son, Sam, is the same age. He didn't stop at just sympathy, though; he set about a scheme to raise money to help the Hospital for Sick Children in Great Ormond St, London (GOSH for short), where George and hundreds of others were being treated.

Deciding to use amateur radio for the fund raising, Justin recruited fellow Essex operators - Dave Gilligan, G1OGY; Chris Hewitt, G0PAE; Dave Humphries, G4ETG; Alex Holden, G1EVD; Alvin Hardy, G1BTF; Alan Goodwin, G7ABL, Dave Wallace, G0BDC and Clive Tarling, G7CWX. He then wrote to manufacturers and dealers for help with equipment and many of them responded very favourably: Waters & Stanton and SMC loaned antennas and all the transceivers, Phoenix SMD donated the 14-element beam for 2m, G4LDS loaned a triband HF beam, and Vecta who make anti-theft systems made an £800 donation.

Accommodation for the amateur radio stations at Gt Ormond St was provided by the hospital's broadcasting station Radio GOSH, by courtesy of its manager Peter Losch. Not content with all this, Justin wrote to Buckingham Palace to ask Prince Philip to visit the station as Patron of the RSGB. He also wrote to His Majesty King Hussein of Jordan, who is licensed as JY1, to try to set up a Royal sked. He was pleasantly surprised when both readily agreed to help.

Four days in February were chosen for the operation. The RSGB issued Justin with the special callsign GB0OSH, together with a tee-shirt design and some QSL cards. The RA agreed to relax the greetings message facility to permit the contact with Jordan.

On Wednesday, 24 February, Prince Philip, the Duke of Edinburgh, opened GB0OSH. Presented to him were RSGB President, Peter Chadwick G3RZP; RSGB General Manager, Peter Kirby; Peter Losch and Justin himself.

Unfortunately, radio conditions prevented a successful contact with King Hussein despite the efforts of Dave, G0BDC. However, Prince Philip was able to pass a greetings message over the two metre station during an unscheduled contact with Mike Wickham, G4IGK, who afterwards said that he couldn't believe what had just happened!

After the royal visit, there was an opportunity to allow some of the young patients to go on the air - and they were delighted. Six-year-old Mutu,

CONTINUED ON PAGE 6

HF Convention Date Change

THE DATES FOR the RSGB International HF Convention, originally planned for September, have been changed. The new dates are 8 - 10 October. This is due to circumstances beyond the Society's control and any inconvenience is regretted. See page 63 for details of the event.

The RAF is 75

TO COMMEMORATE the 75th Anniversary of the Royal Air Force on 1 April, a Royal Review will take place at RAF Marham where the Queen and other members of the Royal Family will be shown the past, present and future of the RAF. The event includes a parade of 850 personnel.

RAF North Luffenham ARC will be on the air for the full 24 hours of 1 April using GB75RAF. The station will participate in all RAFARS nets and contacts with past and present members of the RAF will be welcomed. Frequencies are: 1830, 1984, 3515, 3710, 3790, 7015, 7045, 14055, 14290, 21055, 21290kHz, plus 2m SSB and CW. For further details contact Rob Luckenham on 0780 720041 x 7283, or via packet to G6RAF @GB7RUT.

IEE Conference

THE INSTITUTION of Electrical Engineers is holding its 7th European Conference on Mobile and Personal Communications in Brighton 13 - 15 December. Contributions are requested on a wide range of topics from Cellular systems through Radio LANs to Navigation and EMC. The Conference is co-sponsored by the RSGB so that members of the Society will be able to benefit from attending at a reduced rate. Further details from IEE Conference Services, Savoy Place, London WC2R 0BL, tel: 071 240 1871 x 5477/5478 (fax 071 497 3633), quoting reference MPC93.

The RSGB representative on the conference Technical Committee is the President, Peter Chadwick, G3RZP.

RAE Report December 92

THE CITY and Guilds has published its detailed report on the December 1992 Radio Amateurs Examination. Amongst the report's general comments is the advice that "The need to accompany instruction with practical demonstrations when preparing candidates for the examination cannot be over-emphasised." A copy of the full five-page report can be obtained by sending an SASE to the *RadCom* office at RSGB HQ.

GOSH!

continued from page 5

complete with oxygen cylinder, opened his eyes in amazement at hearing greetings and his name from K3KFD. Young and not-so-young met as Jennifer (9) chatted to 60-year old KA1UTV. Steven (12) wanted to talk to someone in North Wales where he lives, and GW3BGP happily obliged.

Operator Chris, G0PAE, takes up the story: "Three radio stations were used: Two on HF, allowing uninterrupted 40m and 80m operation whilst using 20, 15 and 10m for the more distant stations. The VHF/UHF station was so busy using FM and SSB on the 50, 144, 430 and 1296MHz bands that a second rig was brought into use.

"On Friday, *Blue Peter* presenter, Anthea Turner visited the station and spoke to VK3GEE on 15m, G0IUA on 40m and N2REI, a blind operator. Anthea described how *Blue Peter* helps to raise money for Guide Dogs for the Blind. Owen, G0DKE, brought along his daughter Helen (14), 2E0ACR, who went on the air on two metres FM and coped with pile-up conditions and other distractions like a veteran.

"Thanks to publicity from Radio GOSH, there was considerable interest from within the hospital in what we were doing and during the afternoons and evenings several patients came to find us. Some were microphone shy, but most went on the radio after some encouragement. Amongst those who took the plunge were Robert (6), Katie (11), Iain (9) and Michelle (11).

"The response from amateurs on the air was extremely good and many people kept frequencies clear or guided other stations to work us. Of particular note were VO1NP and N3JT. In total, 1070 contacts were made with four continents."

Fund Raising

SPONSORSHIP HAS already raised over £1500 and money is still coming in. Very generously, the high street store Dixons has offered to double all funds raised.

Fund Raising at Great Ormond Street Hospital is an ongoing procedure, and £8m is required each year just to keep things going. The radio station is supported solely from money raised from various sponsored events throughout the year, and all operators, including Station Manager Peter Losch, are volunteers.

If you would like to make a donation please send it made out to Great Ormond Street Children's Hospital Fund, at 19 Great Ormond Street, London WC1N 3HZ, marking the envelope 'GB0OSH'.

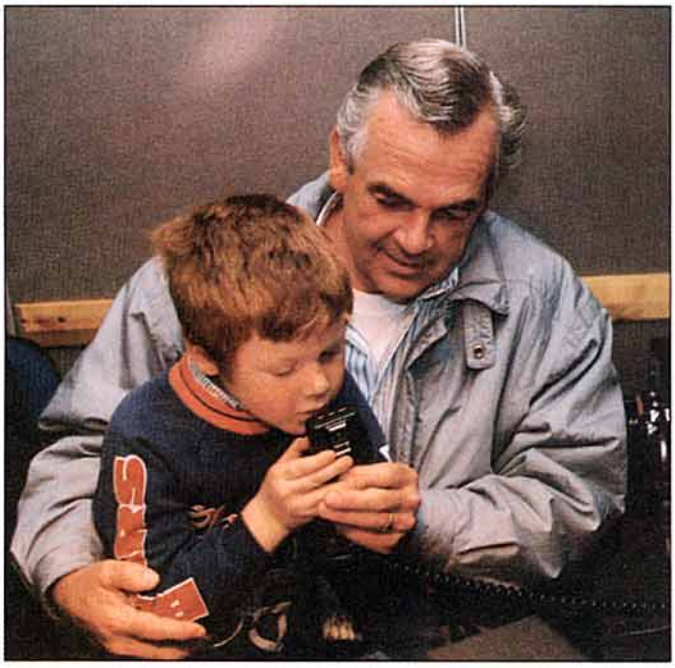
President Peter Chadwick, G3RZP, and General Manager Peter Kirby are presented to Prince Philip, watched by officials from Great Ormond Street.

Radio GOSH Station Manager Peter Losch was most cooperative throughout the event.

Organiser Justin Johnson, G0KSC, eventually finds time to use one of the radios.

Alvin, G1BTF, was one of the many operators who gave freely of their time in a good cause.

Dave Gilligan, G1OGY, checks part of the extensive aerial farm.



Six-year-old Robert enjoys his first taste of amateur radio, under the watchful eye of Dave, G0BDC.

BBC TV presenter, Anthea Turner (above) speaks to a blind operator in the USA. Refusing to allow medical encumbrances to spoil their fun are (top right) Jennifer (9) and (bottom right) six-year-old Mutu.

GB0OSH/Pheonix Aerial Auction

PHEONIX SMD have donated the 144MHz 14-element long Yagi (worth nearly £200) used by GB0OSH, to the Gt Ormond St Hospital appeal, and the Society is pleased to offer it for sale by sealed-letter auction.

To make an offer for this super antenna, just write your name, callsign and address on a piece of paper, together with the amount of your bid, and send it to us in a sealed envelope. *Do not send any money!*

All of the envelopes will be opened on 31 May and the person found to have made the highest bid will be contacted. Arrangements will then be made for payment and delivery. If you do not wish your details to be passed to Phoenix SMD after 31 May, please indicate this clearly when writing in.

Be generous and help the children at this hospital. Send your bid in now to: GOSH Appeal, RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

EMC and Planning Permission

THE RSGB Planning Advisory Committee (PAC) provides advice to members who are applying for planning permission for amateur radio aerials, or are appealing against refusal of planning permission. A few such planning applications have been turned down on the grounds of interference or the possibility of interference, requiring the RSGB EMC Committee to become involved. EMC considerations related to planning are covered in the Department of the Environment(DoE) / Welsh Office document *Planning Policy Guidance Note 8 - Telecommunications* (PPG8) which has recently been extensively revised. In July 1992, the RSGB was asked for comments on a draft of the new version of PPG8. After consultation between the RSGB PAC and EMC Committees, a joint response was submitted.

Most of the Society's suggestions have been incorporated in the final version of PPG8 which was issued in December 1992. One amendment is in paragraph 34 which deals with masts including those used by amateur radio operators. At our suggestion, a statement has been added saying that such masts need to be high enough for technical efficiency and located as far as possible from other antennas in order to minimise the possibility of interference. Another amendment appears in paragraph 7 of Annex 4 'The control of radio interference'. This paragraph, which deals with problems of insufficient immunity, now has an additional sentence based on our suggestion: "Such interference can often be alleviated by means of suitable technical measures to improve the immunity of affected equipment to unwanted signals."

If you are intending to apply for planning permission, we would like to draw your attention to the following extracts from Annex 4 of PPG8:

From para 1: "In most situations, therefore, questions of potential interference are of no relevance to the determination of planning applications for the masts or antennas needed to operate a transmitter. Other controls will generally be available to deal with radio interference problems."

From para 4: "It is unlikely that refusal of planning permission would be justified on the grounds of radio interference from a transmitter or non-radio equipment alone except in extreme cases". Another extract from para 4 relates to appeals: "Where applications which are turned down solely or mainly on interference grounds come to appeal, the secretaries of state will expect planning authorities to produce full details of the evidence of interference, or likely interference, and evidence that there are no reasonable remedies that would be satisfactory."

During the last year, the RSGB EMC Committee has represented the interests of the radio amateur in four separate submissions to government departments and has achieved substantial success in influencing new rules and regulations.

EMC Specification

THE EUROPEAN Telecommunications Standards Institute (ETSI) RES-09 Committee has appointed RSGB President Peter Chadwick, G3RZP, as rapporteur for the production of the EMC specification for commercially manufactured amateur radio equipment.

The Society has formed an *ad hoc* group, reporting to the Chairman of the RSGB's EMC Committee, to coordinate input to this specification.

All IARU Region 1 member societies whose countries are members of ETSI are being approached to provide an input. Anyone wishing to contribute should write to G3RZP via RSGB HQ, marking the envelope 'EMC Spec'. It is expected that a number of meetings will be required to formulate input. These will probably be hosted by the RSGB at its headquarters.

The RSGB — Working for You

International Marconi Day

THE ANNUAL International Marconi Day is on 24 April this year. As usual several special event stations will be active from the UK and many other countries.

The list includes GB4IMD, GB4MID, GB0IMD, GB2IMD, GB2MDI, GB2MID, GB0SFL, CT1TGM, EI1IMD, EI4IMD, DA0IMD, IY0TCI, IY1TTM, IY4FGM, IY0GA, ZS6IMD, VO1IMD, VE1IMD, K1VV/IMD, N2FCZ/IMD and KK6H/IMD.

The involvement of the Puckpool (IOW) Museum is detailed in this month's *SWL News*. Organiser G3FWE says that Lord Mottistone will be participating, as will Sir Peter Anson, retired Chairman of Matra Marconi Space Systems. Additional support for GB0IMD is being provided by the Isle of Wight Radio Society and the Royal Naval ARS (*HMS Mercury*).

● At Clifden, the Irish end of his link to Glace Bay, Canada, Marconi built a 300kW transmitter, quite a feat in 1907. Steam engines produced the 1100HP needed to drive the DC generators. His 1.16μF, 80000V working, air-spaced capacitor comprised 1800 galvanised steel sheets 9m x 3.8m in a building over 100m long. 18km of wire was needed for the 62m high aerial. The site was so remote that access was by its own light railway, the engines of which were sometimes fired by peat from the surrounding bog. The radio station operated successfully until 1921 when it was blown up by Irish rebels.

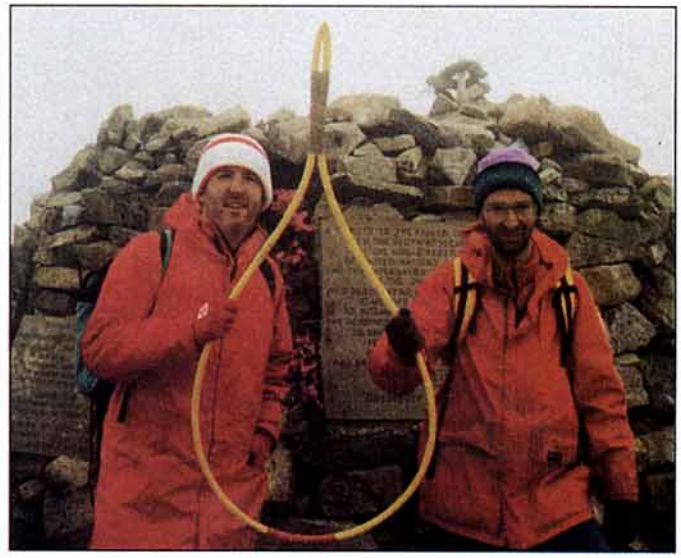
● A TWO-METRE DXCC, the world's second, has gone to KB8RQ of Ohio.

RAEN/RSGB A Statement

A JOINT statement has been issued by the Council of the Radio Society of Great Britain and the Radio Amateurs Emergency Network Limited as follows:

The application by the Radio Amateurs Emergency Network Limited for affiliation to the Society has been considered by the Society's Council. It has become apparent that clarification of some points of the Company's constitution is necessary before a final decision is made. The matter is now under discussion between the Society's Solicitors and the Company's Solicitors.

● KH6JEB HAS BEEN honoured by the US Coast Guard for his work on Kure Island, volunteer technical assistance arising directly from amateur radio.



Tony Larkin and Clive Ellis, GM4NVX, on the summit of Ben Nevis. The strange orange thing is a Hoople, a very simple low-tech mobility aid for the blind which was designed by Clive and Tony after working with teachers of the blind in the third world. They were accompanied by a blind student, Gary Lomas, who found the Hoople simpler to use on rough terrain than a long cane. Clive took his dual band ICW2E with him on the climb.

Amateurs Help in Balkans

JIM ATHERFOLD, G0FZB, of Shoreham-by-Sea, Sussex, was called on 20m by YU1ADJ requesting medicine urgently needed to save the life of a young man in a Belgrade Hospital.

After much effort and via a complicated route, he was eventually able to pass this message to the British Red Cross for further action.

A spin-off of this was a very favourable local newspaper story which praised amateur radio, distanced amateurs from eavesdropping scanner users, and listed the meeting times and contact addresses of two local clubs. Well done, Jim!

This is a timely opportunity to remind members that although the Amateur Radio Licences prohibit the passing of third party traffic, the sort of message received by G0FZB may be passed to an authorized government official. This is normally the RA (on 071 215 2171) who will see that it reaches the appropriate destination.

Bosnia Lifeline

AMATEUR RADIO featured in the national news media during March, this time projecting a positive image. The stories were of radio amateurs in the many beleaguered Bosnian villages who were providing the only remaining link between the starving villagers and the United Nations relief agencies.

Morse Test Change

RSGB MORSE Test candidates are reminded that the Radiocommunications Agency has announced that, from 1 April, the old-style 12WPM test consisting of separate plain language and figures will cease. This is to be replaced by a QSO-format test as described in *RadCom*, September 92.

An information sheet containing full details of the new format, including examples of the test, is being sent to all Morse Test candidates. Copies may be obtained by Morse instructors by writing to Fiorina Sinapi at RSGB HQ.

ARDF Committee

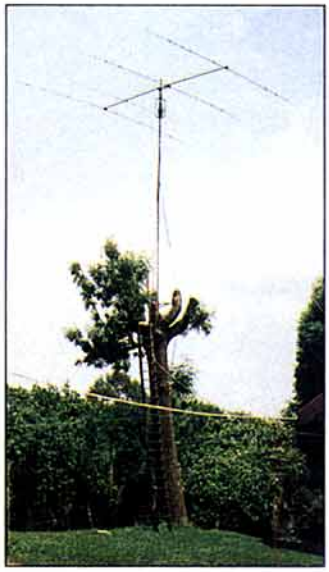
THE SOCIETY'S ARDF Committee, which deals with all direction finding matters, has a vacancy for a VHF 'DFer'. Applicants should have an interest in ARDF VHF Fox Hunts and need to be keen to assist in the organising of National VHF DF events.

Interested members should contact committee Chairman Brian Bristow, G4KBB, QTHR.

GAM1 Latest

THE LICENCE application for the RSGB's solar data beacon, GAM1, still awaits international

quency 3.821MHz. This could take two months. Full details of GAM1 can be found on page 7 of *RadCom*, June 1991.



Harry Booth, ZS5AEE (G3BDX) sent in these photographs of this unique antenna support at his hill-top QTH. The tree, which was shaped like this when he moved in, offers both support and a tilt-over action. Sadly, the tree is now redundant as Harry moved to Zimbabwe last year and is now Z26JP.

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BH10 6BW
Tel: 0202 577760

Dave G4KFN at
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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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Tel: 0629 580800
Fax:0629 580020

Steve G6URJ at
KENT
Chatham Road,
Sandling,
Maidstone,
Kent
ME14 3AY
Tel: 0622 692773

NEW

Tom G4LAR at
LEEDS
34 New Briggate,
Leeds
LS1 6NU
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...and now
PLYMOUTH
See page 64

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V2000	50/144/432MHz 2.15/6.2/8.4dB 2.5m	£109.95
HSWX1	2m/70cm, 4.5/7.2dB,	£74.95
HSWX2	2m/70cm, 6/8dB,	£82.95
HSWX290	2m/70cm/23cm, 3/6/8.4dB	£64.95
GPV5S	2m COLINEAR ,2X5/8, 6dB,	£48.95
HS50V	50MHz VERTICAL	£39.95

ANTENNA ACCESSORIES

ZA1	Bencher Balu1:1,5kW	£24.95
HS50B	BALUN, 1.8 - 50MHz, 1:1, 1kW	£24.75
MX2000	6m/2m/70cm TRIPLEXER	£59.95
HS790SN	2m/70cm DIPLEXER	£29.95
HS1010	6m/2m/70cm TRIPLEXER	£54.95

VSWR / POWER METERS

MR1000	HF / VHF 200W	£52.95
MR2000	VHF/UHF200W	£63.95
SX100	1.6 - 60MHz, 30W/300W/3kW,	£109.95
SX200	1.8 - 200MHz 5/20/200W,	£79.95
SX400	140 - 520MHz, 5/20/200W,	£89.95
SX600	1.8 - 525MHz, 5/20/200W,	£149.95
SX1000	1.8 - 1300MHz, 5/20/200W,	£175.00

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CX210A	2-WAY, SO239	£29.95
CX210N	2-WAY, N-TYPE	£53.25
CS201	2-WAY, SO239	£18.95
CX401	4-WAY, SO23	£48.95

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TL100	100W	£54.95
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DL30A	15/100W	£16.95
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105TSX	Medium Duty 520kg/cm	£163.16
747SRX	Heavy Duty 700kg/cm	£335.00
1105MSX	Double Gear Twin Drive 800kg/cm	£465.00
1200FXX	Vari Speed 2000kg/cm	£539.00
1300MSAX	ULTRA Powerful, 3000kg/cm	£935.00
EV700DSX	AZ-EL Based on 1105MSX	£899.00

HAND-HELD ACCESSORIES

AH209S	2m/70cm HELICAL, BNC	£10.95
AH210R	2m/70cm TELESCOPIC, BNC	£31.95
AH212	2m/70cm/23cm FLEXI	£28.95
AH213	2m/70cm/23cm High Gain Flexy	£36.50
HS2BN	2m TELESCOPIC	£15.95
HS2RB	2m HELICAL	£8.35
HS702S	2m/70cm FLEXY	£10.50
CF2K	Coiled Coax / Dc Lead, Suits Kenwood & Icom	£29.95
CF2Y	Coiled Coax / Dc Lead, Suits Yaesu & Alinco	£29.95
DC36F	Coiled Cigar Lead, Suits Yaesu / Alinco	£12.75
DC38F	Coiled Cigar Lead, Suits Kenwood / Icom	£12.75

MOBILE ANTENNA MOUNTS

BM5BC	Mag Mount, So239, 4m Cable Inc Bnc	£23.95
CLPM	"CLIPMAN" Clip Mount Inc Cable	£34.95
GSS	Heavy Duty Gutter Mount	£6.99
HSTMK	Trunk Mount Inc 4m Cable & PL259	£24.95
RG4M	Cable Harness 4m With PL259	£6.50
SFA4M	Cable Harness 4m (with Small Dia. Entry Cable) inc PL259	£28.50
SSB2	Boot / Hatch Mount 4m Cable & PL259	£27.95
FM101	Adjustable Boot / Hatch Mount	£20.50
FM202	Adjustable Gutter Mount	£19.95

MALDOL MOBILE ANTENNAS

CLEAR2E	2m 5/8 3dB, 6m 1/4,	£17.95
HS320	2m 1/4,	£4.25
HS727VM	2m 1/2, 3dB, 70cm 2X5/8 5.5dB	£29.95
HSVM2	2m 1/2 3dB,	£22.95
VM2SK	2m 1/2 3dB	£19.95
VM720SKR	2m 1/2 3dB 70cm 2X5/8 5.5dB	£26.50
VM727E	2m 3/4 4.5dB, 70cm 3X5/8	£47.95
VM7SS	70cm 1/2 3dB,	£17.95
WT300	70cm /900MHz	£24.50
WT500	2m/70cm/900MHz	£35.50
WT1000	2m/ 70cm / 900MHZ	£49.50
WT1062	21-28 / 50 / 144MHz	£62.00
WT1500	50 / 144 / 430MHz	£57.00
WT1800	21-28/ 144 / 430MHz	£59.95

HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham B17 8QB

I RECEIVED a most interesting letter from Rag, OZ8RO/LA5HE, about the recent AH1A expedition. He feels that in spite of the fact that advance publicity emphasised the presence of European operators on the expedition there seemed to be some lack of understanding of conditions likely to exist at the *European* end of things. Rag suggests that similar expeditions in the future should be aware of which regions have particular problems, and points out that there seems to be propagation into the Mediterranean area 24 hours a day. On phone the DX station should make announcements slowly in very plain and simple English because if these are not heard clearly stations will inevitably start a discussion on the frequency! It seems like a good idea to have a preponderance of good CW operators because - even if one is not a high-speed CW operator - most people can read their own callsign at reasonable speed and, of course, the DX station should slow down occasionally so that callers can follow instructions. Finally, there is no *law* which dictates that expeditions have to stay on the 'usual' expedition frequencies of 14.025, 14.195, 21.025, 21.295, 28.025, and 28.495MHz. Why not pick a *unique frequency* for each expedition. On the low bands it is a good idea to move up from the lowest 10kHz which is usually very crowded - a point emphasised by AH1A which used 7.023 MHz with considerable success. All very valid points I think.

If you are an ex-VP8 or ex-ZD8 and would like to meet others in the same category ex-VP8AQQ suggests meeting at 1100 or 1500 at the RAFARS or RSARS stands during the RSGB'93 Show. For more information please contact Craig, c/o YMCA Sports Centre, G3TRF ARC, Melrose Close, Maidstone, Kent, ME15 6BD.

To celebrate the 75th anniversary of the RAF on 1 April the RAF North Luffenham RC is operating a special event station on that day - GB75RAF. Look for it on 1.830, 1.984, 3.515, 3.790, 7.015, 7.045, 14.055, 14.290, 21.055, and 21.290MHz. More information from G3ZDW (QTHR).

CONVENTIONS

RSGB INTERNATIONAL HF CONVENTION

This will take place at the Beaumont Conference Centre (as last year) on Friday, Saturday, and Sunday, 8 to 10 October 1993 (and not as previously advertised). The centre is located a few minutes drive from the M25 and Heathrow Airport. There will be an extensive programme of talks on topics such as DXpeditions, equipment, IOTA, DX clusters, EMC, HF DXing, antennas and contesting. There will also be a programme for the ladies and on the Saturday night there will be a reception for overseas visitors and a DX dinner. For a prospectus and a booking form send an SASE to: RSGB HF Committee, PO Box 599, Hemel Hempstead, Herts HP3 0SR .

1993 IOTA CONVENTION

This year the IOTA Convention will take place on 15 and 16 May in Torremolinos, Spain. The venue will be the four star Don Pablo Hotel. Inclusive rates are available, and may be booked direct with the hotel (tel +34 52 389500 or fax +34 52 381562).

A full programme of events is being arranged and IOTA enthusiasts from many countries have indicated that they will be attending. Any queries regarding this event should be addressed to G3KMA (QTHR).

DX NEWS

THE DXAC release dated 4 February said that the committee is considering a petition to reinstate the country status of **Eritrea** and is waiting for the result of an election to take place there this month. There is a possibility of some operation by a group of Norwegians who are hoping to be there to give a training course in amateur radio between 4 and 12 April. Consideration of the situation in the former Czechoslovakia is also under discussion. The committee voted unanimously not to add the Tembourong District of Brunei to the DXCC list as it is not separated by at least 75 miles. Finally the committee is seeking world-wide input on suggested DXCC rule changes "that would discourage abuses in the QSL process." If you have any examples of poor QSLing practices and suggested changes please drop a line to ARRL DXAC, 225 Main St, Newington, CT 06111, USA - to arrive before 31 August 1993.

G4XPL has been keeping regular schedules with Tony Bevington, G4ZUI, who is currently in **Botswana** as A22PB. These take place between 14.130 and 14.170MHz at 1800 and all are invited to join in. According to *DX'press* DK7PE, HB9CVB, and G4CTQ are hoping to establish a club station ET3AA with equipment donated by INDEXA, and that ET3YU is now very active. The same source mentions that S92YL, in **Sao Tome & Principe**, is the wife of S92SS, and often to be found on 21MHz SSB. K4OFL is also on Sao Thome and is now S92ST. Daniel, F1FIC, is now on **Seychelles** with the callsign S79MD and expects to be there for two years. The *Long Island DX Bulletin* says that EA9TL, in **Ceuta & Melilla** is often in the 24.970 - 24.975MHz area from about 1330. Also that EA9UK is near 28.475kHz almost daily at 1600 and offers later CW skeds on 14 and 21MHz. *RSGB DX News Sheet* reported a new callsign from **Tristan da Cunha** - ZD9CQ - actually located on Gough Is (AF-030) in mid-February but no other details were available. TJ1GG, in **Cameroon**, appears most days near 28.030MHz after 1400. WA8OBO was expected to return to **Tchad** for a short stay as TT8OBO which will probably end in mid-April. G0DEZ is on **Ascension Is** until August as ZD8DEZ and is expecting to be on all HF bands. Favourite frequencies are likely to be 1.910, 3.691, 7.019, 7.091, 10.119, 14.019, 14.190, 21.019, 21.190, 28.109, and 28.491MHz.

The amateur club of Philippeville (ON4RAF) will be on the air from 0500 and 1600 on 17 April. This is to commemorate the crash of a Lancaster bomber which had a crew of seven Scots on its return from a mission over Czechoslovakia in 1943. Special QSLs will be produced.

A new national society - the Qatar Amateur Radio Society - came into being on 20 February and this should herald much increased activity from **Qatar**. *DX'press* says that SP5EXA now has his own callsign A71CW and is now on very often. He appears on 3.501MHz between 1900 and 2000. It also reports that according to VU2SMN the Indian Commercial & Technical Department has relaxed the regulations applying to operations from the **Andaman and Nicobar Is** and that this may lead to increased activity from there. FT4WD, on **Crozet Is**, is very often on about

BAND REPORTS

Many thanks this time to: G2AFV, G2HKU, G3GVV, G3KKJ, G4DJC, GW4KGR, G4MUW, G4NXG/M, G4PDQ (and the UK DX Packet Cluster), and G0KDS. Stations listed in italics were using CW:

1.8MHz

0800	*FK8CP, KP2A, TI4CF, ZL2JR, 7X2DG*
2100	*HL0HH, 5B4ADA, 9K2ZZ*
2200	*JA's 3AAJ, 4LKB, 5MHD*
2300	*HZ1AB, 5U7M, 9K2MU, 9V1ZE*

10MHz

1500	*AH1A*
1900	*A71AL, KL7Y, ZL4HB*
2000	*W0RJU/KP5, S92SS, TA2BK, ZS6QU*
2100	*FY5EW, V2/VE3BW*
2300	*HF0POL*

14MHz

0700	A61AB, V73/WA1PTZ, VK9NS, YJ8RN, 3D2DM
0800	AH1A, FK5C, FK8FA, P29DX, V63OM, V73DO, *ZK1UO*, ZL9/HB9TL
0900	H44JS, NL7QF, VK9LH, *VR6BB, XU5SE*, 9G1AP/9N1, 9M8PV
1500	HS1HSJ, S21A, VU7API, XU7VK
1600	FT4WD, HS0/G4UAV, S21ZG, *VU7SF*
1700	AH1A, KL7XD, V51ED
1900	ZD9CQ
2200	CE0ZIS

18MHz

0800	AH1A, JT1BV, YA1AR
1200	*OJ0/OH1VR, P4/W1EKT, 5T5CJ, 5Z4FM, 9F2CW*
1600	A45ZZ, *KL7HF*, XQ0YAF, *5R8DG*
1700	P40V, *VR6BB*

21MHz

0800	P29DX, T5CV, XU7VK, 9L3BM
0900	BY8AC, JT1BG, S92LB, *9F2CW/A*
1300	HC8KU, KC6RR, PY0PT, ZD7GWM, ZS9A
1600	FT4WD, *HK0ER*, TN1AT, *9F2CW/A*
1900	*HJ0VGJ, VR6BB*, ZD9BV, *ZK1UO*

24MHz

1000	*A71CW, 8Q7XX, 9J2BO*
1300	P43FM, TL8NG, TY1IJ, *9F2CW/A*
1400	A41KW, *3B8CF*, 5H3MT, *9K2MU*
1600	HZ1AB, N0TG/KP5, SU1AL/2, 3X0HLU, *7P8SR, 7Q7XX*

28MHz

0900	BZ9AAA, UA0SPY, XU7VK
1000	HS1HSJ, S21A, VK6, VK9CB, VU7API, 9M8ZZ
1400	FG5FG, FH5CB, SU1AL/2, VP2VF, 3X0HLU, 8R1AK
1700	HH7PV, *VR6BB*

1993 WARC BANDS TABLE

	10MHz	18MHz	24MHz	Total
G3KKJ	28	44	41	113
G2AFV	35	27	24	86
G4MUW	-	32	11	43
G0KDS	-	-	10	10

20kHz above the low ends of the CW bands between 1300 and 1500. V85KX, in **Brunei** looks for Europeans on 1824.1 or 3501 MHz at around his sunrise.

Keith Orchard, G3TTC (ex-ZD8PO, G3TTC/VS6, S79KO), will be holidaying in **Barbados** from 25 April to 6 May and will be active on all bands as 8P9DL. VP2MDB (W2WSE) in **Montserrat** who will leave on 6 April has been appearing often on 21.415MHz at 1730. He will make skeds for other bands. If you need **Navassa Is** look out for KB4VLO and others (including a European operator) who were scheduled to be there between 26 March and 4 April.

G3RZP reports that if you are visiting **Micronesia** the Department of Transportation and Communications there (PO Box PS-2, Palikir, Pohnpei, FM 96943), will be happy to issue you with a visitor's licence *free* if you send a copy of your own licence and some IRCs for return postage. There are three resident amateurs - V63OM, V63YL, and V63YM, plus the radio club V63FA - all reachable via PO Box 687, Yap, FM 96343. *EA DX Boletin* says that ZL1ACX might appear from **Nauru** from C21BR in the middle of this month. VR6RC is a new callsign being heard from **Pitcairn Is**.

AWARDS

ARRL HAS announced that the start date for 5BDXCC has been changed to 15 November 1945. This brings all except the CW DXCC into line with the same starting date.

Please note that - due to the dissolution of the former Czechoslovakia - as from 2300 on 31 December 1992 contacts with OK stations will not count for the **OK SSB** and **100-OK** Awards and both are now deleted. However, applications will still be received for either if received before 31 December 1993. These go to Awards Manager, Box 69, 113 27 Praha 1, Czech Republic. The **S6S** and **P75P** Awards will continue to be issued by the Czech Radio Club without any changes.

The AGCW awards manager has a new address: Tom Roll, DL2BNY, Richard-Wagner St 11, D/W 8502 Zirndorf, Germany. From 1 January 1993 fees for the CW-500, CW-1000, CW-2000, UKW-CW-125, UKW-CW-250, QRP-CW-250, and QRP-CW-500 awards were increased to DM10 or equivalent and for CW-QRP-100 to DM6.

CONTESTS

AGCW -DL-QRP/QRP PARTY

1300 - 1900 1 May

3.510 - 3.560, and 7.010 - 7.040MHz CW only. Class A - maximum input 10W, Class B - maximum input 20W, Class C - listener. Exchange RST/QSO no/class. QSOs with own country count one point, with others two. QSOs with Class A stations count double. DXCC countries are the multipliers. Send logs to Stefan Scharfenstein, DJ5KX, Himberger Str 19a, D/W-5340 Bad Honnef 6, Germany, to arrive by 31 May 1993. In the 1992 event (Class A) G4ZME was fourth with 4,656 points G3DNF (16th) with 2,735, G3OGN (25th) with 1,677, and G0KZO (36th) with 540. I have copies of the rules - SASE please.

HIS MAJESTY THE KING OF SPAIN CONTEST

1800 10 April - 1800 11 April

CW and SSB sections. 3.5 - 28MHz using IARU recommended 'contest preferred' band segments where applicable [see 'Amateur Radio Banplans', *RadCom*, Feb 92 and the *RSGB Call Book - Ed*]. Single and multi-operator and listener sections. All multi-band. One point per QSO and the same station may be contacted once per band. The multipliers are Spanish provinces worked on each band added together. (The provinces are: EA1: AV, BU, C, LE, LO, LU, O, OR, P, PO, S, SA, SG, SO, VA, ZA. EA2: BI, HU, NA, SS, TE, VI, Z. EA3: B, GE (or GI), L, T. EA4: BA, CC, CR, CU, GU, M, TO. EA5: A, AB, CS, MU, V. EA6: PM. EA7: AL, CA, CO, GR, H, J, MA, SE. EA8: GC, TF. EA9: CE, ML). Certificates will be issued to the first three and to those who scored 25% or more of the points scored by the champions. Usual log conditions - and these have to be received no later than 28 May 1993 by - URE, Contest & Award Manager, PB 220, 28080 Madrid, Spain. I can supply photocopies of the rules (SASE please)

According to *RSGB DX News-Sheet*, Paul O'Kane, EI5DI, has produced a version of his 'Super-Duper' contest logging programme for the RSGB IOTA contest on 24-25 July. He will supply a copy to anyone proposing to take part in the contest if they send him a blank formatted disk plus two IRCs or four IRCs without the disk. His address is 36 Coolkill, Sandyford, Dublin 18, Ireland.

Results of the **7th IARU World HF Championship** are now to hand. The RSGB HQ station GB4HQ scored 1,729,760 points to come sixth in that category and eighth in the multi-operator class. Congratulations to **GM0ECO** who came fourth in the world listings in the phone section, and to the late **G3FXB** who was world fifth in the CW section. UK scores were as follows: Mixed mode : G0AEV - 290,250 points. Phone only: GM0ECO (1,065,991), GW4BLE (181,104), GW0ARK (134,444), GI0KOW (107,760), GM3BCL (48,825), G0KTN (38,430), G3PRI (16,132), G3ICG (14,980), and GI0SAP (9,520). CW only: G3FXB (1,121,400), G3SWH (179,000), G3ESF (172,568), GM3CFS (154,752), G3DFV (114,057), G3TXF (104,648), GM3YTS (47,902), and G3UFY (19,680). Multi-operator: GB4DX (1,688,487), G0FDX (384,443), GW3CSA/P (161,660), G0NKL (144,875), GX4SME/P (91,350), and G3LRS (5,842). GM0ECO also entered the US September 1992 Phone Sprint - the first ever GM to do so.

Kevin Walton operating from the club station YL1WW in Riga. He was issued with the callsign YL/N4RMF and has also held the call 9M2ZZ.

HOLYLAND DX CONTEST

1800 10 April - 1800 11 April

1.8 to 28MHz according to IARU Region 1 bandplan. CW and SSB. Single-operator all-bands, multi-operator all bands and listener categories. Exchange RS/T plus QSO number (from 001). Israel stations send RS/T and 'Area' number. Same station may be worked on both modes on any band. QSOs count two points on 1.8, 3.5, and 7MHz and one on 14, 21, and 28MHz. Multipliers are total of areas worked on each band added together. Entries to be postmarked no later than 31 May 1993 and sent to: Contest Manager, Israel Amateur Radio Club, Box 17600, Tel Aviv 61176, Israel. Photocopies of rules (explaining areas) available - SASE please. In the 1992 event G0ROX/G4UIX scored 14,912 points, G4IQM 6,075, G4UZN 851, and GM0LZC 461.

DX YL TO N.AMERICAN YL CONTEST

1400 14 April - 1700 15 April (CW)

1400 27 April - 1700 28 April (SSB)

Ladies only! Copies of rules available (SASE please)

continued on page 16 ▶

QTH CORNER

FK5C	via F6AJA, 515 rue du Petit Hem, Bouvignies, F-59870, Marchiennes, France.
HA5BUS expedition	to Globex Foundation, P.O.Box 49, Budapest 1311, Hungary.
ON4RAF, ON4KAR	Fonds des Vaulx 69A, B-5640 Biesme, Belgium.
S01A/S0RASD	via EA2JG, Las Vegas 69, 01479 Luyando, Alava, Spain.
T55C	WA6CDR, 9903 Current Ave, Fountain Valley, CA 92708, USA.
XF0C	PO Box 231, Colima, Mexico 28000, Mexico.
ZL7AA	PO Box 54, Hastings, New Zealand.
3W4DK/3W4VL	*direct only* to OM3IA, Pavel Horvath, Radvanska 16, 81101 Bratislava, Slovakia.
9G5AA	PA2FAS, W.Faasen, Weeskinderdijk 3314 CM Dordrecht, The Netherlands.
5U7M	*only* via the JARL QSL Bureau.
8P9DL	Keith Orchard, G3TTC, 32 Myton Crescent, Warwick, CV34 6QA.

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YAESU RADIO

Yaesu FT747GX – Still an unbelievable performer across the H.F. bands and one of the top 5 in budget H.F. Transceivers. Top Band to Ten, you won't be disappointed...**£775**

Yaesu FT-890 – Recent reviews answer all your questions. Based on a winning combination, available with or without auto A.T.U...**£1199**

Yaesu FT-530 – A Twin Band Handheld and a host of features including Dual In-Band RX, CTCSS DTMF all fitted. Wideband coverage plus optional speaker mic with LCD display. Guaranteed to be the next No. 1...**£449.95**

Yaesu FT-1000 – You will never want another H.F. Transceiver! The FT-1000 does it all. This has to be the ultimate word in H.F. communications. Full brochure available...**£3299**

FULL YAESU RANGE NOW IN – CALL FOR DETAILS

DRAKE

Drake R8E – Number one in the U.S. since 1943. Drake is known right across the globe for its technology and above all, reliability – remember the "B" line separates (mine are still going!). Wide frequency coverage, excellent dynamic range Superb filtering In fact it's simply the best shortwave clarity you'll find. Outperforming many other receivers costing much more. Whatever your interests – Drakes' R8E can handle it!!!

- Fully filtered with AMS as standard
- 99 programmable memories with Scan
- Computer control option
- I.F. Pass-band offset facility

£1145

Options

R8E Matching Speaker	**£49.95**
VHF Conv. (35-54 & 108-174MHz)	**£225.00**
P.C Computer Drive Software	**£59.95**
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SCANNING RECEIVERS

NEW – MVT-7100,

Set to be *THE* handheld of 1993. This radio must be heard to be believed. It provides effortless reception of SSB and CW signals using **TRUE** carrier injection with 50Hz resolution. It can even (with accessories) be hooked up for FAX and DATA reception.

- 100KHz–1650MHz
- 1000 memory channels
- All mode reception (incl. SSB & CW)

Each set is supplied with all accessories including: UK Charger, NiCad Batteries, Earphone, Telescopic Antenna, Original Yupiteru English Manual.....**PRICE £449**

YUPITERU MVT 7000 HANDHELD

- Receives 8 to 1300 MHz 100kHz-1300MHz (at reduced sensitivity)
- 200 Memory channels
- Rotary or keypad freq. control
- AM/FM/NFM
- Large display with strength meter

Each set is supplied complete with:-

Full set of high power NiCads, AC charger, DC power lead and carry strap.....**£369**

AR1500 HANDHELD

Covers 500kHz-1300MHz receiving NFM/WFM/AM and SSB.

Supplied with a large selection of accessories including:-

- Charger
- Dry Cell Battery Case
- Long Wire Antenna
- Ear Piece
- Soft Case.....**£339**

HP2000 HANDHELD

Still our most popular handheld scanner.

- 500KHz-1300MHz
- 1000 Memory channels
- AM/FM/WFM Modes
- Sensitive Receiver
- Supplied with all accessories & UK charger.....**£299**

HP2000 – SUPPLIED WITH FREE UK SCANNING DIRECTORY VALUE £14.95

MVT-8000 – Mobile version of the 7000 c/w mains adaptor. Especially sensitive @ UHF. Recommended.....**£389.00**

AR2800 – Desk top, all mode scanning receiver. 500kHz-600MHz and 800MHz-1300MHz. Fitted BFO for SSB reception, excellent results. Come and try one!!!.....**£449.00**

AR3000A – The latest in multimode scanners, offering continuous coverage from 100kHz-2036MHz. Modes:- USB/LSB/CW/AM/FM/WFM. Computer control available via ACEPAC-3 Software (for PC/Clones).....**£899.00**

KENWOOD RADIO

Kenwood R-5000 – Tried and tested in all corners of the world. This receiver keeps going and going. 150kHz-30MHz. All mode with many options - what more could you want...**£949**

JUST ARRIVED!

The new TS 50S "Micro" 100 watt mobile HF transceiver. Go mobile now with 9 months FREE CREDIT. Part exchange available (written details on request).....**Price £999**

Kenwood TS450/690S – Two superb H.F Transceivers capable of delivering the "punch" when necessary. 100W O/P, optional Auto A.T.U. plus general coverage receive... **TS450 – £1149 690S – £1399**

TH28/48/78E's – The family of 3 "designer-type" handhelds that feel comfortable in the hand whether Two Meters, 70 Cms (ideal novice band) or 2/70 Twin Bander is what you're after - take a serious look at the "TH" range...**£Call**

Kenwood TS850S – Another sure winner from Kenwood! Designed with the serious operator in mind and built to last ..... why not consider upgrading or part-exchanging your old TS830???...**£1599.99**

NEW

EXTENDAMAST

10 METRE RETRACTABLE MAST

Suitable for: Dipoles, Long Wires, VHF/UHF Beams, G5RV and many other antennas.

A new and inexpensive aluminium 10 metre retractable mast that may be used at home or for portable use. Easy to erect in minutes - your antennas can now be independant of trees, buildings and other make shift fixing points! The steel guying rings are corrosion protected to provide years of useful life. Because individual requirements vary guy wires are *not* included. A base fixing plate is available as an extra.

Introductory Price £69 Plus £8 Carriage

FRG-100 H.F. RECEIVER

Call now and be one of the first to own this brand new general coverage receiver. Don't forget our generous part-exchange schemes.

Call the Hotline for Immediate response: **£559**

SONY "PYXIS" G.P.S. RECEIVER

A new portable global positioning satellite receiver that gives –

- ★ Position in Latitude/Longitude and Altitude, accurate to 30-100 metres
- ★ Distance and direction to dest.
- ★ Current speed and heading
- ★ Time incl. estimated time of arrival

PRICE £599

THIS MONTH'S BEST BUY

NEVADA MS1000 BASE/MOBILE SCANNER

SAVE £50

MOBILE VERSION OF THE HP2000 HANDHELD BUT WITH SEVERAL ADDITIONS:-

- ★Switchable audio squelch
- ★Tape recorder output socket
- ★Automatic - signal operated tape recorder switching
- ★All metal case for improved EMC compatibility
- ★Receives:- 500kHz - 600MHz, 805 - 1300MHz. Supplied with mains power supply.

£229

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TELEPHONE HOTLINE: (0705) 662145 FAX: (0705) 690626

ICOM RADIO

Icom IC-737 – A new full coverage HF transceiver with Auto ATU, Electronic Keyer, good receiver an a host of extras **£1350**

Icom IC-728 – If you like Icom, you'll like the 728 HF Transceiver. As expected, built to a high standard. Full coverage, 100W p/p, many accessories ..... **£Under 1000**

Icom IC-735 – This is more than just another transceiver - well designed & stylish in looks with an enviable performance. All the usual features and still **£1095**

Icom IC-W21E – Twin band handie with full duplex "Whisper" mode. C/W NiCad and charger **£425**

Icom R-100 – The mobile monitoring station. 500kHz to 1.8GHz. What more is out there? 100 mems, AM, FM & WFM modes ..... **£475 incl. free antenna**

Icom R-7100 – An affordable - professional grade receiver. Hosting 25-2000MHz coverage & a whole 900 memories to play with! Full colour brochure available ..... **£1095 incl. free discone**

Icom R-72 – Lets not forget all the S.W.L's - Icom haven't with this general coverage H.F receiver 100kHz-30MHz. All mode (FM optional) with 99 mems for favourite frequencies ..... **£649 incl. free antenna**

EARTALKER

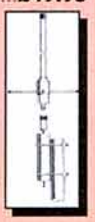
Eartalker – A completely new concept in microphone technology. The Eartalker is a combination of earphone and microphone which is worn within the ear. It provides outstanding transmitted audio quality and is suitable for all leading brands of handheld (Call for details on your particular model). Separate volume, PTT switch and control box **£39**

MICRO-READER

ERA Microreader – Data Communications decoder - decodes RTTY, CW, AMTOR (A) & SITOR (B). 16 character LCD display needing only connection to receiver extension speaker socket. Shortly to become available will be the large 4-line LCD display with built-in parallel printer driver port. Variable in-built morse tutor. Call and reserve your optional display now! **£169.00**

SCANNING ANTENNAS

WB1300 Discone – (25-1300MHz) Stainless steel top of the range "N" type connector. Complete with short mounting pole and clamps. 8 elements with vertical whip. Suitable for transmit on 6m, 2m, 70cm, 32cm, and 23cm bands. Length 1.7 mtrs **£49.95**



Nevada Scanmaster – (500kHz - 1500MHz). New high quality wide-band receiving antenna uses fibre glass/stainless steel with 4 small radials. "N" type connector. Length 1.1 metres **£39.95**

Micro-Scan – (180-1300MHz). New low cost budget ground plane antenna **£12**

Skyband – (25-1300MHz). Our most popular stainless steel economy wideband discone. Recommended. Bargain Price ONLY **£27.95**

SONY ACTIVE ANTENNAS

AN1 – An external active antenna with built-in pre-amp, covers 150kHz-30MHz. Fully portable with easy to mount fixing brackets **£57.95**

AN3 – Active antenna for Aircraft and VHF reception, suitable for Sony Air 7 plus many others **£54.00**

ALINCO & STANDARD

Alinco DJ-580 – Fast becoming the top selling Twin Band handheld here in the U.K. Complete with all "mod-cons" including AM Airband RX. Comes ready to go just plug-in and charge - the perfect way to operate 2M & 70 Cms **£399**

Alinco DJ-F1E – Don't take my word for it but my customers agree that this is the perfect companion when considering a 2M handheld. Full coverage and again offered with Airband receive **£249**

Alinco DR-599E – Replacing the 590E - This little unit has an impressive 50W on each band, automatic remote repeater function (ideal raynet exercises) and a host of extra facilities including ext.RX. Full colour brochure available - call us now! **£599.95 incl. free duplexer**

Standard C528 – This Twinband handheld is the model the others were based on! Still a popular choice with many features including remote cloning and repeater talk-thru! **£365**

Alinco DJ-F4E – A popular novice band radio on 70cms. Simple to operate handheld with 40 memories and 5 Watts output. **£269**

LOW LOSS CABLE

Superb Japanese low loss cable with aluminium foil and braid double earth screening, tough weather resistant yet flexible. Fantastic low loss – suitable for high power and frequencies up to 3GHz.

5D-FB (8.1mm – 0.055dB/mtr) **£0.65/mtr**
8D-FB (11.1mm – 0.039dB/mtr) **£1.65/mtr**
10D-FB (13.1mm – 0.031dB/mtr) **£2.42/mtr**

Losses quoted at 100MHz

CONNECTORS (for above)
"N" Types **£3.56**
BNC **£3.75**
PL259 ..... **£1.50**

KENPRO RADIO

KT-44 – 70 cms handheld. Thumb wheel frequency control. Full 10MHz! Ideal novice or repeater user. c/w NiCad, beltclip & charger **£159.00**

KT-22 – Popular 2M version of the KT-44 with simple NO FUSS operation. Ideal standby handheld or for use on Packet **£149.00**

KT-220 – A 2M handheld with direct keypad entry and LCD display. 10 memories & CTCSS fitted. Ext 12V DC socket. Up to 5 watts output SPECIAL **£169.95**

NEW HAND-HELDS

ALAN CT-145 – Fully featured 2M handheld with options for DTMF & CTCSS Paging. 5 watts output is available when powered from external 12V DC supply. Now with extended receive - 130-169MHz. Excellent reliability & performance **£199.00**

ALAN CT-450 – 70 cms version of the CT-145. This model will be a proven winner amongst the new novices and seasoned users alike. Full 10MHz coverage, 430-440MHz. 5 watts available when powered via 12V DC. This model comes highly recommended! **£220**

SONY SHORTWAVE

As a Sony Shortwave centre, we stock a complete range of Sony Shortwave product. Here is a selection of our best sellers:-

SW77 – One of the best new editions to the Sony range. The SW77 covers 150kHz-30MHz plus an additional 76-108MHz. With a rotary tuning dial, 125 scan memories, the reception of AM/FM/USB/LSB and CW modes is a breeze. Fitted tape record facility finishes this superb all round receiver. **£349.95**

SW1E – Pocket Shortwave plus VHF Commercial radio. Each unit is supplied with headphones, case and shortwave guide. This model will not hurt your pocket. **£139.95 this month only**

SW7600 – One of Sony's most popular VHF and Shortwave medium sized receivers. Frequency coverage:- 76-108MHz FM, 150kHz-30MHz Shortwave, on AM/FM/SSB. Well rated ..... **£149.95 this month only**

NEW PORTABLE SONY SW55 – Technically the best that Sony have come up with yet! Stable enough for fax reception, yet easy enough to tune on SSB. A dual conversion receiver produces excellant results on all the bands - the SW55 is a real winner.

- 150kHz - 30MHz, 76-108MHz, all mode inc. SSB.
- 125 multi-function memories inc. world time clock/alarm.
- 4 way digital inc. scan/manual/direct access ..... **£P/X Special**

NEW VECTRONICS AMP

Vector 500. "Canadian Punch!" A full 1000 Watts PEP on SSB enables you to beat the pile-ups. Now available here in the U.K. Top band to 10 from only 60-80 Watts input. Call now for your brochure!

- 4x811A Low Cost Tubes
- 600W C.W. 1000W PEP
- Compact 24lb weight

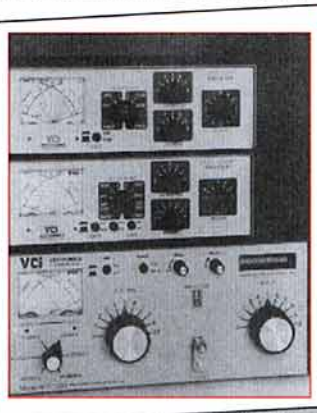
£865

TRADING POST

We buy as well as sell new and used radio equipment, please feel free to call Paul or John on our Hotline for an instant quote on either P/X or Buy-Ins.

Yaesu FT200 HF Rig, slight fault on 10m **£195**
Kenwood TS930 Matching Speaker, reasonable condition **£75**
Yaesu FRG9600 Desktop Scanning Receiver, av. cond **£365**
Kenwood TS440S C/W Matching Speaker, excellent cond. **£845**
Yaesu FT102 Mains Powered HF Transceiver av. cond. **£525**
Weltz SWR Meter Model SP400 ..... **£59**
Mirage B1016 2m Amp 150W **£150**
Trio JR500/S Shortwave Receiver, good for beginners **£149**
Trio R1000 Digital RX, 0-30MHz (choice of two) **£265**
Datong Speech Processor, Boxed **£50**
Yaesu FT707 12V HF Transceiver, excellent cond. **£425**
Kenwood R5000 Top of the Range model, exc. cond. **£650**
Yaesu FT290 Mk I, 2m Multimode, NiCads & Charger **£345**
Standard C5800 2m. Mobile, reasonable condition **£345**
MM33/LS 2m. Amp **£59**
Tokyo HP, HC200 ATU, 80m thru' 10m **£99**
ERA Microreader, boxed, v.g.c. **£1220**
Yaesu FT220 2m. M/M Base **£275**
VC300LP ATU, boxed **£110**
Trio TS700G 2m. Base av. cond. **£375**

Call us now – even if we haven't listed your radio, for what we know to be unbeatable P/X deals.



VECTRONICS

Vectronics – Canadian based - producing High Quality affordable Amateur accessories including:-

ANTENNA TUNING UNITS
VC300 – 300 Watt ATU with X pointer metering of FWD/REV/SWR readings. Select 2 coax antennas plus balanced line (4:1 balun included) **£139.00**
VC300DLP – As above but with built-in Dummy Load **£149.00**
VC300D – De-luxe model with peak reading bar graph **£169.00**
HFT1500 – 3KW ATU with built-in 4:1 balun. Peak reading bar graph, X pointer meter matches just about anything! **£399**
PM-30 – 3KW Power/SWR meter covers 1.8-60MHz **£89**
LP30 – Low pass filter rated 1.5KW **£39**

NEVADA ATU COMPONENTS

VARIABLE CAPACITORS
Either – 150pF, 170pF or 250pF variables (7.8KV rating) **£19.95**
500pF variable (2 x 250pF ganged) **£28.00**
TC48 – 48 turn mechanical turns counter 1 count/rev **£15.95**
Control Knobs – Large graduated 1-9 indicator knobs **£3.57**

HF NEWS

continued from page 13

HELVETIA CONTEST

1300 24 April - 1300 25 April

Nothing received so I suggest following the 1992 rules.

SP DX CONTEST

1500 3 April - 1500 4 April

CW only. As above.

EXPEDITIONS

LAST MONTH I mentioned a possible visit to **Ghana** by a group of five Dutch amateurs who will be going there at their own expense in connection with the Dormaa Hospital. This is because the Merwede Hospital in Dordrecht has close associations with Dormaa. The project planned will cost about US $15,000 and the five are hoping to raise this sum. When not on the air they will be helping with the installation of equipment and training of technicians. The callsign to be used will possibly be 9G5AA and the operators PA0TUK, PA3AWW, PA3DEW, PA3ERA, and PA3FUE. If you make contact please enclose a donation with your QSL - which should be sent to the address in *QTH Corner*. If the visit hasn't happened yet information is available from PA3AWW on +31 78160765 but it was scheduled for late March with a stay of three weeks.

If you are thinking of visiting the **Maldive Is** or **Sri Lanka** Vincent Paul of Post-A-Holiday Travel promises to get an 8Q7 licence in three days of arrival in Maldive and says that he can also help with getting a 4S7 licence. Phone or fax 081 570 9322 between 0700 and 2100. The Baltic DX Group is organising a summer camp on the Neringa peninsula, **Lithuania**, between 24 July and 4 August. There will be activities for non-radio people. There will be a radio station with the callsign LY93BDX, and operating using LY/your own call is also possible. Contact John, G0NPI, QTRH or telephone 061 793 5922 (evenings) for more information. Early registration reduces the price.

The P5RS7 activity is reputed to have taken place from a camp in the north-eastern part of the country near the Russian border. There were five operators - UB5JDM, UW0MF, UT3UY, 3W8RR, and Oleg Pavlenko and there were two stations operating simultaneously and using two TS-690Ss, one with a TL-922 linear. Antennas are a ground plane on 21 and 28MHz, an inverted-vee on 14MHz and vees for 1.8, 3.5, and 7MHz. The team ceased operation at 1800 on 6 January "on instructions from Pyongyang" after making over 36,000 QSOs.

PROPAGATION

THE G8KG REVIEW this month goes as follows: "The end of the 1992/93 DX season is as good a time as any to take a look at a few of the pointers to the state of Cycle 22. The provisional monthly sunspot number of 59.1 for January was the lowest since the first quarter of 1988 at which time values were, of course, rising rapidly. More recently, values have been on something of a plateau since falling below 100 in May 1992, though with a minor recovery centred on November. The average for the nine months from May 1992 to January 1993 was 75 as compared with 145 for the same period 12 months back; or in solar flux terms, 128 as compared with 202sfu. Comparison of the average geomagnetic indices for the same two periods shows a 50% reduction in the more recent one, reflecting a generally less disturbed magnetic field although still with some significant disruptions.

"The impact of all this on HF band conditions has been most noticeable on the higher bands which have proved to be disappointing as compared to last season and where DX openings have become shorter and less consistent, though even 28MHz has still been open to all continents on the better days.

"The first weeks of February saw a short sharp peak in solar indices with the daily solar flux value reaching 188 sfu on 8 February; but the magnetic indices peaked at the same time and by the middle of the month the flux was falling back toward the mean. It remains to be seen how far the fall will continue but it cannot be as dramatic as the fall of the 27-day average solar flux from 236 to 115 sfu in only 120 days in the first half of 1992."

THANKS

TO EVERYBODY who wrote and to the editors of the *Heard Is DX Association Newsletter* (VK9NS), *Long Island DX Bulletin* (W2IYX), *RSGB DX News Sheet* (G4DYO), the *Lynx DX Bulletin* (EA2KL), and a special welcome to the new *EA DX Boletin* (EA1QF). Please send everything for the **June** issue to reach me no later than **22 April.**

VHF/UHF NEWS

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

THE FIRST HALF of February brought some good periods of tropospheric propagation due to a large, persistent area of high pressure over Britain and the near continent. A few winter sporadic-E openings livened up 50MHz.

REGULATIONS

ON 1 JANUARY the Single European Act came into force heralding many changes to regulations in all walks of life, including amateur radio. The ITU (International Telecommunications Union) is being restructured and WARCs (World Administrative Radio Conferences) have been replaced by two-yearly WRCs (World - or Regional - Radio Conferences).

A very important development is that the CEPT, an acronym for the European Conference of Postal and Telecommunications Administrations, has introduced a new radio regulatory process through the ERC (European Radiocommunications Committee). These CEPT/ERC Decisions, as they are known, are more binding agreements between Administrations than the previous CEPT Recommendations, which were implemented on a voluntary basis.

Since the CEPT was formed about 25 years ago, many complementary bodies have been created which are now assuming increasing importance. Typical is the ETSI (European Telecommunications Standards Institute) and its numerous committees. These fix technical standards for everything from satellite Earth stations to cordless telephones, including specifications for the EMC performance of radio transmitters.

Ideally the Society should become an active member of ETSI. However, the cost would be a minimum of the equivalent of 50p on the annual subscription. It would seem fairer if IARU Region 1 appointed a member, thus spreading the cost among many national societies.

These topics were extensively discussed during the VHF Committee meeting on 20 February. One liaison on CEPT matters is through the ERO (European Radiocommunications Office) in Copenhagen, the head of which is David Court, G3SDL. Its regular *Newsletters* are a mine of information and alert us to proposals that could affect amateur radio. *[See 'EMC Specification' on page 7 for another link between the RSGB and ETSI - Ed.]*

PUBLICATIONS

THE VHF/UHF DXer is now published monthly. The January issue includes a photograph and description of K5GW's 2m EME antenna system comprising 48 10-ele Yagis; no wonder Gerald is loud. Sam Jewell, G4DDK, contributed an article on noise figure measurements and John Regnault, G4SWX, a comprehensive piece on a no-tuning power-FET preamp for 144MHz using an MGF1801 device.

The February edition just missed the deadline but publisher Dave Hardy, G8ROU, faxed the uncorrected proofs of the band reports. The UK subscription rate is £10, cheques payable to 'The VHF-UHF DXer' please. The QTH is: Thorntree House, Wensley, Matlock, Derbyshire, DE4 2LL. The magazine is distributed to 16 countries in addition to British Isles readers.

The January issue of *Six News*, the journal of the UK 6m Group, comprises 48 pages of news, information, reports and notes on the TS-690 transceiver by Darrell Moody, G0HVQ. Neil Carr, G0JHC, and John Livesey, G0JJL, are the joint editors and Geoff Brown, GJ4ICD, handles the DTP processing. His new Hewlett-Packard Laserjet-4 printer has produced high resolution copy at 600DPI. Contact G4IIL at Flat 6, 132 Marine Parade, Brighton, BN2 1DE for membership details of the UKSMG.

TROPHIES

THE VHF COMMITTEE has proposed the award of the Harold Rose Cup, for outstanding contributions to 6m, to Geoff Brown, GJ4ICD; the Louis Varney Cup, for advances in space communications, to James Miller, G3RUH, and the 1962 VHFC Cup to the editor of and contributors to the new *VHF/UHF DX Book*.

NORDIC MEETING

THIS YEAR'S Nordic VHF/UHF/SHF Meeting will be held in Denmark at Freeslev, near Haslev, from 11-14 June. The venue is

55km south of Copenhagen on the E47 road. Some indoor accommodation is available as well as extensive camping facilities. Lectures on low noise preamps by DJ9BV, microwave techniques by G3WDG, and satellites by AMSAT are proposed. Also promised are measurement facilities for antenna gain and radiation pattern on 5.7 and 10GHz, preamp gain 50MHz to 10GHz and general RX/TX parameters.

Social activities are high on the list including the traditional Ham Party on the Saturday night, excursions and entertainment for non-radio folk. For further details contact either Uffe Lindhardt, OZ1DOQ, at Ostrigsgade 49, 2 tv, DK-2300 Kobenhavn S (Tel: 010 45 31 598970) or Ivan Stauning, OZ7IS, at Bartholinstraede 20, DK-2630 Tastrup (Tel: 010 45 42 523314 or fax 010 45 44 922891).

CONTESTS AND ACTIVITY

THESE TOPICS have generated some useful input from readers. The broad conclusion is that contests ought to be a useful basis for increasing activity provided that the scoring systems are fair. Rob Briggs, G1GHA (SFD), proposes a three-category contest on a regular day and time each month, eg 8pm to 10.30pm local time on a Tuesday, with the results; ". . . . normalized to remove variance due to propagation and activity levels." He suggests the results be published monthly in this column as a table of each station's best three entries from the last six.

Geoff Grayer, G3NAQ (BRK), reckons that: "Seeing huge discrepancies in the final score discourages people to enter contests." He prefers to consider the scoring algorithm rather than the scoring system, the aim being to evolve an algorithm that would reduce the spread in results. He suggests the only way to do this is empirically, excluding any factors like station ASL or power level from the equation.

Ian McLuskie, G8ORG (SFD), disagrees that Midlands stations are more favoured by the county multiplier scoring system but thinks the radial ring system should be replaced by the points-per-kilometre method. Jim Barr, GI1CET, from Belfast thinks that dropping the county multiplier idea would further reduce the chances of GIs making QSOs, since many operators in the south and south-east would only beam towards the continent.

Darrell Mawhinney, GI4KSO (DWN), also likes the county multiplier scheme as it encourages stations to beam to GI to pick up a few points. He points out the disadvantage of a locator squares multiplier for GIs and stations in the north and west; they have large areas of sea, so fewer opportunities to pick up points.

METEOR SCATTER

ACCORDING TO the International Meteor Organization's *1993 Meteor Shower Calendar* the Lyrids stream should peak at 0200GMT on 22 April. The ZHR (Zenithal Hourly Rate) is usually 15-25 but up to 90 was recorded in 1982. If you are into number crunching, at maximum the solar longitude is 32.1 degrees, the right ascension 271 degrees and the declination +34 degrees.

The radiant is above a mid-UK horizon from 1830, through midnight, till about 1430. GMT times when the reflection efficiency exceeds 50% are: NE/SW 2300-0400 and 0700-1130; E/W 0230-0600; NW/SE 2100-0100 and 0530-1100. The IMO states: "Maximum rates are attained for only about an hour or two at best, and can be rather erratic at times."

MOONBOUNCE

ON 144MHZ, GI4KSO (IO64XK) runs 350W to a 13-ele Yagi. At moonset on 5 February Darrell worked VE7BQH, and next day WB5BLT with both signals peaking RST529. From the February *VHF/UHF DXer* I note that Stewart Cooper, GM4AFF (GRN), has worked 11 new initials - stations contacted for the first time - including VE1BVL, N4GJV, WA6PEV and AA4FQ.

Andy Cook, G4PIQ (ESX), added 15 new initials bringing his total to 65. He uses four 15-ele Cue-Dee Yagis and completed with PA3FJY who was only running 50W to two 17-ele Cue-Dee antennas. The test was conducted when both stations had horizon gain. To illustrate its effect, I ran K4VX's Yagimax-3.25 program to analyse a 13-ele DL6WU-type Yagi with a 6.75m boom and found the free space gain was 15.4dBi. At 10.4m AGL, the calculated gain went up to 21.3dBi at 3 degrees and at 15.6m AGL it was 21.4dBi at 2 degrees.

To put this in perspective, if you double up your antennas you will probably achieve 2.5dB extra gain, so horizon gain can effectively quadruple your system. If stations at either end are able to take advantage of this phenomenon they could enjoy over 11dB less path loss. However, terrestrial noise pick-up becomes a problem when the Moon is at low elevation.

The weekend 3/4 April, three days before full Moon and approaching perigee, is the best period for April EME tests. As most operators exploring this more esoteric propagation mode will have access to a computer with EME software, I won't give any 'when and where' data. For those with Amstrad PCW computers using CP/M and 3" disks, I can supply the WA1JXN program; send me an SASE for a copy of the latest Proglist of amateur radio software.

50MHZ

WHAT A difference a year can make. The April 1992 *VHF/UHF News* featured reports on excellent openings to Australia and Japan. The only F-layer DX this February was noted by Ted Collins, G4UPS (DVN), who learned, via 4X4IF, that DK5UG reportedly worked VK4FP at 0840 on 21 February. Towards the end of the month TEP propagation to southern Africa returned, according to GJ4ICD's report.

Geoff learned that C31HK seems quite keen on 50MHz but has no equipment. He has been granted a permit after five years of negotiations and will be the first *legally licensed* 6m station in Andorra. Only residents are now permitted to operate on the VHF/UHF bands in the principality as the authorities seem fed up with the problems caused by foreigners in the past.

Next some items from G4UPS's February *Information Pages*. Canadian beacon VE2TWO has been heard again on its original frequency 50.088MHz. ZS6UB is sending gear to C9RJJ (KG64) in Maputo, Mozambique. He is John, WA4WKY, and is with the US Embassy there; QSL only via W8GIO. Club station 9K2USA is QRV from Kuwait and QSLs for 9K2ZR should only go via K8EFS and *not* direct.

If you still need a card from 7Q7JA, try his home call, JH1IHE at 2-10 Yamate, Hanno City, Saitama 357, Japan. Nick Waite, G3KOX, operated from Mogadiscio (LJ22) for a couple of weeks from 12 February using the call 6O/G3KOX. He used 100W to a 4-ele Yagi. Class A and B Polish amateurs have access to 50-52MHz with no antenna restrictions but are limited to 10W output on SSB and CW only. The charge for permits is the equivalent of $160, according to SP4TKK.

Coming to activity, the EME tests arranged by the UKSMG with W6JKV and K6QXY brought a few reception reports from the southern part of the realm. GJ4ICD reported that G8VR (KNT), G3UKV (SPE) and

G4AHN (SRY) identified signals. On 2 February there were fleeting Es openings to LA, DL and OE, 1129-1405 in which G4UPS worked DLs in JN48/49.

GJ4ICD reported widespread Es on the 3rd to stations in ES, OH and SM0, who were worked from GD down to F8OP in Lyon. The opening lasted from 1530 to 1900. At 1654 G4UPS worked SP5CCC (KO02) as did Terry Chaplin, G1UGH (SFK). On the 15th, G4UPS noted Es to SP and 9H, 1716-1750, then to S5, OK and 9A, 1953-2030. Next day Ted heard F5QT and EH3CUU calling "CQ", with beacon CT0WW peaking S6 at 1815 for 10min.

Ela Martyr's, G6HKM (ESX), tower suffered some wind damage on 16 January so she missed the Es opening. On 3 February she enjoyed 45min of Es from 1654 working OH3XA (KP20), SM0TSC (JO99), SP5CCC and ES5QA (KO38). On the 13th she contacted FC1ERF (JN19) after QSY-ing from 2m.

70MHZ

IAN CORNES, G4OUT (SFD), operated in the first two legs of the Cumulatives on 24 and 31 Jan; best DX were GD7HEJ/P, GW3MHW (PWS) and G4DSP (LCN). One QSO on the 24th was with Jack Hum, G5UM (LEC), who again complains about fixed stations hogging the FM calling frequency, 70.450MHz, instead of QSY-ing once they have established a QSO. He wishes they would buy a pair of crystals for another frequency so that mobiles could have a chance to have some contacts.

144MHZ

MIKE MATHER, G0LBP (LEC), seeks publicity for an AM Experiment on 11 July on 144.5625MHz organized by the Charnwood Amateur Radio Contest Club. Club station G0OCE will beam north and south in the hope that any AM enthusiasts will call. A chance to blow the dust off some of those old rigs and give them an airing? Mike is QTHR.

Colin Morris, G0CUZ (WMD), thought the Quadrantids shower: ". . . . was a washout . . . . with a small increase in meteor activity, 1400-1800, on 3 January, otherwise hopeless." All his skeds failed but he did complete on random CW with OE6XHF and UZ2FWA. (Previous reports were more favourable suggesting the peak occurred just after midday). The good tropo on 14 February brought CW QSOs with HB9s AOF (JN36) and BNI (JN37) and assorted French stations. He heard GM3JFG at 1725 in a weak aurora on the 17th.

G6HKM worked GU3EJL (ALD) on 3 February. On the 5th Ela contacted EI7GL (IO51) at 0022 and later in the day some DLs, LX/ON1KTE and ON5SE (JN29) and F1BLD (JN38). The period 13/14 brought QSOs with DL, F and HB9 stations in JN25, 36-38 and 48. In the evening of the 13th, TV channels 23 and 26 were unwatchable at G3FPK.

Edward Allely, GW0PZT (GDD), worked some continentals in the 4-6 February lift including ON2AAC (JO11), LX1JA (JN29) and F6APE (IN97). When he contacted DK8KJ (JO30) on the 5th he was S9, yet there was little activity. In a short aurora on the 7th he heard a few GMs, 1840-1900; that was the only aurora heard in Pwllheli in the month. Edward worked a couple of DLs on the 9th, one when he was only using 10W, but again activity was low. More Germans were contacted on the 14th.

Joe Ludlow, GW3ZTH, operated portable again. On 3 February the opening extended from IN78/88 to JN29/38, best DX being FD1MKD (JN38). The 4th was a good day with 11 continental squares worked plus IO51 and the usual UK ones. His 1800ft ASL portable site was 200-300ft above the temperature inversion with a temperature of 10 degrees Celsius; back home it was only 2 degrees in the fog. On the 6th Joe worked into IN96, 97 and 99, JN05, 17, 26, 30 and 37 squares in declining conditions. During two hours on the 14th he contacted six HB9s and quite a few stations in JN36-39.

GI1CET anticipates more contest activity from GI following the formation of a new group; ". . . . from the ashes of a number of previous groups providing a good number of experienced operators." The first outing should be for the 15/16 May 144MHz event.

430MHZ

G0CUZ WORKED F1JRX (JN25) for square number 80 on 14 February. G6HKM was QRV on the 4th contacting F1CYB (JN17) and next day Ela found DL3SBH (JN48). She completed 97 QSOs in the contest on the 7th. In the lift on 13 Feb she worked HB9AMH/P (JN37), F1JRX and DK5WO (JO30), while another 11 QSOs were made on the 14th with JN17 and 36, JO30, 31 and 40.

Karl Lamford, G6ODT (NHM), reports increasing activity and has been putting his 32W to two 21-ele Yagis to good use. He worked a few Fs in the 3-5 February opening, plus PI4ZVL (JO21) on the 9th and FD1MKD/P next day. The 13/14th brought the best DX with DLs in JO30, JN48 and 49, ON5VU (JO30), FC1DBE (JN09), F1JRX and HB9SNR (JN36).

By midnight on the 4th, GJ4ICD found Jersey's TV link to the mainland unwatchable due to severe co-channel QRM from the continent. All beacons were well up and Geoff worked HB9MIN/P. GW3ZTH/P contacted FC1PAU (IN88) on the 3rd; F6s CRP, DBB and CCH (IN96) on the 4th; F6APE on the 6th plus stations in IO71, 81, IN97 and JN06; HB9MIN/P was worked on the 14th.

1.3GHZ

G6HKM's FIRST QSO of the year was on 7 February with ON5UI (JO11). On the 13th Ela worked HB9AMH/P, F1HRY (JN18) and DK5WO, plus F6CTW (JN18) next day. On the 4th GJ4ICD copied several German beacons in JN48, JO30 and JO50. Two new squares were FC1MOZ/P (JN27) and DL4SDT (JN48). Next day on CW OK1s FFD and IBL (JO60) were the first ever GJ/OK 23cm QSOs with the Czech Republic and provided Geoff with another new square.

LOCATOR SQUARES TABLE
STARTING DATE: 1-1-1979

Callsign	50MHz	70MHz	144MHz	430MHz	1.3GHz	Total
GJ4ICD	559	-	264	121	68	1012
G4DEZ	201	-	255	71	62	589
G4RGK	167	-	319	182	58	726
G6HKM	415	-	237	118	57	827
G3IMV	403	-	492	125	52	1072
GW4LXO	440	23	261	108	48	880
G1GEY	-	-	179	125	35	339
G4MUT	186	25	158	97	34	500
G6MXL	110	23	115	64	28	340
G0NFH	133	26	101	51	18	329
G8LHT	196	20	202	93	17	528
G1SWH	245	33	179	63	9	529
G3FIJ	1	24	80	25	3	133
G0EVT	230	12	249	65	1	557
G6HCV	435		246	-	-	681
G4TIF	310	28	207	112	-	657
G0JHC	481	-	48	-	-	529
GW6VZW	332	-	143	6	-	481
G0MGA	249	-	216	-	-	465
G0CUZ	-	-	375	80	-	455
G4SSO	80	-	269	99	-	448
GU7DHI	329	-	106	5	-	440
G0FIG	200	-	171	42	-	413
G4SWX	-	-	404	-	-	404
G0GMB	66	-	216	108	-	390
G4RRA	-	-	299	80	-	379
G4YTL	-	38	279	37	-	354
G0HVQ	268	-	71	-	-	339
G1UGH	196	-	121	-	-	317
GW8JLY	-	-	271	36	-	307
G0EHV	-	35	187	81	-	303
G8XTJ	147	-	126	-	-	273
GW4VEQ	-	-	267	-	-	267
G3FPK	-	-	246	-	-	246
GW4FRX	-	-	235	-	-	235
G4DOL	-	-	226	-	-	226
GM1XOG	181	-	-	-	-	181
G7LIJ	-	-	153	-	-	153
G7EWL	54	2	79	6	-	141
G7CLY	70	-	60	2	-	132
G6ODT	-	3	57	62	-	122
GM0GDL	-	-	122	-	-	122
GW0PZT	-	-	121	-	-	121
GI1CET	88	-	29	3	-	120
G0HDZ	11	-	67	-	-	78
G4OBK	21	1	45	-	-	67
G7JAF	-	-	53	3	-	56
G3UOL	-	-	37	-	-	37

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Next deadline is **29 April**. Band of the month 1.3GHz.

FINALE

A FEW ENTRIES in the Squares Table have been deleted as scores had not been updated for a year, even after my sending reminders. I hope all your antennas survived the January gales so you were able to enjoy the tropo. Let's hope there is more to record next month. The deadline for **June** is **29 April** and for **July**, **27 May**. The BT Gold mailbox is 76:MSX021, though nobody seems to use it now. By contrast my CompuServe one on 70630,603 is busy and can be accessed by Internet users, whereas the BTG network doesn't support this. The fax machine is left on 081-668 5582, shared with my telephone, and the telex number is 9312111074(CN).

● 2 METRE beacon GB3VHF, Wrotham, Kent, returned to service at the end of February.

QSL

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

Frank Harris, G4IEY, who is a QSL Sub Manager, has sent me a card dated 1971 for a SSB contact between a PY5 and a G6 - another in the 'never give up hope' series.

● Rex Pontet-Piccolomini, G3MRS, did his wireless operators course at Cranwell in 1938 and was taught VE as an alert or 'get ready to receive' signal. Sending and receiving callsigns were separated by V until replaced by DE after the war, although Rex used DE in 1944 but its use was discouraged.

● Eddie Lingard, G3WNQ, trained as a Merchant Navy Radio Officer 35 years ago and says that VE meant everything sent after that signal was meant to be copied. It ensured that preliminary Q signals and pleasantries were not taken down. Sending VE meant the start of the 'real' message.

● Martin Stoneham who used to be the QSL Sub-Manager for GB A to GB M cards is still getting a couple of envelopes with cards in them despite the fact that he ceased doing the job ages ago! Once again - Martin does *not* want the cards sent to him.

● John Bosley, G0FGS, sent me photocopies of an Admiralty Instruction dated 1918 which shows VE as an executive signal to perform some previously indicated action. The manual also states that Morse can be sent by WT, lamp, flag, foghorn or whistle! It also includes some interesting information on the old Z Code. Here are some examples: ZPM - Your signalling is very slack: ZOD - At dawn all guns are to be manned, ammunition is to be ready and a sharp look-out kept and, the best one of all, ZSD - Am stopping temporarily due to difficulties on the cattle decks!

● G4ZVB, G Mantovani, says he is still getting cards for HS0AIT and he doesn't want them. He was there some five years ago but only for a few days!

AWARDS

Because QSL cards are invariably vital to any awards system I thought it might be interesting if I went through some of the awards for which the Radio Society of Great Britain is responsible. In the next few months I will show the requirements for various awards together with a picture of the actual certificate and detail some of the tips passed on by the relevant awards manager. I hope it will make interesting reading.

I will start with a few basic golden rules which apply to the claiming of all award certificates:

1) If you are claiming an award try and make it easy for the award manager to administer. He may have to check up to 500 QSL cards against an application. It's even worse if you happen to be a QSL manager for a rare DXpedition and have to deal with tens of thousands of cards.

2) No manager is interested in what type of equipment you use or the fancy design on your card. He or she wants to take note of the important details so make it easy for him and you will get your award a lot quicker.

3) Keep your callsign and QSO details on one side of the card.

4) Write clearly indicating Day/Month/Year and always have the time in GMT/UTC.

5) You can write a potted version of your life history on the back of the card but do not expect the manager to find the time to read it to extract the relevant details for the award!

6) Be accurate with the time and date. Just one hour wrong could be 200 entries away in the DXpedition log book. One day wrong could be 2000 entries away! If you make that sort of mistake you will almost certainly get the card back marked 'not in log'.

7) Be concise, be accurate and be legible. When you next order a reprint of your QSL cards why not think about a simple design with your callsign on the front and a rectangle split into separate boxes headed Day, Month, Year, GMT, Band, Report, Mode. If we ever get round to electronic scanning of cards then that configuration will put you right up to date for the technology. In addition please remember to put your callsign on the back of the card if you are sending it via the bureau.

8) When it comes to paying for the award you can almost always use either International Reply Coupons, US Dollars or local currency. *Do not send cheques* for awards. The reason is put simply by an award manager when he says "Have you ever tried to cash a cheque for 4 US Dollars drawn on the Commonwealth Bank of Australia?" If you haven't, then he has and, whilst the listening bank will oblige, it will cost almost £10 to do it!

Even cheques for sterling drawn on British banks incur charges that make it uneconomic to process them. One award manager even had a cheque for 39p for postage to return the QSL cards! The golden rule is *no cheques - no hassle.*

This is the attractive QSL card used by the Isle of Man Guides organised by Denys Hall, GD4OEL. This year the Guides also celebrated 100 years of the Isle of Man Steam Railways.

RSGB 28MHZ COUNTIES AWARD

THE FIRST award I will detail is the 28MHz award, the certificate for which is reproduced opposite. It is issued for confirmed contacts on 28MHz with 40 different counties in the United Kingdom, Channel Islands and Isle of Man. Stickers are available for 60 counties and all 77 - if you can manage to get that many!

The award is for Tx only on the 28MHz band either all CW, all SSB or mixed mode. Stations in the United Kingdom, Channel Islands and the Isle of Man must submit QSL cards with the application. Other stations should support their application with a list of contacts certified as correct by their national society's awards manager. The fee for the award for RSGB members is £1.50 or US $2 or 6 International Reply Coupons. To all others the fee is £3 or US $4 or 12 International Reply Coupons. Remember - *no cheques!*

The application should be sent to: RSGB HF Awards Manager, Bill Ricalton, G4ADD, 4 South Road, Longhorsley, Morpeth, Northumberland, England. NE65 8UW.

SUB-MANAGER CHANGES

● Please note that the following are no longer QSL Sub Managers: Mick Cuckoo, G6ECM (Sub-Manager for the G0BAA-BZZ series), and Mr A D Robinson, G0GRA (Sub-Manager for the G0RAA-RZZ series). The new Sub-Managers are - for the G0BAA-BZZ series is Mr Tom Bruin, G0PRN, Seaford, 38 Kirkley Cliff Road, Lowestoft, Suffolk NB33 0DB. For the G0RAA-RZZ series is Mr G P Greatrix, G7HNM, 80 Liquorpond Street, Boston, Lincs PE21 8UJ.

● The new Sub-Manager for the G0TAA-TZZ series is Mr Jim Taylor, G0RFN, 19 Fairview, Burnhope, Durham DH7 0AW.

HF F-LAYER PROPAGATION PREDICTIONS FOR APRIL 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	.....11111..	....123332..	...24566661.	...56777884.	213766667885	866543345789	8642111112478	53.....24+
MALTA	....112121..	....234344..	...25677773.	...578888962	533777778997	988654445799	997321123588	++4.....25+
GIBRALTAR	.....	.....11112..	....2444452.	...15676785.	211577777995	876765555799	9985322225589	++52.....25+
ICELAND	.....	.....	.....111121.	.....333453.	466678773	6325655555688	8875322234677	++52.....34
** ASIA								
OSAKA	.....11.....	....1231....	...144421...	...25443312.	...142124562	....1...2563	.....24.	.....,.
HONGKONG	....12332...	...1344542..	...35656651.	..1245457741	1...22125784	1.....2585	253	.....2.
BANGKOK	...1334431..	...3455663..	..134666772.	..1235457851	3....2125786	3.....2588	1.....266	33
SINGAPORE	...2344442..	...3566664..	..135666872.	..1235457852	3...12125786	3.....2588	1.....266	33
NEW DELHI	...234443...	...3566651..	..145666732.	1.2334457652	421..1125787	63.....2589	4.....267	34
TEHERAN	...3455552..	...4567774 1.	..2555668731	2144334578 63	6552..125798	862.....2589	73.....267	4.....34
COLOMBO	...2455553..	...4567775 1.	..1446668841	2122244578 73	631..1125798	72.....2589	5.....267	2.....34
BAHRAIN	...3566653..	...5667775 2.	1.2555668852	3244334578 75	8651..125799	962.....2589	73.....267	5.....34
CYPRUS	...34565541.	...5678776 2.	1.2788888962	3248777789 85	8776545568 99	9863212236 89	8731....1378	+4.....4+
ADEN	...3567765 1.	...5677787 31	3125556689 75	6444223579 87	9751..125799	973.....2589	85.....267	52.....34
** OCEANIA								
SUVA/S	.....	.....111...	....1222321.	...12333552.	..144212474.	..142...141.	...1.....2..	.....
SUVA/L	11.11.....52	32.231....74	43255211.285	3347632215 74	.1474211375 1	..141...142.	...2.....2..	.....
WELLINGTON/S	.....	.....112....	....233421..	...2444444 2.	..2542124651	..241...253.	...1.....21.	.....
WELLINGTON/L	1.....11	22.11.....23	44243.....56	554651...176	235741...463	.1352...1431	...2.....21.	.....
SYDNEY/S	...12221....	...244431...	...56655431.	..1665456531	..1542125773	...21...2562	.....24.	.....
SYDNEY/L	....1.....1	....3.....12	211151....45	3223721...76	2125521112 85	...32...1462	.....13.	.....
PERTH	...34551....	...46762....	..15766421..	1.2465444 32.	4111421256 73	3...1...2586	1.....265	32
HONOLULU	.....	.....11..	.....1..331.	....1211552.	..1232114 51.	..342...12..	..12.....	.....
** AFRICA								
SEYCHELLES	...35577641.	...5667786 31	3125556688 75	6443234578 97	975...125799	962.....2589	84.....267	5.....34
MAURITIUS	...3677776 21	1..5678888 42	4225566689 76	7444334579 98	9851.1125799	962.....2589	84.....267	5.....35
NAIROBI	...3667776 31	2..5677888 53	5326555689 87	8655223578 99	9972...25799	984.....2589	872.....267	54.....35
HARARE	1..3678887 42	31.5777889 64	6427555689 98	9757333578 99	9974...24799	9961....1589	883.....267	55.....34
CAPETOWN	...2678888 52	1..4778899 75	41.7766689 98	73.8644437 99	9716311147 99	9964....1589	7851.....257	552.....24
LAGOS	1..1668888 52	42.3777789 75	7526755589 98	9857532368 99	9987 2...4799	8974....1489	7852.....257	452.....24
ASCENSION Is	1...5656775 2	32..7766887 4	6522865569 97	8854742248 99	9986 51..1699	9984 2....379	7852.....157	452.....24
DAKAR	....4677785 1	21.1677779 73	5523865568 97	8755743248 99	9987 51..1589	9985 2....278	7852.....47	552.....24
LAS PALMAS	....2455563.	....5677785 1	21.2788889 84	4425887788 97	9878765567 99	9986432235 89	8874 1....268	++4.....3+
** S. AMERICA								
Sth SHETLAND	.....7888 51	.....1888 973	2....3668997		9642321146 78	8974 2...1357	6852.....124	452.....
FALKLAND Is	.....2777 851	11...3788 873	4422156678 86	7755254467 88	9987 42113468	9985 2....147	7862.....15	553.....2
R DE JANEIRO	.....6755 751	11...7766 873	4422276557 86	7755454335 88	9987421..279	9985 2.....48	8762.....27	543.....4
BUENOS AIRES	.....4677 751	11...6777 873	3322166667 86	7644354435 88	9987 42111268	9985 2.....37	8862.....4	553.....2
LIMA	.....44454 1	....1.6666 62	21..4266556 5	5322634433 57	8875 5211..26	8985 2.....3	6862.....1	353.....
BOGOTA	.....3444 3.	.....1555 552	2...1365446 5	4311344323 247	8765521...16	8985 2.....3	6862.....1	353.....
** N. AMERICA								
BARBADOS	.....3444 541	.....5555 662	21..2665457 5	5322454323 67	8865521...37	9985 2.....15	7862.....2	553.....
JAMAICA	.....2233 3.	.....4445 52	1....2554 454	421.2344 3246	7653421 1..16	7975 2.....3	5862.....	253.....
BERMUDA	.....2223 3.	.....2444 552	1....4554 564	31..2443 3367	8643421 1.137	8975 2.....4	6862.....2	353.....
NEW YORK	.....1112 2.	.....2233 41	1....1444 564	31...3443 456	7532221 11136	7874 2.....3	4752.....1	.42.....
MEXICO	.....1122.	.....1333 31	1.....2444 43	21..1.3432 24	5532311 11..2	4774 2.....	1652.....	.32.....
MONTREAL	.....1111.	.....1223 31	.....1344 453	2....2343 466	6422221 11136	6874 2.....3	4752.....1	.42.....
DENVER	.....	.....11.	12232	1.....23233	43211.112112	3664 2.....	1452.....	..2.....
LOS ANGELES	.....	.....111.	12331	1.....24332	32111..131.1	2564 2.....	.252.....	..2.....
VANCOUVER	.....	.....	11	1.....1122	22111..13112	1454 2...1...	.142.....	..2.....
FAIRBANKS	.....	.....	.....	11111111	111231113321	1234 2...11..	..12.....	.....

The provisional mean sunspot number for February 1993 issued by the Sunspot Data Centre, Brussels was 90.5. The maximum daily sunspot number was 134 on 8 February and the minimum was 22 on 1 February. The predicted smoothed sunspot numbers for April, May and June, are respectively: (classical method) 68, 66, 64; (SIDC adjusted values) 72, 69, 66.

SWL NEWS

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

FROM YOUR comments it seems that many listeners tune in to the many nets which provide such an easy source of DX. Thanks to Frank Knot, PA3342, I have a fairly comprehensive list of 190 nets operating world-wide. Anyone who would like me to send them a copy should send 60p to the address above to cover copying and postage. One not mentioned is the Caribbean Net, details of which come courtesy of G6QQ, who has been active recently from V2. At that time this net met daily on 14.283kHz between 1000 and 1100.

WHERE ARE THEY NOW?

THE NEXT EX-SWL to feature in this series is Don Cliffe, G0JWE, ex BRS33156. Don retained his BRS number until 1983 when he became G1KVE and received his present callsign in 1988. His incentive to get a licence was the fact that he used to listen to the Rotarian (ROAR) nets on either 3.692kHz at 0900 or 7.070kHz at 1000 on Sunday mornings. As he could not partake as an SWL he was determined to get his 'A' licence so he could join in. Although Don spends a great deal of his time listening, he does enjoy the many conversations with fellow Rotarians.

Since becoming licensed, Don has been lucky enough to lead a party of five non-Rotary types on an exchange visit to Tasmania (VK7). Whilst he was there he was able to talk to two disabled amateurs. One had the first split-screen computer programme for Morse which he had seen, and the other, who was blind, had a 'talking typewriter' so he could be sure he recorded his messages correctly. Unfortunately, Don has been unable to contact either of these amateurs since his return.

DX PUBLICATIONS

SEVERAL LISTENERS have asked me how they can be kept up to date with Prefix and DXCC country changes. There are two excellent and reasonably-priced publications marketed by Geoff Watts, Britain's best-known listener. His address is 62 Belmore Road, Norwich NR7 0PU.

The first is his DXCC Countries guide (14 pages). DXCC countries are listed alphabetically. Present and past prefixes are given back to 1945, and previous names of countries and other useful data is provided. The second is the Radio Amateur Prefix-Country-Zone List (15 pages) which is arranged by prefix. Everything for each country is printed on one line: Normal prefix, Special prefixes, ITU callsign block, Continent, DXCC status, CQ Zone and ITU Zone.

The cost of each publication is £1.25 for double-sided pages, or £1.50 for single-sided pages. Overseas, the rates are 6 IRCs or 8 IRCs respectively.

INTERNATIONAL MARCONI DAY

G3FWE HAS provided his usual timely reminder to SWLs that IMD falls on 24 April this year. GB0IMD will be active from the Wireless Museum, Puckpool Park, Nr Ryde on the Isle of Wight. The Isle of Wight ARS look forward to greeting any SWL or licensed amateur who can pay the station a visit. Other attractions will be the Lodge Museum which houses artifacts from yesteryear with displays charting the development of both radio and television. There will be a further display of wartime communications equipment. There will also be Morse demonstrations all day. GB0IMD expects to make contact with 500 stations, and SWL reports will be gratefully received via G3FWE.

HEARD ALL BRITAIN

GW6JNE HAS asked me to remind listeners that to claim HAB Awards does not entail membership of the HAB organisation. SWL, A Mudie, recently claimed a WABEMA Award - awarded to SWLs for helping amateurs activate WAB areas. GW6JNE asked A Mudie to write to him so he could find out more, firstly so the details can be featured in the WAB/HAB Newsletter and secondly so that Dennis can provide more details for *RadCom*. On the award scene generally, eight awards of various types have been processed so far this year.

DX NEWS

IT WAS GOOD to hear again from Malcolm BRS20249. He was not very active in 1992 due to other commitments and only collected 44 new countries, most on the WARC bands. With a little more time at present his best DX so far in '93 seems to have been V63OM (Federal States of Micronesia - formerly KC6). He has also heard 4K2BCA on Franz Josef Land on 14MHz - a country I have not heard for some time!

The band reports this month reflect the fact that HF has been very poor - indeed it now seems rather rare to find 28MHz open. 24MHz has also been poor and the RT5UN Net, mentioned here in February, now seems to have been discontinued. There were of course exceptions, like 28MHz being in quite good shape during the 6/7 February contest, and 24MHz providing stations from Stateside, Africa, the Near East and the Caribbean during the afternoon of 7 February. This improvement in conditions coincided, of course, with improved solar flux numbers.

Conditions prevented many listeners hearing the AH1A expedition to Howland Island. Indeed, of all those reporting this month only Robert Small, BRS8841 (on 7MHz CW), Philip Davies, G1EMD (14MHz SSB), and myself (7MHz SSB) heard them.

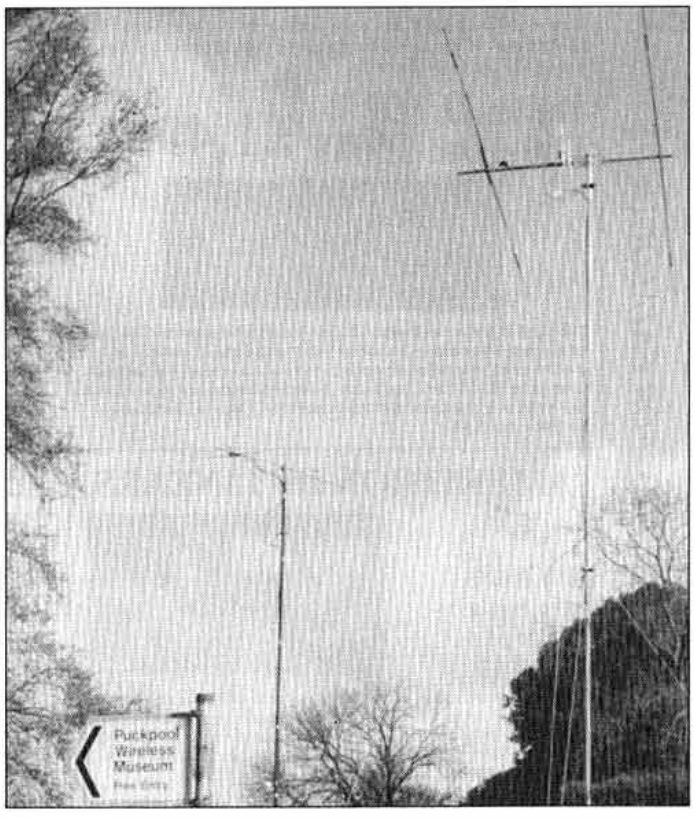
By far the best conditions were on 3.7MHz SSB. The list of DX heard seemed never-ending, and several SWLs heard over 100 countries on the band in January alone - a feat which could always be achieved during the last sunspot minimum, but this seems to have been the first time it has been done for a few years.

7MHz was not quite so good, but again some listeners reported logging 100 countries in January. Because LF conditions were good, some SWLs turned their attention to 1.8MHz with good results. Here are some of the better DX stations reported on LF from the turn of the year to 9 February:

1.8MHz: A45ZZ, CE8ABF (0112), CU2CE, EA8AR, RM8NA, UF6QBA, UW0SE, 4X6DK, 9A2AJ, 9K2ZR.

3.7MHz: A92BE, DU9RG, FG5FC, HL9HH, HR2IQC, J69MV, N2KK/6, NN7X (Arizona), OA8K, VP9/WA1AWJ, VQ9YA, VU2BMS, XE1VIC, YB6GB, 3X0HLU, 4U1UN, 6W6JX, 8P9DX, 9F2CW/A (counts as ET for the time being), 9K2MU, 9M2DM, 9V1XQ.

7MHz: A71CW, AH1A (at 0648), FM5DP, J39GH, J68AY, J73CB, S92ST, TR8NSY, TZ6VV, VQ9AC, VU7API, XR6M (CE), YI1OMR, ZL4BO, 5T5SN, 5Z4BP, 6Y5CE, 9K2ZZ



GB0IMD will be active on International Marconi Day on 24 April at the Puckpool Wireless Museum, IOW. Pictured are the antennas used during this event last year. The museum curator is Douglas Byrne, G3KPO.

FINALE

NEWS ITEMS for the **June** issue should be received here no later than **14 April.**

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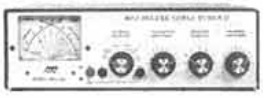

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MFJ-110	Fabulous world clock with map
MFJ-32	Packet radio handbook. Super guide!
MFJ-1286	Gray Line Graphics Programme for IBM
MFJ-1281	Easy DX logging programme
MFJ-1040	1.8-54MHz tx/rx preselector
MFJ-1020A	Indoor active antenna station. 0-30MHz
MFJ-1272B	TNC/Microphone interface
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MFJ-752C	Tuneable audio filter
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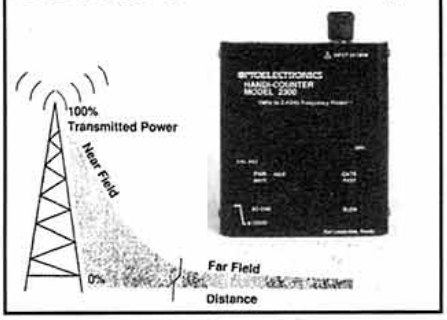

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RADCOM NEWS FEATURE

Return to S21 — Bangladesh

by Jim Smith, VK9NS

ON 24 JULY 1992, a telex arrived here on Norfolk Island. It said: "BTTB IS pleased to inform you that the Govt of the People's Republic of Bangladesh has approved the Amateur Radio Service". This arrived two and a half years after my initial application.

As a DXer Bangladesh was needed, but the country did not permit amateur radio; could anything be done? After numerous letters and telephone calls to the Bangladesh High Commission and to the Prime Minister's office, I was invited in December 1989 to go to Dhaka. It appeared that something could be done for me and for amateur radio.

But in February 1990 came the telex from Bhutan permitting my A51JS operation after several years of trying (see *RadCom* Feb 1991). Plans were made to travel to Bhutan immediately and I arranged to stop over in Dhaka on the return journey. However, whilst in Bhutan a JA station told me that S21U was active with a Japanese group and that K5VT was active as S21VT. It seemed pointless for me to go to Dhaka as Bangladesh was already on the air.

Early in 1991 I received a telex inviting me again to visit Dhaka. Whilst making arrangements I became aware that Bangladesh was in turmoil. The eventual result was the election of the first Democratic Government for many years, but the immediate effect was a telex from BTTB advising me that amateur radio activity was not permitted and that "any inconvenience was regretted". I decided to go to Dhaka anyway.

I spent 14 days there. The new government was just in place and by visiting both BTTB and NBA daily I finally received permission to operate S21U for a few days. The authorisation was sent to the ARRL DXCC Desk and the operation was accepted. Despite the low number of contacts - 731, the operation was a success since so many people came to see what was happening. These 14 days laid the foundations of my relationship with the Bangladesh authorities.

It was in Bhutan that I underwent a major change of outlook in DXing: A DXer trying to get permission to operate in a country which does not permit amateur radio, cannot really justify it solely on the grounds of DX. So in Bhutan and Bangladesh I set out to repay some of the trust which had been shown in me.

With the election of a Democratic Government the introduction of amateur radio became a possibility and, finally, reality. This reflected the tremendous effort of the staff of BTTB and their application to the idea of the Service. Amateur radio is well documented and has considerable clout and international standing. In writing the basic regulations, outlining frequencies, power and modes, the material fell on fertile ground. In August the BTTB Board voted in favour of the introduction of the amateur radio service and S21A and S21B would be issued to two Bangladeshis, Saif and Nizam.

It was several months, however, before I was to receive the telex quoted above. On arrival in Dhaka, the formalities for the issue of S21ZA, the first 'ordinary' amateur radio licence involving a foreigner, were soon completed. There remained the task of paying for the licence which included a charge for the callsign and a charge for the Equipment Licence, a total cost of £100.

On air at last

I SOON HAD all my equipment in place at my planned location and started setting up the S21ZA station. On the roof the temperature was about 30°C but my modified Butternut HF6V was ready for operation in 30 minutes. The equipment used was an ICOM IC751 transceiver, an ICOM IC-2KL linear, and a BUTTERNUT HF6V vertical antenna. A computer and a Tono 777 terminal was used for RTTY.

I soon had the station connected together. The receiver sounded fine and I tuned in a VU station on 20m SSB but as I moved the rig back a few inches, everything went dead; dial lights still on, but silence. My heart sank. I removed the covers of the ICOM 751 to check the plugs and sockets and found that touching a coax lead brought things back to life. The rig was soon back together as I heaved a sigh of relief.

My licence was valid for seven days and during this time I got on all bands. I ran into S21ZC (Rudi, DK7PE) on 20m CW. Rudi's low band activity took a lot of weight off my shoulders.

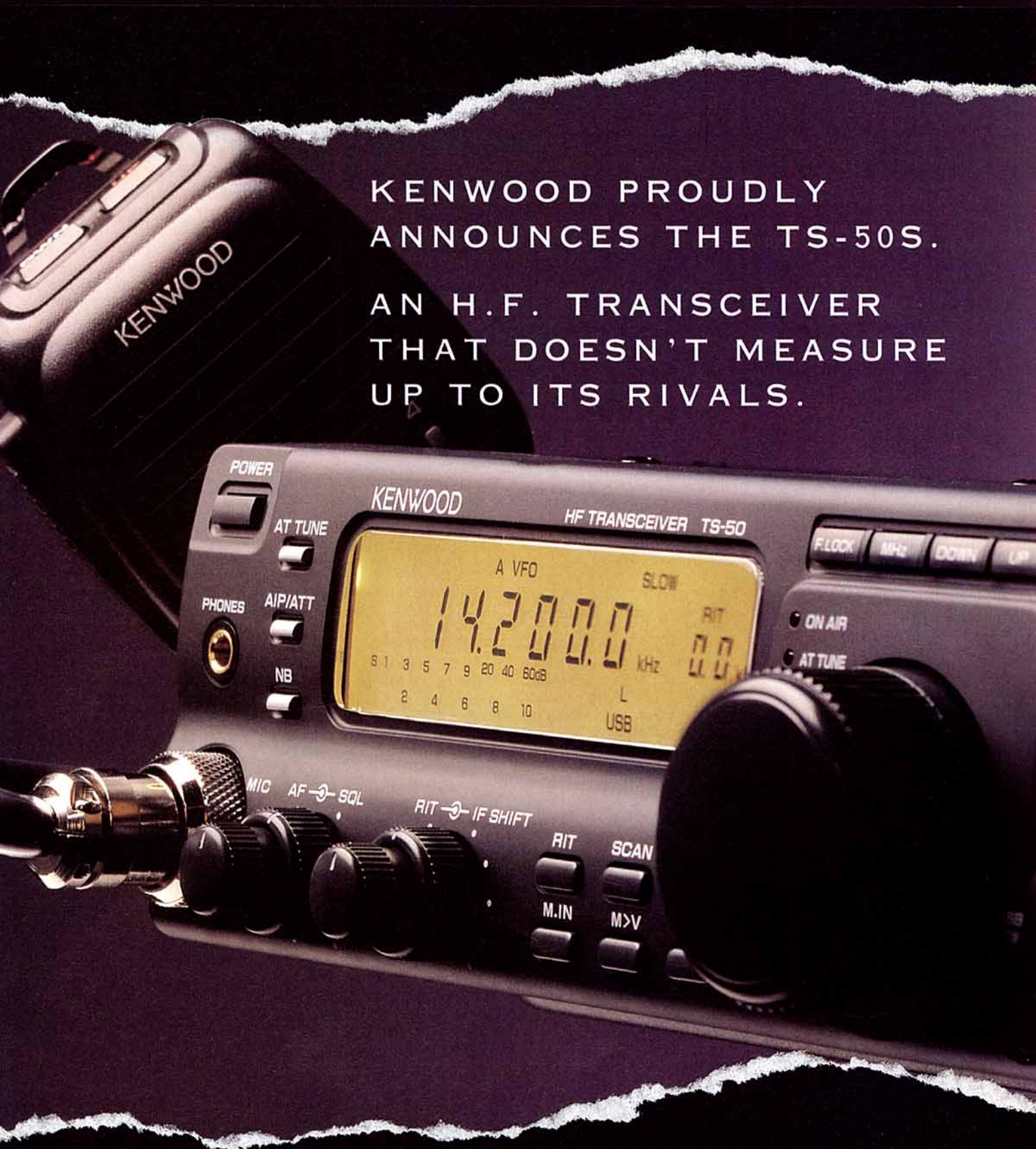
On the second day the drive coupling on one of the ATU variable capacitors came loose. I removed the screw and headed into the outside world with the idea of trying to get an Allen key. I ended up at a road-side locksmith's stall and by signs I asked if he could help. With hammer and anvil he shaped the end of a bicycle spoke to fit the set screw, and made a small loop in the other end. For about 50c I managed to fix the ATU.

Band conditions were very poor for a couple of days and this makes the 7-day licence looks fragile. I had a few exciting openings to East and West coast USA but did not make many QSOs. Of course, Europe and Japan were very good and at the end of it all, with some 6,500 QSOs in the log I felt happy. It had not been the usual DXpedition with nobody active in the country afterwards. With amateur radio a reality in Bangladesh and with a couple of nationals in place, the demand for S21 would soon be met.

I have many pleasant memories of my stay: The happiness and sincerity over the issue of the S21ZA licence was obvious; they had finally been able to prepare the document of authority for amateur radio activity in Bangladesh. The personal kindness of Muhammad Ismail, of Frequency Management, coming to the S21ZA shack to wish my wife Kirsti (VK9NL) a Happy Birthday and to invite her to visit Bangladesh. The get-together at S21ZA with a small group of Bangladesh nationals interested in amateur radio.

Thanks is due to many people but may I just thank BTTB Board in general and specifically the Director Frequency International, Mr Fazlur Rahman and Muhammad Ismail of Frequency Management. They were the 'true believers' in the Amateur Radio Service in every sense of these words.

Bangladesh Taxi Service - quick, cheap but a bit scary in Dhaka traffic.



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Novice NEWS

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

WHEN I WAS asked to mount an information stand for Scout Leaders at Rastrick High School in February by Peter, G8AUL, I frantically rang the RSGB for supplies who arranged to send lots of Novice literature. A phone call to Gerald, G3SDI, ensured help on the day.

A large notice on the classroom door proclaimed 'Radio Society of Great Britain' which improved my self-image. Plenty of desk space and chairs were provided in a spacious room, with lots of wall space for a display. It was not very long before we were ready for the first visitor.

For the next four hours we were very busy - sandwiches were swallowed almost whole between visits by about 350 Scout Leaders and their junior counterparts from round the county. Interest was enormous but many of our visitors knew absolutely nothing about amateur radio - until that day.

If the questions asked, and the amount of literature taken away, is any guide there will be a great need for yet more Instructors in this area. From the interest shown by a member of the staff at the school, a new subject could appear as an extra curricular activity soon!

KIDLINK '93

LAST MAY Kidlink was introduced where amateurs were invited to listen for, and reply to, stations where children were actively involved as part of a project linking children in schools world-wide.

A number of schools took part and youngsters had their first taste of amateur radio. This year 'Kidlink' stations will be heard on 6,7 and 8 May, so listen out for them.

Full information appeared in May 1992 *RadCom*. Briefly, the link-up will be made throughout the world using all methods of information technology, in an attempt to forge friendships and make the world more caring. A good idea in view of the present climate. Contacts had four set questions which they had to answer:

1. Who am I?
2. What do I want to be when I grow up?
3. How do I want the world to be when I grow up?
4. What can I do now to make this happen?

Mike Burleigh at Oldfield House School, Hampton Middlesex, is the UK Director for Kidlink. Peter Daly, G0GTE, at the Stevenage Day Centre for the Disabled kept me informed of events. One station commented that it was a pity that youngsters had to wait a year before the next Kidlink.

Novice radio amateurs at the Day Centre, kept in close touch with the Sir Ranulph Feinnes/Mike Stroud record-breaking walk across Antarctica, using the callsign GX0OCA.

Arrangements were made via Lawrence, GM4DMA, the UK communications coordinator of the expedition, to contact Morag, GB4MSS/VP8, on several occasions. The youngsters followed the progress of the polar project first-hand. The press pack put out by the Pentland South Pole press office provided a fact sheet and a question sheet giving youngsters the chance to involve themselves more with the expedition. Contacts were also made with others who were also watching progress.

Peter has contacted the DTI and RSGB Licensing Advisory Committee on Kidlink's behalf. The latest information is that a JOTA-type licence extension is granted for the UK, providing more scope for those taking part.

If you would like to take part, you can help by contacting a local school, tell them about Kidlink and offer to set up a station. You could apply for a special event callsign to cover those three days or, even easier, if you are one of the listed users of your Club callsign, you have the same facilities by adding the 'X' or whatever letter is appropriate. Remember too, that Kidlink is not confined to school hours - why not have a 'Kidlink evening' at your Club and invite youngsters in. A notice in your local Youth Club, or schools and libraries is another way of contacting the youngsters.

If you would like the current list and/or would like to be added to it, please write to me at the address above. A SASE would be appreciated. I will send an update to each person listed, and hope that the project is successful, and enjoyable, for those taking part.

NEED HELP WITH THAT CW?

BRIAN, G4EWJ, has produced the MTR1 Morse Tutor Kit which serves a double purpose - construction and mastery of the dots and dashes.

The cost is £29.95 (does not include case or speaker, headphones are required) and offers many features. Replay facility to check your receiving. Recording of your sending for checking. Digital speed setting between 5WPM and 36WPM. Below 12WPM, an auto delay sends characters at 12WPM but with a longer space between.

A helpline is available if needed either during or after construction. Other add-ons under consideration are a plain language dictionary with several thousand words and a tutor to help with the new format Morse test. Details from Brian Jordan, G4EWJ, at 42 Ben Nevis Road, Birkenhead L42 6QY.

Helen, 2E0ACR, went along to GB0OSH at Great Ormond Street Hospital. Using 2m FM she worked 57 stations and coped with pile-ups expertly.

SOUTHGATE AMATEUR RADIO CLUB - G3SFG

ROBERT, G4OBE, from Southgate reports that training Novices is a very successful club activity. Nine Novices can be heard in the area, with more to follow - three more successful candidates are awaiting their callsigns at the time of writing, and another group is taking their NRAE in March. Jim, who is studying for the RAE in May is also learning Morse in preparation.

Robert has found a way to get Novices on the air by holding a 'Novices on the Air' evening at his home. Beth, 2E0AEC, Jodie, 2E1BEL and Mary, 2E0AEF, made their first contacts. His Mum Margaret, 2E1AQS, often appears on various WAB nets under his supervision as she is aiming for the SFARG Defence of the Realm award.

As a keen constructor Robert has a series of projects planned which he hopes to reproduce for sale at a very modest price. Once costs are recovered, any profit made will help towards the cost of hiring Novice training space.

Finally, if your Club is working on similar lines, let me know and it may give others the encouragement to try something similar in their club.

BELFAST ROYAL ACADEMY

NOEL, GI7CMC, wrote to tell me about Belfast Royal Academy's radio club (GI7DAW) activities.

There are about fifteen members who meet daily between 1245 and 1345 to operate 2m FM, SSB and Packet - the local mailbox being GB7TED. Come Summer you may hear them when they try 2m DXing from a nearby hill top. Listening on HF, learning Morse and constructing also take place during the lunch break and a class for the RAE and/or the NRAE is held.

Jonathan held the first Province callsign, 2I1AAV, which he changed last year when he, along with Geoff, Glenn and Richard, sat and passed the RAE.

Belfast Royal Academy has another claim to fame. During the Juno mission in 1991, they participated with the callsign GB5JUNO and Helen Sharman visited them on her return.

AND FINALLY . . .

DON'T FORGET - The closing date for entries for the May NRAE, is 14 April.

KENWOOD APPROVED DEALERS

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

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

BERKSHIRE
Lowe Electronics, 6 Cherwell Close, Langley. Tel: 0753 545255

BUCKINGHAMSHIRE
Photo Acoustics, 58 High Street, Newport Pagnell. Tel: 0908 610625

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

DERBYSHIRE
Lowe Electronics, Chesterfield Road, Matlock. Tel: 0629 580800

South Midlands Communications, 102 High Street, New Whittington, Chesterfield. Tel: 0246 453340

DEVON
Reg Ward & Co, 1 Western Parade, Axminster. Tel: 0297 34918

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

ESSEX
Coastal Communications, 19 Cambridge Road, Clacton. Tel: 0255 474292

Waters & Stanton, 22 Main Road, Hockley. Tel: 0702 206835

Waters & Stanton, 12 North Street, Hornchurch. Tel: 0708 444765

EIRE
Intronic Ltd, Windsor Hall, Glounthaune, Cork. Tel: 010353 2135 4422

HAMPSHIRE
Nevada, 189 London Road, North End, Portsmouth. Tel: 0705 662145

South Midlands Communications, S M House, School Close, Chandlers Ford Industrial Estate, Eastleigh. Tel: 0703 255111

HUMBERSIDE
Peter Rodmell, Field Head House, Leconfield. Tel: 0964 550921

KENT
ICOM UK, Sea Street, Herne Bay. Tel: 0227 741741

Lowe Electronics, "The Corner House", Chatham Road, Sandling. Tel: 0622 692773

LONDON
A R E, 6 Royal Parade, Hanger Lane W5A. Tel: 081 997 4476

Radio Hamstore, 11 Watford Way NW4. Tel: 081 202 0073

Martin Lynch, 286 Northfield Avenue W5. Tel: 081 566 1120

MERSEYSIDE
Amateur Radio Communications, 38 Bridge Street, Newton le Willows. Tel: 0925 229881

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

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

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

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

NORTHERN IRELAND
GM Electronics, 1 Evelyn Avenue, Belfast. Tel: 0232 671876

Tyrone Amateur Electronics, 44 High Street, Omagh, County Tyrone. Tel: 0662 242043

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

SCOTLAND
Lowe Electronics, Cumbernauld Airport, Cumbernauld, Strathclyde. Tel: 0236 721004

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

WEST MIDLANDS
Dewsbury Electronics, 176 Lower High Street, Stourbridge. Tel: 0384 390063

Radio Hamstore, 963 Wolverhampton Road, Oldbury. Tel: 021 552 0073

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

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

WEST SUSSEX
Bredhurst Electronics, High Street, Hand Cross. Tel: 0444 400786

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

South Midlands Communications, Nowell Lane Industrial Estate, Nowell Lane, Leeds. Tel: 0532 350606

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

WALES
P M R Limited, Industrial Estate, Gwaelod-y-Garth, Cardiff, South Glamorgan. Tel: 0222 810999

KENWOOD

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

Contest Exchange

Andy Cook, G4PIQ
Fishers Farm, Colchester Road,
Tendring, Clackton-on-Sea, Essex,
CO16 9AA

WELCOME TO a new regular column in *RadCom*. Contesting has long been regarded by many as a specialist part of the hobby, one in which you can only have any interest if you have acres of space and no TVI problems. Well, not too many of us are in that happy position. Over the coming months in this column I hope that I can dispel these myths and show you that contesting is something which can be enjoyed by all, no matter what their station's capability is.

I plan to address three main areas. Firstly, for the newcomers to contesting, I will introduce some of the principles of contesting and try to explain in more detail some of the rules. Secondly, in order to keep the experienced contesters happy, I will cover the current state of the art. Finally, I hope that there can be some useful discussions on how you found recent events - what equipment blew up, what you are going to do to improve things, and what you feel about current hot topics. In short - this has to be an interactive column, and I need your input - so get writing!

WHY ENTER CONTESTS?

PERHAPS YOU do not enter contests, and are asking yourself the above question. Undoubtedly the most important answer is that you can have fun. Much of the fun and skill in contesting comes from setting yourself a realistic but tough target, and then going all out to achieve it. This target might be to come two places higher than you did last year or, in an HF contest, it could perhaps be to work 50 DXCC countries, or at VHF perhaps to work 25 locator squares.

Contesting is one aspect of the hobby which really does live up to the 'self-training' clause of the licence. If you set yourself targets, you provide motivation to improve your station so that you can meet these goals. Contesting will improve your operating too - with time you will get better at reading the weak signals and the ones which are buried under QRM. However, learning from a magazine article does not work and there is no substitute for practice. Apart from the effort that the top contesters put into improving their stations, one of the main secrets behind their success is simply that they have been playing contests and DXing for many years and have become rather good at it!

If you set yourself targets, are there any real rewards? I am pleased to say that in some contests, there are. During any VHF contest, you can request a placement certificate by enclosing an A4 SAE with your entry - this shows where you came, no matter whether it was 3rd or 93rd. The quality of these certificates has also recently been upgraded. Also the leading single operator fixed station who uses 25W or less and only one antenna, receives a certificate of achievement.

Next, are there some events in which you could get your feet wet without having to commit too much time or effort? I have two suggestions for you, both during the weekend of 16/17 May. On the 144MHz band, there is a contest which runs from 1400UTC on Saturday until 1400 on Sunday; however, there is also a section which allows you to operate for any continuous six-hour period of your choice starting on the hour. See the rules in the *Contest Classified* pages of February *RadCom* for full details. For HF there are two short three-hour contests (one CW and one SSB) both on 80m and 40m and called the County Roundup events. Details of these are in the March *RadCom*.

HF NATIONAL FIELD DAY 1993

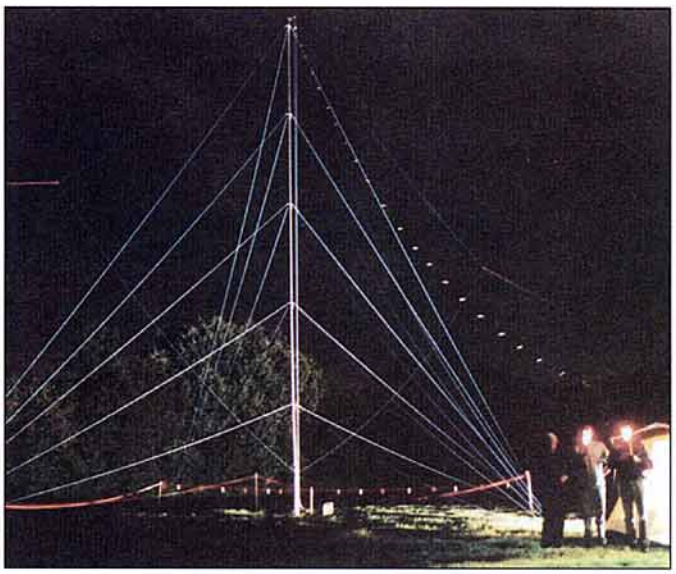
MANY CONTESTS have multi-operator sections within them which encourage groups to band together and form a team in order to take on the opposition. Foremost in this class are the HF and VHF National Field Days, both of which take place during the summer and offer ample opportunity for everyone to lend a hand in their own area of expertise. This pooling of experience and effort means that you can put together a station that is much better than you could do in the time available on your own. Also, there's always plenty of opportunity for a barbecue, a few drinks, and if you are really lucky - a bit of sun-bathing, though it must be said that field-days don't have the best reputation for weather so take your waterproofs and wellies too!

On 5/6 June, we see the 60th Anniversary of HF Field Day. First held in 1933, this event has always been held in June and been a focus for clubs and groups of RSGB members to have a pleasant weekend of radio, probably out in the countryside. Groups take part in this contest with all sorts of intentions - some are there really pulling out all the stops in order to beat the opposition. However, not all groups are these lean, mean fighting machines. There are many who, while still hoping to do reasonably well, are much more concerned with having an enjoyable weekend among friends. [One radio club I attended recently spent 20 minutes discussing the barbecue menu and five minutes dealing with operators, tactics etc! - *Ed*]. So, whatever your intentions, get yourself a team together and get out into the fresh air (or rain?) in June. Full rules are in March *RadCom*, but the most important thing to do right now is to register your intention to enter by writing to Chris Burbanks, G3SJJ, QTHR.

Looking back at the 1933 write-up, it seems that little has changed - it says "There are those who level criticism at the modern amateur because he indulges too frequently in various kinds of 'tip and run' contests". I think the "tip and run" description is wonderful, especially when you realise that the writer is talking about an event in which the leading station made 64 contacts in 27 hours of operating! Presumably, the modern contest, in which the leaders make in excess of 1,000 QSOs in 24 hours could be described as a "jettison and leave by Concorde" event.

Along with the increasing QSO totals, the equipment technologies have also marched on. Although trailer mounted towers and caravans are coming more into use, most groups still use tents of all shapes, sizes and degrees of waterproofing (early write-ups also have many references to heavy rain), and most antenna masts are still erected with the use of gin pole and much hauling on ropes. In the early days most stations were powered by accumulators for both LT and HT supplies, although a few were using rotary alternators to obtain the high voltage. Getting the accumulators onto site seems to have been a major problem. Later on, petrol-driven generators became the norm, and there are many tales of generator failure and the need to rebuild engines in the middle of the field by torchlight. These days the almost universal use of solid state rigs makes the use of batteries possible, reducing the problem of generator failure, at least until the battery begins to lose its charge!

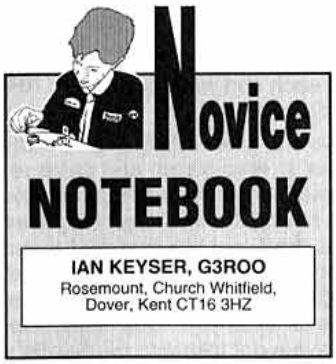
HF NFD has a sister contest - the VHF event, which takes place on 3/4 July. If your group's strengths lie in this part of the spectrum, why not book the first weekend in July. Even better - enter both - two weekends of fun and sun!



Night-time view of the Gravesend RS antenna used for SSB Field Day.

WRITE IN

THAT ABOUT covers it for this month. Please let me have your comments about what you would like covered, and any contest related photographs. My address is at the top of the column, but I can also be contacted by packet radio, either on the DXCluster network, or on the BBS network @ GB7MXM.



Novice NOTEBOOK

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

THIS MONTH we have a little converter that should prove useful to both class A and B Novices alike. This band offers superb cross-town working as well as DX contacts without the hustle and bustle of the HF bands. If 6 metes is open, you'll find it a very exciting band.

SIMPLE TO BUILD

THIS CONVERTER if far from 'state of the art' but here's a design that's simple to build and get working. In fact there should be no problem getting it going, using easy to obtain 'off the shelf' components. It uses a cheap 48MHz crystal, which means there could be a little QRM (interference) from local FM transmitters. Actually, the reason is very simple and I'll leave you a little teaser to work out why it happens. If there are too many letters the answer will be given in a future Notebook!

Take a look at the circuit in **Fig 1**. The antenna signal is fed into transformer T1 which is tuned to 50MHz by capacitor C1. The signal is passed via C2 to integrated circuit IC1 which contains a mixer and crystal oscillator (XL1) at 48MHz. The signal antenna mixes with the one from the crystal, and produces yet another at a lower frequency. For example a signal on 50MHz will mix with the 48MHz signal to produce a copy of the 50MHz signal on 2MHz, an aerial signal on 51.334MHz will mix down to 3.334MHz and so on. Remove the can from T1 together with the ferrite cup inside, and the tuning slug. It's a bit fiddly but can be done with care.

If you couple the output of this converter into the input of a receiver tuning from 2 to 4MHz you can listen to signals on 6 metres. On this range you can feed the converter into a relatively simple short-wave receiver and have some fun. **Fig 2** shows the component layout, and the track side of the PCB is given in **Fig 3**.

FINE TUNING

TO ADJUST the converter, set C1 to half-mesh and the cores of T2 and T3 level with the top of the former. Couple the output of the converter to the aerial socket of the receiver with a length of coax cable and a suitable 6 metre aerial to the input. It's easiest if you can ask a local amateur to provide a signal, or maybe you live near a beacon on the 6m band. Anyway, tune the band and when you've found a signal, make sure it's on 6m and not a strong signal on 80 metres breaking through!

Peak C1 for maximum strength then do the same for T2. Next disconnect the power for a second and then reconnect it. Check that the oscillator starts again and the signal can still be heard. If not adjust T2 half a turn and try again, it is important that the oscillator runs smoothly. I found the converter worked very well with my FRG7000 receiver!

If you have problems with local FM broadcast stations a different crystal and HF receiver frequency could well cure the problem. Using a 22MHz crystal, 50MHz signals can be converted into the 10 metre band of an HF receiver. See the components list for details. Tuning T2 is a little more tricky with the 22MHz crystal - it's easy to tell when the oscillator starts, as receiver noise increases by a noticeable amount.

I've also constructed a little 100mW CW transmitter for 6m that's very easy to build. This will be described in the near future.

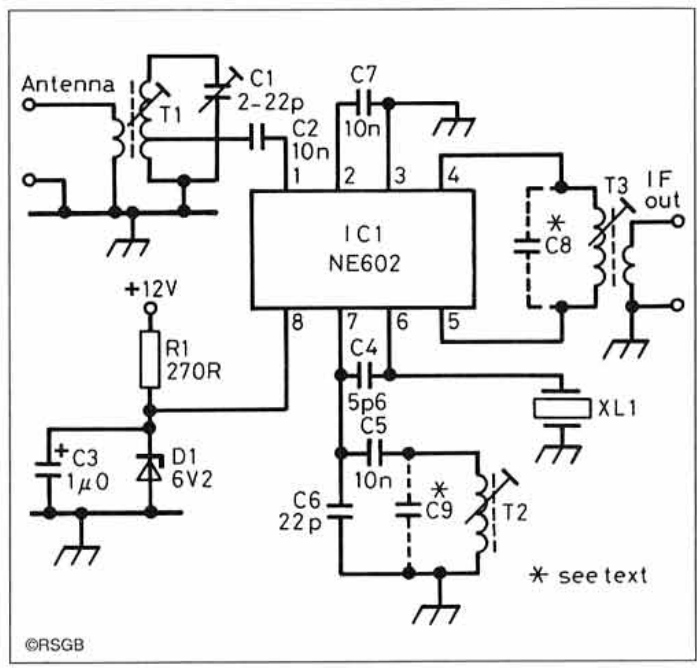


Fig 1: Circuit diagram of the simple-to-build 6 metre converter. Capacitors C8 and C9 are only required for a 28-30MHz IF.

COMPONENTS LIST
(see Fig 1)

R1	270R
C1	2-22pF trimmer cap
C2,C5,C7	10nF disc ceramic
C3	1uF 25V tantulum bead
C4	5p6 ceramic plate
C6	22pF ceramic plate
T1	KANK3335 with metal can and cup removed
T2	KANK3335 complete (the can is earthed)
IC1	NE602
D1	6V2 zener diode
	For 2-4MHz IF
C8	No cap
C9	No cap
T3	KANK3333 complete
XL1	48MHz crystal
	For 28-30MHz IF
C8 33pF	ceramic plate
C9 33pF	ceramic plate
T3	KANK3335 complete
XL1	22MHz crystal

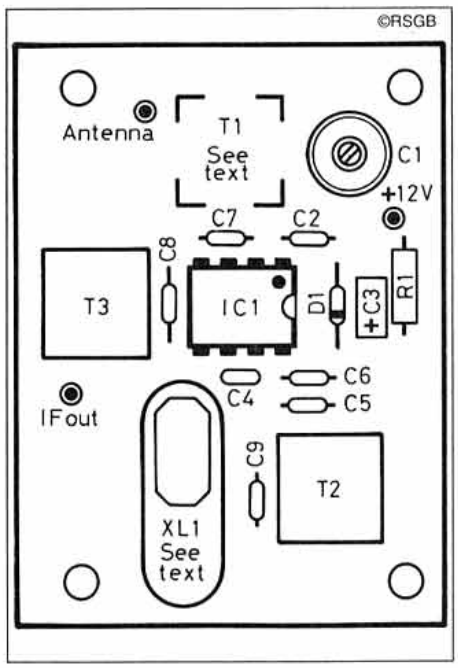


Fig 2: Component layout (not to scale).

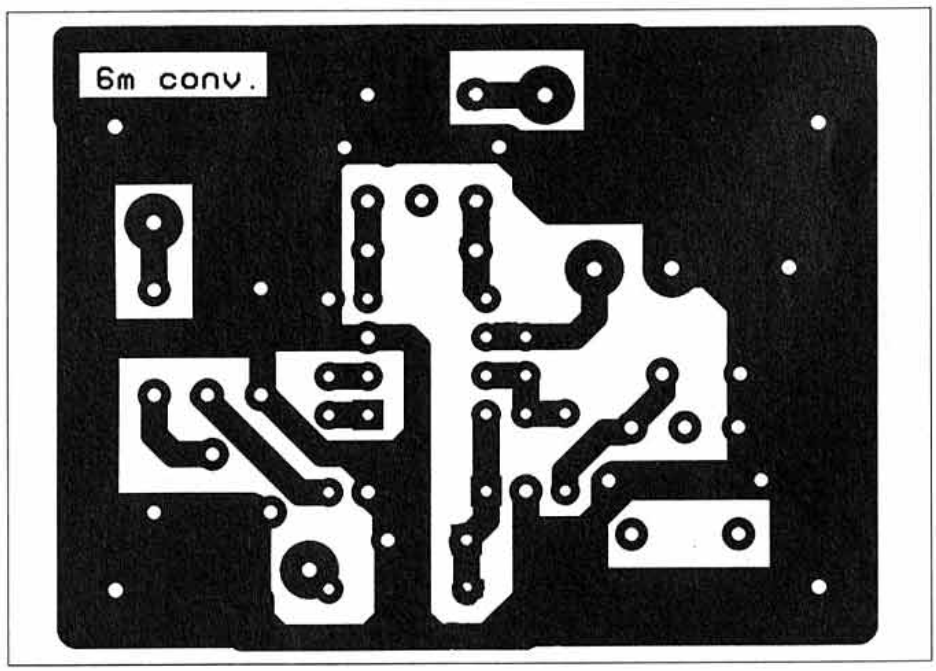


Fig 3: Track side of the printed circuit board (shown twice actual size).

IN PRACTICE

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

WELCOME TO THE NEW *In Practice* column. If you've only recently passed the RAE and are still 'getting to grips' with real-life amateur radio, this column is for you! To complement *Technical Topics*, *Eurotek* and *Novice Notebook*, I'll be dealing with some basic, practical aspects of amateur radio, on a monthly basis.

QUESTIONS AND ANSWERS

MOST OF THE COLUMN will be in question-and-answer format - featuring your questions! To give you some idea of the kinds of questions we will tackle, here are some examples from when the column was last featured (July 1989 - February 1990):

- 3-terminal regulators
- RFI from the hi-fi
- Smoothing capacitors
- Heatsinks
- LEDs replace S-meter bulbs
- Making PC boards
- Plugs on coax cable
- Servicing tips for valve RXs
- Removing components from PC boards
- Antennas for 144MHz
- Solder suckers and solder-wick
- More about 3-terminal regulators
- Overhauling rotators
- Mains-borne noise
- Drilling brass
- Transient spike suppressors
- Selecting capacitors
- Giving callsigns on the air

Get the idea? Anything of general interest - any band, any mode - but with a specifically practical slant. I'll try to answer your questions or find someone else who can.

What I cannot do is provide a personal consultancy service about highly specific topics, such as mods to particular rigs (eg "How do I modify my FT290 for Top Band?"). This is because I'm not a tabloid 'Agony Aunt' with a large backup staff! What I *will* do is to answer those questions which will be particularly useful to a large number of *RadCom* readers. Also, this column isn't really the right place to tackle major topics such as 'What goes on inside my rig?'

However, within those purely practical limitations, I'll do my very best! Away we go, then . . . .

HARD SWITCHING

WHY IS IT BETTER to hard-switch an external power amplifier or preamplifier, and how do I do it?

'HARD-SWITCHING' REFERS to a directly-wired transmit/receive control connection between a transceiver, and an external power amplifier (**Fig 1a**). The transmit/receive changeover circuitry switches the PA in-line to transmit, and may also switch in an optional preamplifier for receive. Likewise, stand-alone receiver preamplifiers have to be bypassed in order to transmit (**Fig 1b**). Most 'packaged' solid-state PAs offer the alternatives of hard-switching and RF-actuated changeover, often called 'RF VOX'.

First of all, how does RF VOX work, and what are its strong and weak points?

Let's concentrate on the transceiver PA configuration, and come back to receive-only pre-amps later. When you start to transmit from the transceiver, the RF VOX circuit detects the incoming signal and switches the PA in line. The advantage of RF VOX is that the equipment will work with almost any transceiver, straight out of the box and without any external control wiring.

But there are also several disadvantages. Obviously, RF-controlled switching cannot begin until the RF power is already flowing. That means that your transceiver is actually transmitting while the relays are changing over, or switching diodes are changing state, which stresses components in both the transceiver and the PA.

On SSB, the RF power varies as you speak, and you may be well into your first word before there is enough signal to activate the RF VOX. The result is an unpleasant 'click' which cuts off the start of your transmission. Most RF VOX systems incorporate a delay circuit for SSB, which doesn't switch back to receive for about a second after the end of the RF signal. This is supposed to hold the system on transmit until you've finished speaking, but it doesn't really work in practice. The PA clatters on and off at all the wrong moments, and there's an unwanted pause after you really have finished.

Hard-wired switching eliminates these problems by forcing the PA to change over at the same time as the transceiver. The extra connection between the transceiver and the PA often requires no more than a length of wire. Most solid-state PAs have a phono socket on the back, the inner conductor of which simply needs to be grounded to switch over to transmit (test it with a bit of wire between the inner and outer of the socket).

Similarly, most transceivers have an 'accessory' socket which provides auxiliary changeover contacts. All you usually need to do is wire a plug to provide a contact to ground when on transmit and an open-circuit on receive (test it with an ohm-meter as you press the PTT). Since a ground return between the transceiver and PA is provided by the outer of the coax cable, you can sometimes get away with a length of ordinary insulated wire, though thin shielded cable (eg microphone cable) with the braid grounded at each end will help to avoid RF-feedback problems.

R%%eceive-only preamplifiers may be a little more complex to hard-switch and some require a separate sequencer unit to protect the system from having to switch high RF power levels. If you don't feel too confident about any of this, consult the instructions or contact the manufacturer. If all else fails ask someone over the air or at your local radio club. Above all, have a go! Installing hard-switching is an easy project and will greatly increase your operating pleasure.

RELATIVE FREQUENCY

HOW DOES MY 'RECEIVE' frequency relate to my 'transmit' frequency?

THERE ARE THREE different answers to this - for FM, SSB and CW. However they all have one thing in common: the display of 'receive' frequency is always based on assumptions about what that frequency ought to be, relative to the 'transmit' frequency.

For FM, your transmit frequency is straightforward: it's what you'd see on a frequency counter connected to the output, in the absence of any modulation (which would vary the frequency). Your FM receive frequency ought to be exactly the same as on transmit, so your digital display won't change when you release the PTT.

SSB is a little less straightforward because the transmit-frequency display always relates to the suppressed carrier which you shouldn't be able to hear (**Fig 2a** - if in doubt, check your RAE text or any of the major handbooks). The receive-frequency display ought to be the same unless you're using the RIT/XIT or Clarifier control - see later.

The relationship between the CW transmit and receive frequencies depends very much on your particular transceiver and on your

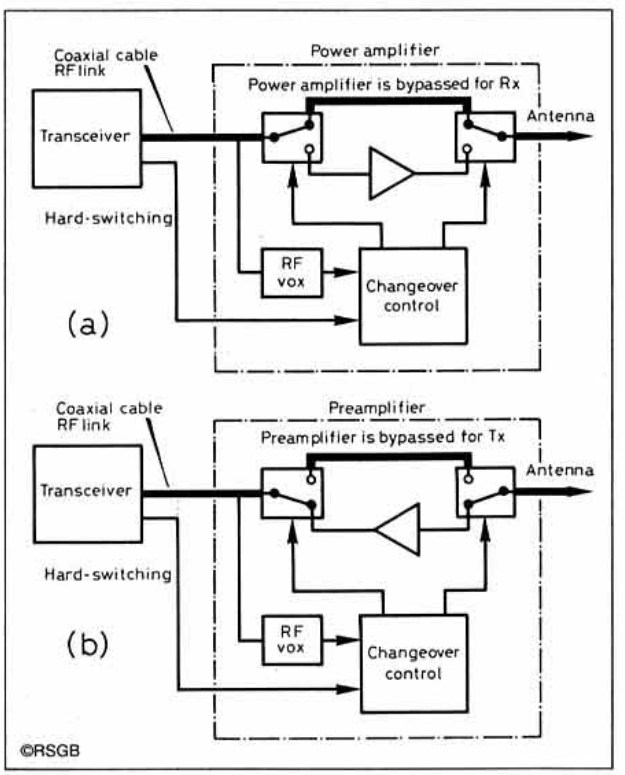


Fig 1: Hard-switching controls Tx/Rx changeover directly, while RF VOX has to wait for a transmitted signal.

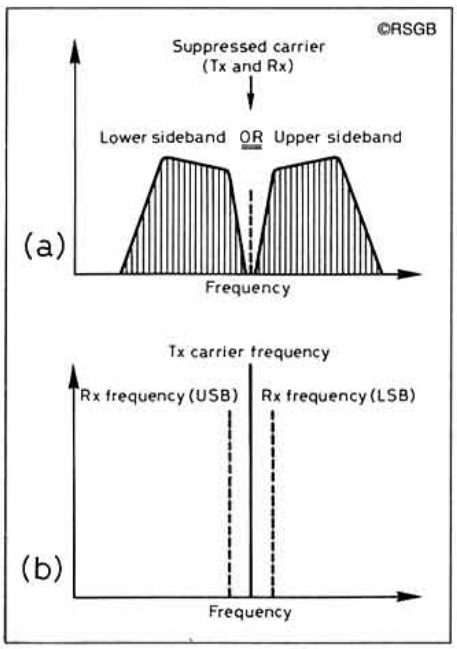


Fig 2: (a) On SSB, nominal transmit and receive frequencies are both the same as the suppressed-carrier frequency. 2(b) On CW, receiver frequency must be offset low to provide a beat note for upper-sideband reception, and high for lower-sideband.

own personal preferences. Transmit frequency is obvious - it's what you'd measure using an external counter. However, an incoming CW signal on exactly the same frequency as your transmitter would appear at zero-beat so you need to tune the receiver away by 400-1000Hz to produce a comfortable audio tone (**Fig 2b**). The exact frequency offset depends on your personal preference, though many frequency displays are programmed simply to shift by an arbitrary amount such as 800Hz. On an older rig with a mechanical frequency scale, the dial is usually set by zero-beating to the crystal calibrator, so only the receive frequency will be displayed correctly.

Note that all these transmit/receive frequency relationships are only correct if the RIT/XIT or Clarifier is switched off. Warning! - on older rigs with mechanical dials, or those whose frequency display does not change with the Clarifier setting, there will also be an internal 'RIT/XIT zero' control. Unless this is correctly adjusted there will be an unintentional offset between Tx and Rx frequencies when the Clarifier is switched off.

PACKET TNC SETTINGS

THE TNC MANUAL CONTAINS a bewildering number of parameter settings - my own fairly basic TNC has no less than 116 - and it's easy to get lost. Even worse, many TNCs are supplied with default parameters which are inappropriate to UK packet usage. For some time now, Datacomms columnist Rick Sterry, G4BLT, has been compiling and testing an improved set of parameters.

If everyone uses these parameters, we'll all enjoy better throughput of data on the air. Following the convention in your TNC manual, we give the parameter name in full, though you can use only the capitalized part if you wish. The number or code following the parameter name is the revised value, and is often very different from the factory default.

MAXframe 2

A packet sent over the air is made of one or more separate 'frames', each one complete in itself and containing information. A frame is generally one line of text, ending with the RETURN character (generated when you press the Enter key). When you are uploading a long file from disk, or are typing ahead of what the TNC is sending, the outgoing frames are stored in the TNC's buffer; MAXframe tells the TNC how many frames to assemble into a packet for transmission. By limiting the TNC to 2 frames per packet, it will always send short packets which have a better chance of getting through without umpteen retries.

Paclen 80

Contrary to what the name implies, Paclen defines the maximum length of an individual frame, not the entire packet. The setting is often irrelevant, as in normal use a RETURN will end the frame before the limit set by Paclen is reached. However, in case you tend to forget to press Enter, it is advisable to reduce the setting from the factory default 128. Do not exceed 128, as some Personal Message Systems have software bugs that will cause corruption of forwarded messages!

FRack 7

After a TNC has sent a packet, it waits a certain time for an acknowledgement. If none is forthcoming within the time limit set by FRack, the TNC will 'poll' the other station to check if the link is still good. The factory default time of 2 or 3 seconds is far too short on a busy frequency, as the other station often has to wait 5 seconds or more for the channel to go quiet before it gets a first chance to acknowledge. Meanwhile, your TNC keeps polling impatiently, increasing the channel congestion and risking disconnection due to exceeding the retry count. FRack 7 (ie 7 seconds) is much more efficient, even though it may seem to make the TNC very lethargic. This is the single biggest improvement you can make to the network!

PPersist ON (note the double 'P')

Many TNCs have two sets of timing parameters, and the newer ones are more effective than the old ones. Setting PPersist ON allows your TNC to use the newer and better set. If you get an error message in response to this command, perhaps you need a firmware update . . . .

PErsist 38 (only one 'P' this time)

This is a figure used by the TNC to determine how much it tends to 'grab' the frequency. Ideally the value should be 256 divided by the number of users on the channel; however, owing to a bug in some TNC firmware, the lowest you can use reliably is 38. Using a high PErsist figure is very antisocial, so please don't! If your TNC gives an error message in response to this command, it must be using old firmware. In that case, you need to enter an appropriate DWait setting - see below - and then contact your supplier for an update.

DWait 0 (or 16 on older firmware)

Having set Persist 38, you should set DWait 0 in order to complete the enabling of the PPersist control mode. If your TNC did not accept the original PPersist ON command, but did accept PErsist 38, setting DWAIT 0 automatically changes the TNC into the PPersist mode anyway. If your TNC didn't accept the PErsist 38 command, for heaven's sake don't set DWait 0 - set DWait 16 or else your TNC will hog the frequency all to itself!

SLottime 10

This is a timer value, used in conjunction with Persist. The 'standard' value used is 100ms, ie SLottime 10 with most firmware. Older firmware will not recognize this command, and newer AEA firmware should be changed from its default value of 30.

TXdelay 25 (or as needed)

This is the 'idling time' between the transmitter being keyed up, via the PTT line, and any useful data being sent. TXdelay gives your transmitter circuits time to settle down, and the receiving station's squelch time to open. Most modern rigs can manage with about 20 to 25, so try TXdelay 25 to start with. Even the oldest and most relay-filled rig shouldn't need more than 50! A value less than 20 might be too fast for some other folk's receivers.

Beacon Every 0, CWid Every 180, CWLen 6

If you're operating on a busy BBS-access channel like 144.650MHz, please consider turning your packet beacon transmission off (Beacon Every 0) to reduce channel congestion. It also helps to set the CW identification to the longest interval and highest speed that the licence regulations allow - CWid 180 (30 minutes) and CWLen 6 (20WPM) - and to restrict your CWIDText to just your callsign.

See recommended settings below.

UNTIL NEXT MONTH . . . .

IF YOU HAVE ANY COMMENTS on this month's column, or any new questions, I'd be very pleased to hear from you by mail or by packet (see head of column). Bear in mind that when you first read this in early April, I'll already be writing the column for June.

Finally, please remember what I said at the outset: I can only answer questions through this column, and they have to be on topics of general interest - sorry, but regretfully I cannot give individual advice.

RECOMMENDED TNC SETTINGS FOR VHF PACKET

MAXframe	2	
Paclen	80	
FRack	7	(70 for BAYCOM) ie 7 seconds
PPersist	ON	(may not work on some TNCs)
PErsist	38	(may not work on some TNCs)
DWait	0	(16 if PErsist 38 doesn't work)
SLottime	10	(may not work on some TNCs) ie 100 milliseconds
TXDelay	25	(or as needed)
Beacon Every	0	
CWid Every	180	
CWLen	6	

For further information on TNCs that don't respond to these settings, check the files area of your packet BBS for the original information by G4BLT.

RADCOM TECHNICAL FEATURE

A Two-Metre SSB/CW Transceiver

The first of a two part article by Bernie Pallett, G3VML

THE TRANSCEIVER to be described is modular in construction and provides SSB and CW operation on the two-metre amateur band, **Fig 1**. The output of 600mW is sufficient to drive a linear amplifier, such as the Wood and Douglas 144-Lin-10B, to 10 watts output, or the unit can be used on its own for QRP operation.

Transceiver performance

Basic specification

Single conversion Transceiver (10.7MHz IF)

Frequency Range: 144 to 144.4MHz, covered in 2 switched ranges.

Transmitter

Harmonic and Spurious radiation relative to the Carrier:
2nd Harmonic: -50dB
3rd Harmonic: -58dB
Spurious: better than -50dB
Power output: 600mW (SSB), 600mW (CW) 100% duty cycle into 50Ω resistive load.

Receiver

Sensitivity: -112dBm for 6dB S+N/N

The method of construction used has a number of advantages. Firstly, each module can be constructed and tested separately prior to completion of the transceiver. This should greatly simplify testing and fault finding of the finished product. Secondly, it is possible that the reader may only wish to construct one or two of these modules, perhaps to form part of another unrelated project.

SSB and CW generation

The SSB Processor (Module 1) forms the heart of this transceiver project. The circuit was orginally described in GEC-Plessey Semiconductors professional radio applications notes (August 1979). It has been fully tried and tested in various modified forms, for both PMR and amateur equipment. The version used here has been previously featured in *RadCom* and will be described later.

The module is in fact a transceiver in its own right, which can transmit or receive an SSB or CW signal on a fixed frequency of 10.7MHz. To give a transmit/receive frequency of 144.0 to 144.4MHz, a local oscillator signal between 133.3 and 133.7MHz is applied to the on-board mixer.

For CW transmission, a keyed 1kHz audio signal is injected into the microphone input of module 1. The keyed tone oscillator (Module

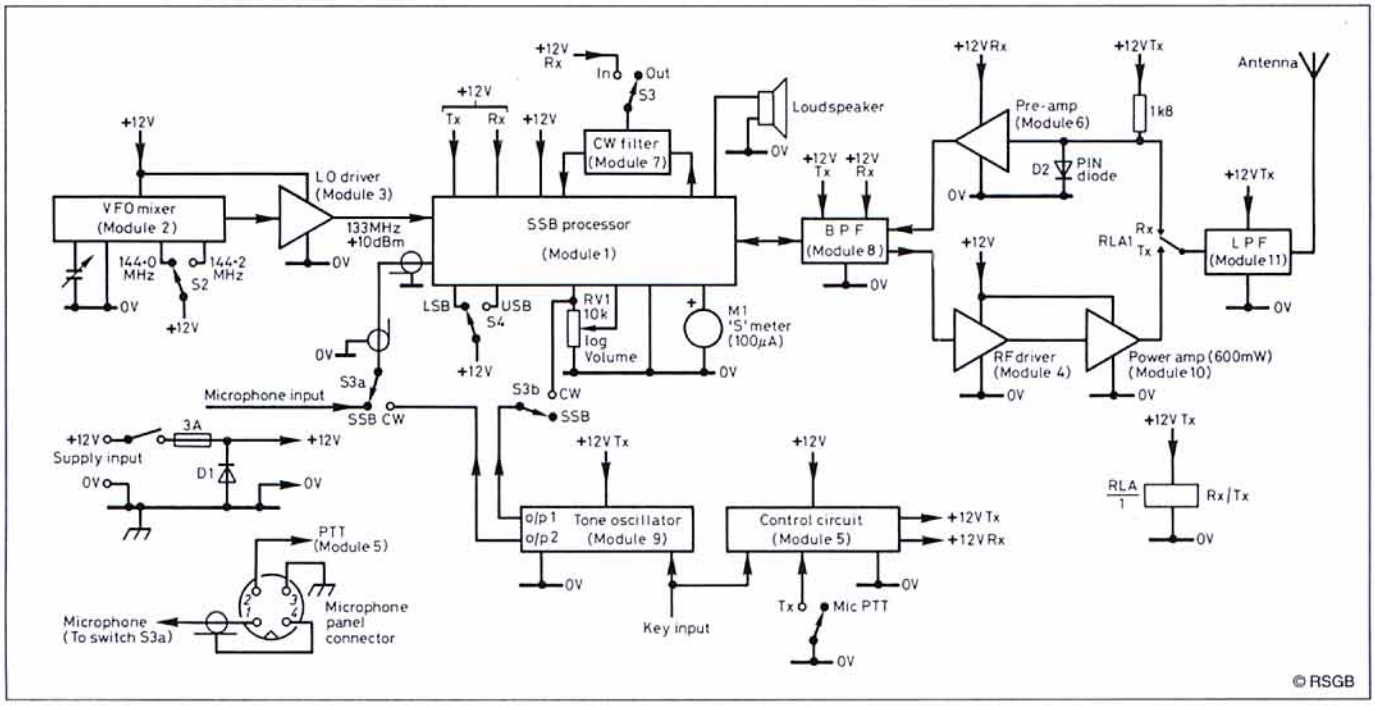


Fig 1: Modular design simplifies the construction of the transceiver, as each unit can be built and tested separately.

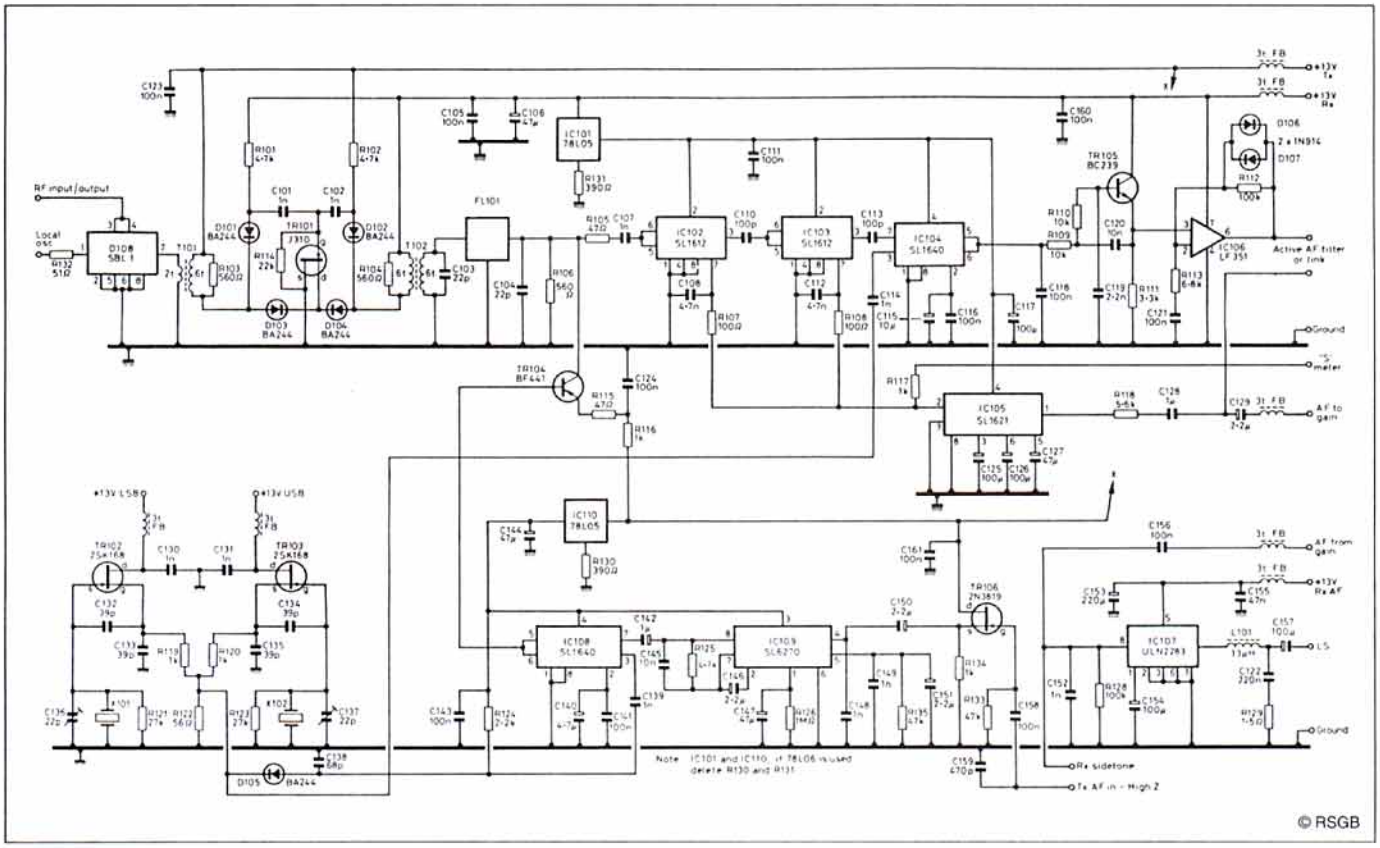


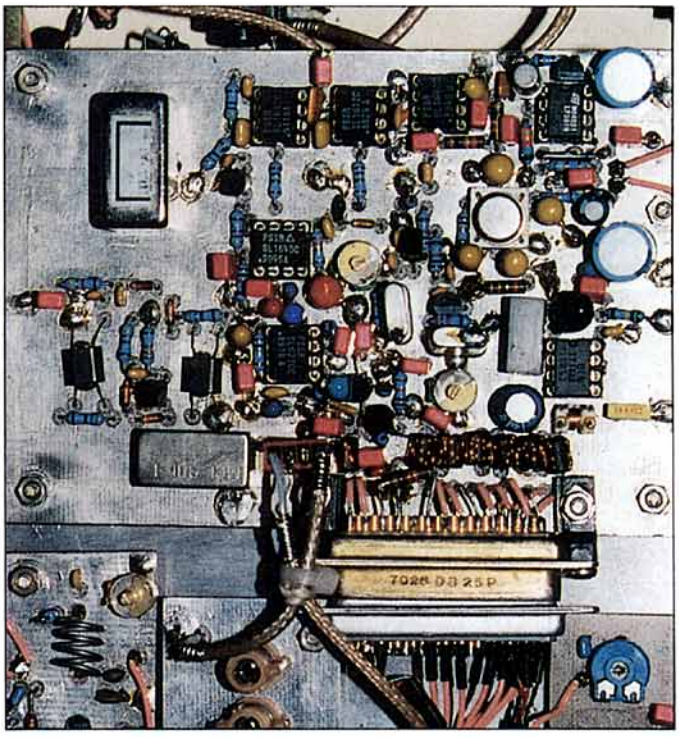
Fig 2: The G4CLF/G3TSO SSB generator forms the heart of the transceiver. Either the SL1621 or SL621 can be used for IC105.

MODULE 1

R101,102,125	4k7
R103,104,106	560R
R105,115	47R
R107,108	100R
R109,110	10k
R111	3k3
R112,128	100k
R113	6k8
R114	22k
R116,117,119,120,134	1k
R121,123	27k
R122	56R
R124	2k2
R126	1M0
R133,135,127	47k
R129	1R5
R130,131	390R
R132	51R
C101,102,107,114,130, 131,139,148,149,152	1nF C
C103,104	22pF C
C105,111,116,118,121, 123,124,141,161,143, 156,158,160	100nF C
C153	220µF A
C108,112	4.7nF C
C110,113	100pF C
C115	10µF T
C119	2.2nF C
C120	10nF C
C117,125,126,154,157	100µF T
C106,127,144,147	47µF T
C129,146,150,151	2.2µF T
C136,137	22pF Trimmer
C132,133,134,135	39pF C
C159	470pF C
C128,142	1µF T
C140	4.7µF T
C145,155	47nF C
C122	220nF
C138	68pF

A: aluminium C: ceramic T: tantalum

IC101,110	78L06(or 05 with resistor)
IC102,103	SL1612/SL612
IC104,108	SL1640/SL640
IC105	SL1621/SL621
IC106	LF351
IC107	ULN2238
IC109	SL6270
TR101	J310
TR102,103	2SK168
TR104	BF441,BF451
TR105	BC239
TR106	2N3819
FB	3t FX1115 (7 required)
L101	33µH
Toko	283-AS-330
D101-105	BA244 switching diodes
D101,107	1N914
X101	10.695MHz
X102	10.015MHz
T101,102	6t+6t FX2249 or equiv.
FL101	10G22D 10.7MHz 8-pole 2.4kHz SSB Filter - Golledge



A 25-way D-type connector is used for DC power and audio connections to the SSB module. Coax is used for LO and RF.

9) has two audio outputs, one is connected to the SSB Processor board via switch S5b, and the other generates a sidetone signal via switch S3b and the volume control.

Oscillator and tx/rx switch

The local oscillator waveform applied to the SSB Processor board, originates from module 2, the VFO/mixer. It has a 7.0 to 7.2MHz VFO, the output of which is mixed with either a 126.3 or 126.5MHz fixed waveform, to give a 133.3 to 133.7MHz signal at the module output terminals. The local oscillator driver (Module 3) has a narrow-band power gain of over 40dB at 133.3MHz to produce at least +10dBm for module 1.

Module 5 is the transmit/receive control circuit which is, in effect, a single pole, double throw, monostable switch. In the rest state +12 volts is applied to the receive circuits. If the key or mic PTT input is grounded, the +12 volt supply is switched to the transmit circuits.

Releasing the key or mic PTT will switch the positive +12 volt supply back to receive mode but with one difference: The key input has a release switching delay for semi-breaking CW operation.

Transmit filters and amplifier

The band-pass filter (Module 8) is tuned to pass transmit/receive signals centred on 144MHz. It has sufficient selectivity to attenuate unwanted harmonics and spurious products. Transmit/receive signal path routing uses PIN-diode switching circuits, activated by the +12V Tx or Rx supply.

The narrow band RF driver amplifier is centred on 144MHz (Module 4). It has a power gain of some 40dB. The circuit is the same as Module 3 but tuned to 144MHz instead of 133MHz.

The transmitter power amplifier stage (Module 10) has a power gain of approximately 7dB at 144MHz, and gives approx 600mW into a 50Ω resistive load, via relay contacts RLA, and the low-pass filter (Module 11).

Receive pre-amp and filter

The receive pre-amplifier (Module 6), has a small-signal voltage gain at 144MHz of approximately 15dB. During transmit, PIN-diode D2 (on RF c/o relay RLA) grounds the receive pre-amplifier input, preventing instability caused by stray feedback.

A 750Hz CW audio band-pass filter (Module 7) helps to clean up CW audio reception, where adjacent channel QRM is a problem. This filter is in series with the SSB processor board receive audio circuit. When not in use, this filter is bypassed by relay contacts activated by switch S5. Diode D1 offers reverse supply voltage protection for the transceiver.

SSB MODULE OPERATION

I WILL NOW BRIEFLY describe the operation of the SSB module (Module 1). This has already been featured in two *RadCom* articles by Mike Grierson, G3TSO, based on a design by G4CLF. For complete component and layout details relating to the SSB Processor board, refer to the orginal articles by G3TSO. [Reprints of the articles (total 7 pages) are available from the *RadCom* office at £3.50 inc P&P - *Ed*].

The circuit diagram of the SSB Processor board is shown in **Fig 2**. This circuit, together with PCB track layout and component location diagrams were published in connection with the article by G3TSO in *RadCom*, October 1988. There are, however, three minor modifications:

a) The Monolithic Filter FL101 shown in Fig 2, is changed from 9.0 to 10.7MHz.

b) Slight alterations have been made to the PCB track layout in order to fit the 10.7MHz Golledge 10G22D filter.

c) Carrier crystals X101 and X102 are changed to 10.6985MHz and 10.7015MHz respectively.

The SSB module uses a number of GEC-Plessey SL1600 series ICs. On receive, the incoming signal is applied to an SBL-1 double-balanced mixer and mixed with a local oscillator signal of about 500mV. The resultant 10.7MHz IF signal is then amplified, firstly by a J310-based bi-directional amplifier, then by the two SL1612 ICs.

After this, the signal passes to an SL1640 product detector. TR102 and TR103 comprise two carrier oscillators but only one of these is active, depending on whether LSB or USB is selected. Audio is filtered by TR105, and an SL1621 provides the main AGC function. Additional audio amplification and AGC is provided by IC106 - an LF351 op-amp. Output to the loudspeaker comes from a ULN2283 integrated circuit.

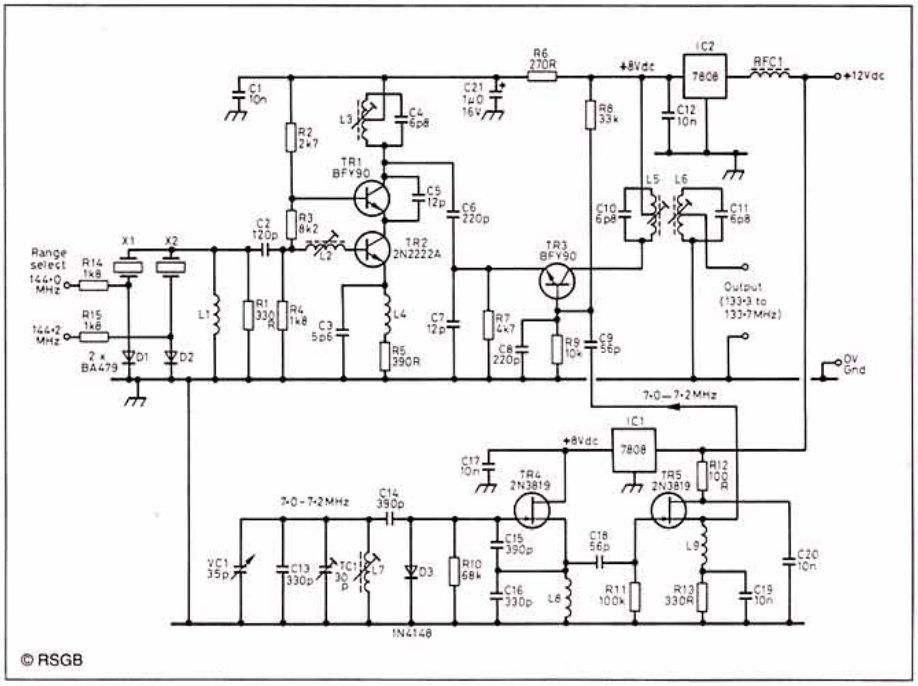
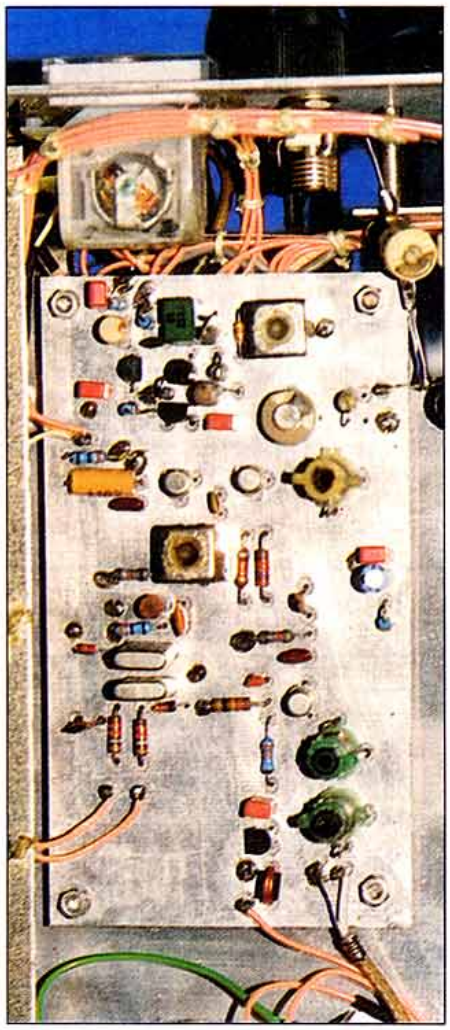


Fig 3: The VFO and crystal oscillator signals are mixed to give a stable output at 133.3 – 133.7MHz.



The VFO/mixer circuit board.

On transmit, the microphone signal is amplified by FET TR106, and then by an SL6270 gain-controlled amplifier. This gives a near-constant output from a wide range of inputs. IC108 is the balaced modulator which receives a carrier signal from one of the two oscillators previously described, as well as audio.

The resultant DSB signal is amplified and then filtered at 10.7MHz to produce SSB at the TR101 switching circuit. The SBL-1 mixer works the opposite way round to the situation on receive, and the SSB signal is output from the board at frequencies 10.7MHz above and below that of the local oscillator.

VFO/MIXER (MODULE 2)

THE FET TR4 AND ASSOCIATED components form a 7.0 to 7.2MHz VFO circuit as shown in **Fig 3**. The VFO output is fed via a buffer amplifier, FET TR5, and capacitor C9 to the base of transistor TR3, a mixer circuit. Transistor TR2 and associated components form a crystal controlled oscillator, selectable between one of two crystal frequencies, 63.15MHz and 63.25MHz respectively.

To select either crystal X1 or X2, +12 volts is applied to either resistor R14 or R15, which serves to forward bias pin-diode DI or D2 respectively. Thus the required crystal is switched into circuit. The output waveform from the crystal oscillator circuit is applied to a frequency doubler, transistor TR1 and tank circuit L3/C4.

The resultant 126.3MHz or 126.5MHz output is applied, via capacitor C6, to the emitter input of the mixer, transistor TR3. Collector load for TR3 is a 133.5MHz parallel tuned circuit L5/C10, which is also inductively coupled to an identical parallel tuned circuit L6/C11.

The module's RF output is derived between the tapped portion of L6 and ground. The combined selectivity of the two parallel tuned circuits should be found sufficient to attenuate frequencies in the region of 126MHz.

VFO/Mixer (Module 2) Components list

Capacitors

C1,C12,C17	10n min polycarbonate
C19,C20	10n min polycarbonate
C2	120pF min ceramic
C3	5.6pF min ceramic
C4,C10,C11	6.8pF min ceramic
C5,C7	12pF min ceramic
C6,C8	220pF min ceramic
C9,C18	56pF min ceramic
C13,C16	330pF polyester
C14,C15	390pF polyester
C21	1µF 16V min electrolytic
TC1	30pF 10mm ceramic trimmer
VC1	35pF min ceramic air spaced variable

Resistors 0.25W 5%

R1,R13	330R
R2	2k7
R3	8k2
R4,R14,R18	1k8
R5	390R
R6	270R
R7	4k7
R8	33k
R9	10k
R10	68k
R11	100k
R12	100R

Semiconductors

TR1,TR3	BFY90
TR2	2N2222A
TR4,TR5	2N3819
D1,D2	BA479
D3	1N4148
IC1,IC2	7808 8V regulator

Inductors

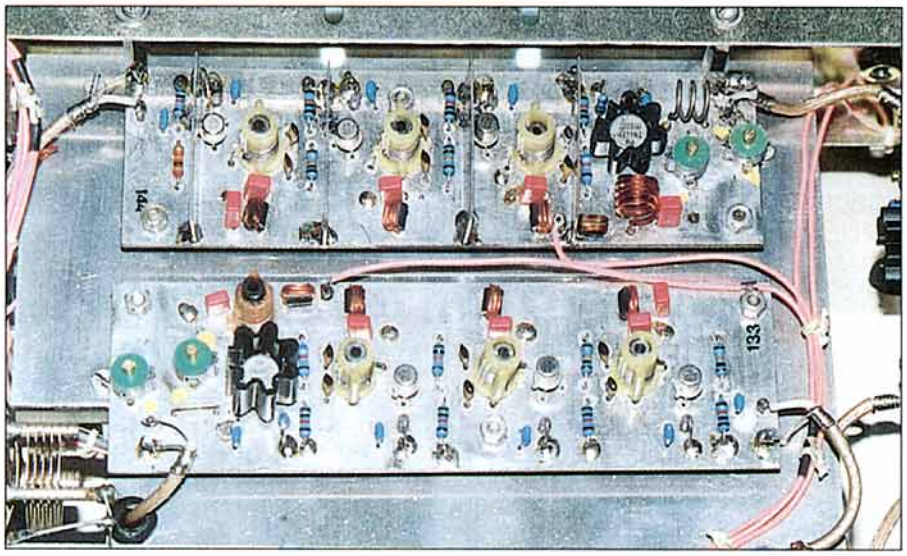
L1	12µH Toko 7BS series
L2	1.1µH Toko KXNK3766EK
L3	0.18µH Toko S18 series (Cirkit No 35-10403) *
L4	4.7µH axial
L5,L6	0.23µH Toko S18 series (Cirkit No 35-10503) *
L7	1.7µH Toko KXNSK46138M
L8	150µH Toko 7BS series
L9	1mH Toko 7BS series
RFC1	3 turns 28SWG enam wound on FX1115 ferrite bead
*L3,L5	tap 3/4 turn from collector end
*L6	tap 3/4 turn from ground

133/144MHZ RF DRIVERS (MODULES 3 & 4)

FROM A CIRCUIT POINT of view (**Fig 4**) the 133MHz and 144MHz RF drivers share many common features, and to simplify construction, the PCB track layouts are identical for both driver modules. Each module consists of four linear amplifier stages, formed by transistors TR1 to TR4, to give a total power gain in excess of 40dB.

Most of the overall circuit selectivity is derived from the three parallel tuned circuits formed by inductors L1, L2 and L3, plus associated capacitors, which make up the respective collector loads for transistors TR1, TR2 and TR3. The values of capacitors C5/C6, C9/C10 and C11/C12 differ between the 133MHz and 144MHz versions and are therefore listed separately.

There are small differences between the 133MHz and 144MHz module transistor stages (TR4). In the 133MHz version, it is necessary to adjust the RF output level to +10dBm, whilst maintaining an output impedance match to 50Ω, whereas with the 144MHz version it is only necessary to amplify the signal and match the output to 50Ω. Circuit and component differences between the two versions are itemised below. Note additonal screening on 144MHz module.



The 144MHz Transmit Driver board (top) and 133MHz Local Oscillator Driver.

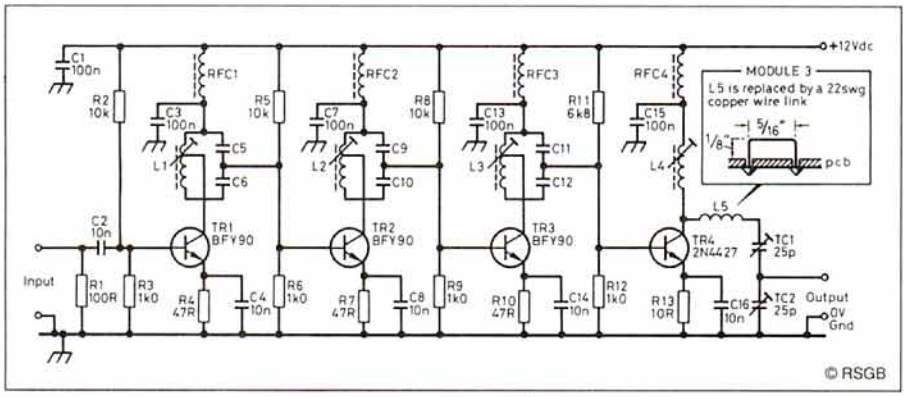


Fig 4: Modules 3 and 4 give a power gain of over 40dB.

RF Driver & Amplifier (Modules 3 & 4) Components list

Capacitors

C1,C3,C7, C13,C15	0.1µF min polycarbonate
C2,C4,C8, C14,C16	0.01µF min polycarbonate
C5,C9,C11	33pF *
C6	8.2pF (133MHz) or 6.4pF (144MHz) *
C10	8.2pF (133MHz) or 6.4pF (144MHz) *
C12	8.2pF (133MHz) or 4.7pF (144MHz) *
* = miniature ceramic	
TC1,TC2	25pF min trimmer

Resistors 0.25W 5%

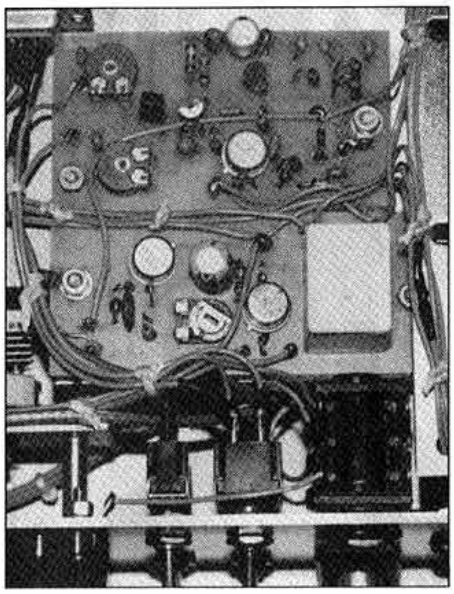
R1	100R
R2,R5,R8	10k
R3,R6,R9,R12	1k0
R4,R7,R10	47R
R11	6k8
R13	10R

Semiconductors

TR1,TR2,TR3	BFY90
TR4	2N4427

Inductors

L1,L2,L3	0.23µH Toko S18 series (Cirkit Pt No 35-10503) All above tapped 3/4 turn from RFC end
L4 (Module 3)	0.114µH Toko S18 series (Cirkit Pt No 35-10303)
L4 (Module 4)	5 turns, 22SWG enam wound on 1/4in ID, 3/8in length
L5 (Module 3)	see circuit
L5 (Module 4)	3 turns, 22SWG, wound on 1/4in ID, 3/8in length
RFC1,2,3 and 4	7 turns 28SWG enam wound on FX1115 ferrite bead



The control circuit is the lower of the two modules shown above.

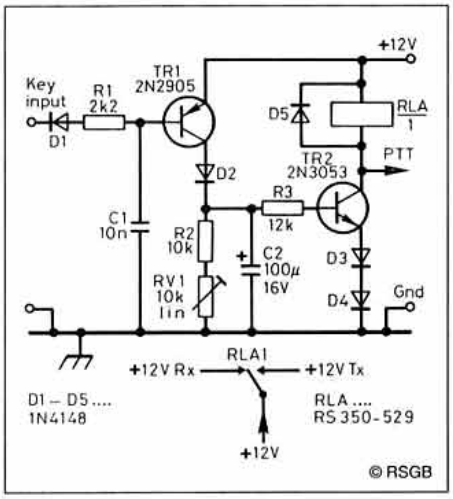


Fig 5: The relay RLA will operate immediately the key input line is grounded. The release time is determined by C2, R2 and pre-set RV1.

CONTROL CIRCUIT (MODULE 5)

IN THE UNENERGISED state (**Fig 5**) both transistor switches TR1 and TR2 are biased 'off' and relay RLA is de-energised, routing +12 volts to the receive supply rail via contacts A1. When the key input is grounded, TR1 is forward biased completing the charge circuit for capacitor C2, via diode D5. Within a very short period of time, C2 charges, and TR2 becomes forward biased.

This permits relay RLA to energise, resulting in +12V being switched from the receive to the transmit supply rail via relay contacts A1. When the ground to the key input is lifted, TR1 returns to the 'off' state. With the charging circuit to capacitor C2 now removed, it discharges through resistors R2 and RV1.

The discharge time of capacitor C2 is determined by adjustment of preset resistor RV1. When the charge voltage across capacitor C2 falls below 1.2V, TR2 returns to the 'off' state. Then relay A de-energises and the +12V supply returns via relay contacts A1 to the receive positive supply rail. Diode D4 offers back-EMF protection for transistor TR2. The microphone Press-to-talk (PTT) switch, directly controls the energising of Relay A.

Control Circuit (Module 5) Components list

Capacitors

C1	0.01µF min ceramic disc
C2	100µF 16V electrolytic

Resistors

R1	2k2
R2	10k
R3	12k
RV1	10k linear pre-set

Semiconductors

TR1	2N2905 or 2N1305
TR2	2N3053
D1,D2,D3, D4 & D5	1N4148

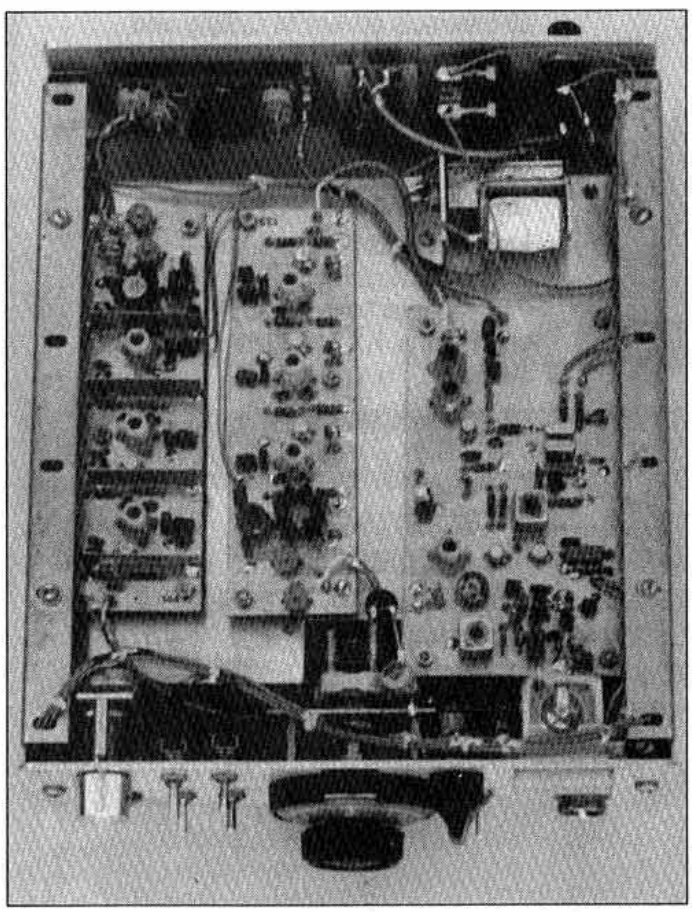
Additional Items

Relay	RS (Electromail) type 350-529 (SPCO)

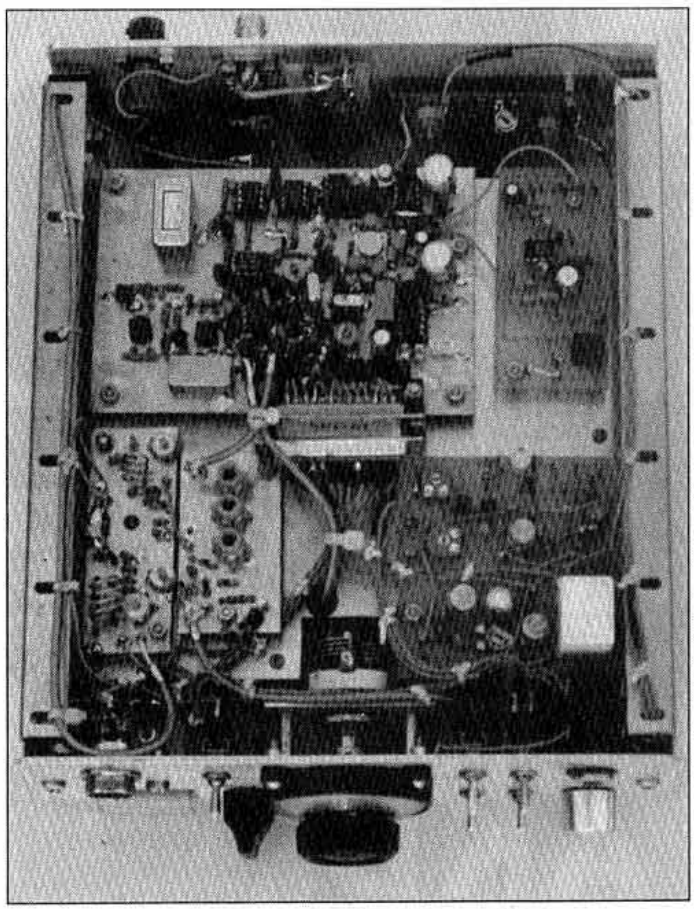
. . . to be continued

NEXT MONTH

In the second part of this feature, G3VML describes the CW Filter, Tone Oscillator, BPF, RF Pre-amp, Power amplifier and Low Pass Filter. Construction, basic fault finding and alignment procedures will also be described together with details of the test equipment required.



Underside showing modules 2, 3 and 4 plus the aerial changeover relay.



The top side has the SSB generator and remaining modules.

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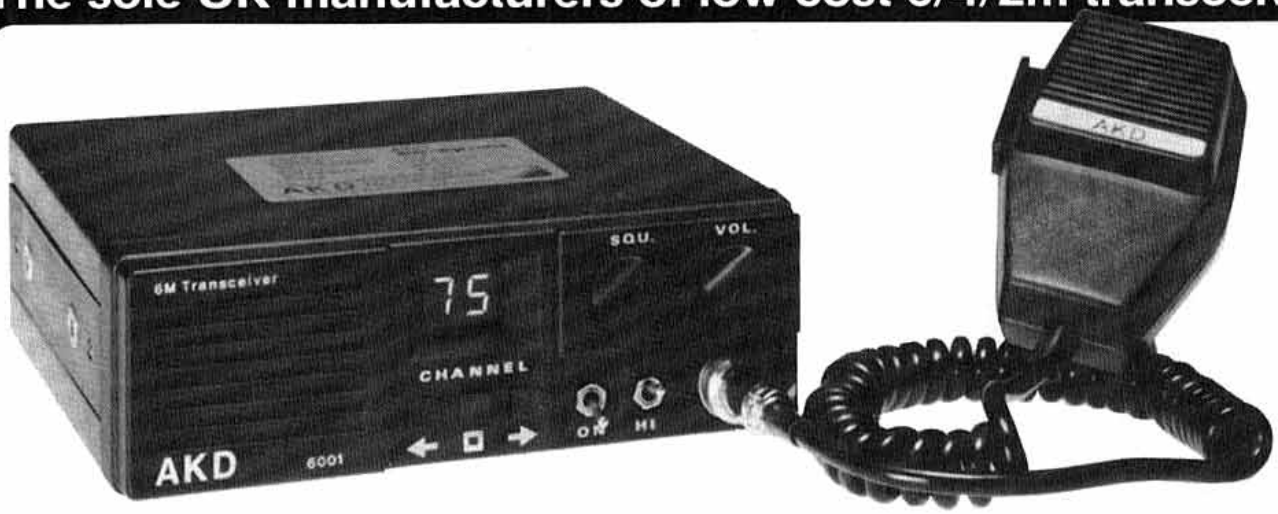

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50.010 to 51.990 MHz in 20 KHz steps. Covers FM Calling FM Packet and Raynet frequencies. RF output 25 and 5 watts. RX sensitivity better than .25uV.
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Access

Simply Silicon

THE MC2833 is a one-chip FM transmitter subsystem designed for cordless telephone and FM communication equipment. It includes a microphone amplifier, voltage controlled oscillator and two auxiliary transistors

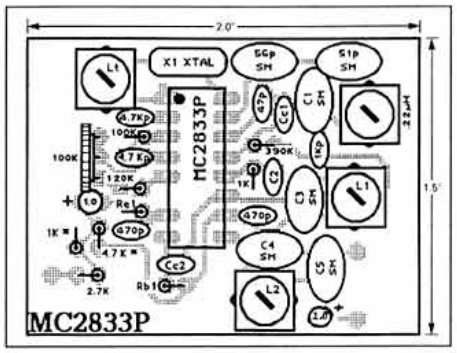
- Wide Range of Operating Supply Voltage (2.8-9.0V)
- Low Drain Current (I_{CC} = 2.9mA Typ)
- Low Number of External Parts Required
- -30dBm Power Output to 60MHz Using Direct RF Output
- +10dBm Power Output Attainable Using On-chip Transmitter Amplifiers

MOTOROLA MC2833 - This FM low power transmitter IC opens up the possibility of a single chip QRP FM transmitter for 50MHz, 70MHz or 144MHz. It incorporates a modulator, oscillator and voltage regulator. Also, two internal transistors may be used as amplifiers or frequency multipliers. Additional stages may be used to increase output power. Operating characteristics are shown in the table on page 40.

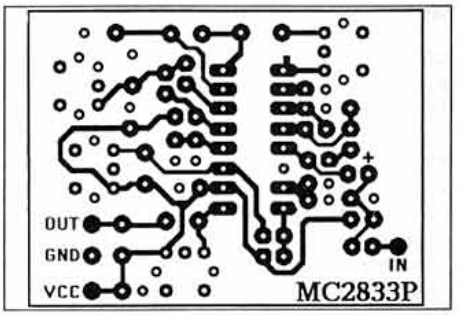
Crystal X1 is fundamental mode, calibrated for parallel resonance with a 32pF load. The final output frequency is generated by frequency multiplication within the MC2833 IC. The RF output buffer (Pin 14) and Q2 transistor are used as a frequency tripler and doubler, respectively, as required. The Q1 output transistor is a linear amplifier in the 49.7MHz transmitter, and a frequency doubler in the 144MHz transmitter.

All coils used are 7mm tunable shielded inductors, Toko B199SN-T10XXZ, B199KN-T10XXZ or equivalent.

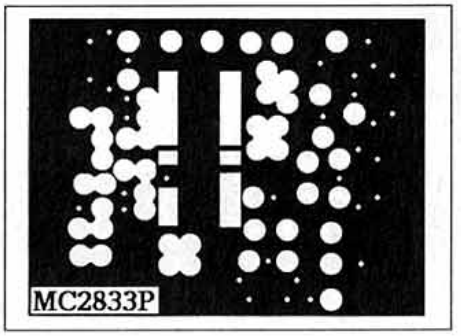
Power output is approx +10dBm for the



Component layout of transmitter.



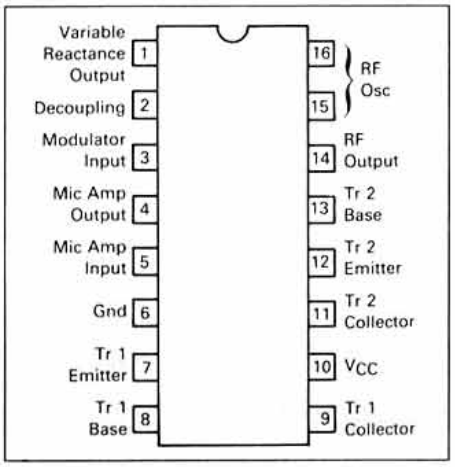
PCB layout of track side (above) and ground plane (below).



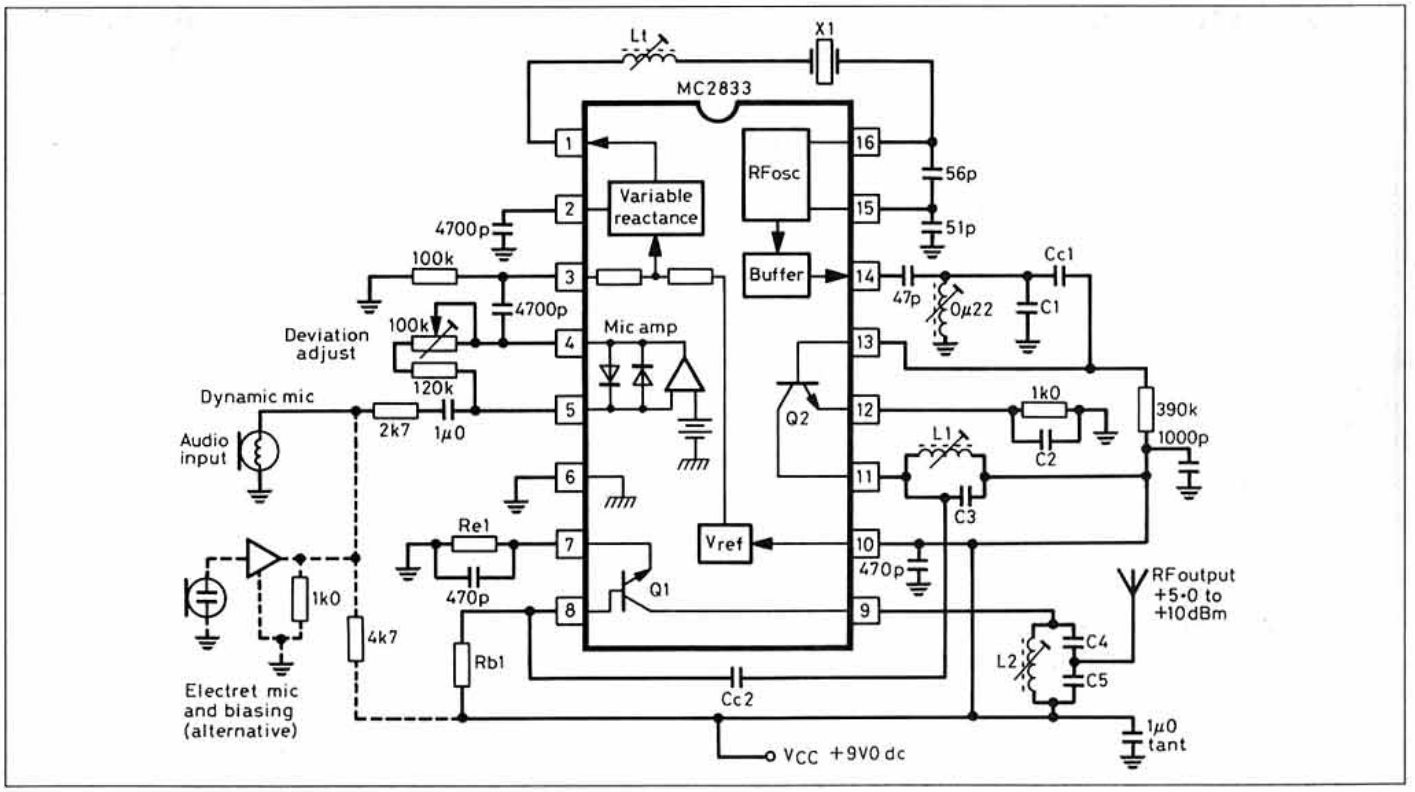
FM transmitter

Components versus output frequency

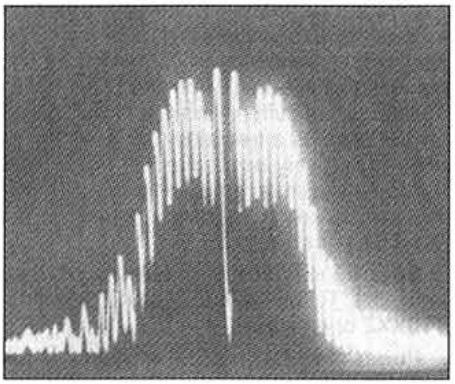
	49.7MHz	144MHz
X1(MHz)	16.5667	12.05
Lt(uH)	3.3-4.7	5.6
L1(uH)	0.22	0.15
L2(uH)	0.22	0.10
Re1	330R	150R
Rb1	390k	220k
Cc1	33p	47p
Cc2	33p	10p
C1	33p	68p
C2	470p	1000p
C3	33p	18p
C4	47p	12p
C5	220p	33p



Integrated circuit pin assignments.



Single chip VHF Narrowband FM transmitter. RF output between +5dBm and +10dBm depending on frequency.



Modulation Spectrum of the transmitter.

49.7MHz transmitter, and approx +5.0dBm for the 144MHz transmitter at V_{CC} = 8.0V. Power output drops with lower V_{CC}.

All capacitors in microfarads, inductors in Henries and resistors in Ohms unless otherwise specified. The IC is available in DIP package (Psuffix) or surface mount.

Note: Device characteristics and application notes in Simply Silicon are compiled from manufacturers published data. Circuit diagrams are included for experimental purposes and have not been proven by *Radio Communication*. Transmitting equipment must be operated in accordance with national regulations. All data is copyright of the device manufacturer.

The Motorola MC2833P is available from Motorola Distributors or from JAB Electronic Components. Tel: 021 366-6928.

MC2833 SPECIFICATION

MAXIMUM RATINGS

Ratings	Symbol	Value	Unit
Operating Supply Voltage Range	V_{CC}	2.8 – 9.0	V
Operating Ambient Temperature	T_A	–30 to +75	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 4.0V, T_A = 25°C)

Characteristics	Symbol	Pin	Min	Typ	Max	Unit
Drain Current (no input signal)	I_{CC}	10	1.7	2.9	4.3	mA
FM MODULATOR						
Output RF Voltage (f_o = 16MHz)	V_{out} RF	14	60	90	130	mVRMS
Output DC Voltage (No input signal)	Vdc	14	2.2	2.5	2.8	V
Modulation Sensitivity (f_o= 16.6MHz)	SEN	3	7.0	10	15	Hz/mVDC
(V_{in} = 0.8V to 1.2V		14	-	-	-	
Maximum Deviation (f_o = 16.6MHz)	Fdev	3	3.0	5.0	10	kHz
(V_{in} = 0V to 2.0V)		14	-	-	-	
MIC AMPLIFIER						
Closed Loop Voltage Gain (V_{in} = 3.0mV RMS	A_v	4	27	30	33	dB
(f_{in} = 1.0kHz)		5	-	-	-	
Output DC Voltage (No input signal)	V_{out}dc	4	1.1	1.4	1.7	V
Output Swing Voltage (V_{in} = 30 mV RMS)	V_{out} p-p	4	0.8	1.2	1.6	Vp-p
(f_{in} = 1.0kHz)						
Total Harmonic Distortion (V_{in} = 3.0mV RMS)	THD	4	-	0.15	2.0	%
(f_{in} = 1.0kHz)						

AUXILIARY TRANSISTOR STATIC CHARACTERISTICS*

Characteristics	Symbol	Min	Typ	Max	Unit
Collector Emitter Breakdown Voltage (I_C = 200uA)	$V_{(BR)CEO}$	10	15	-	V
DC Current Gain (IC = 3.0mA)	h_{FE}	40	150	-	-
(V_{CE} = 3.0V)					

AUXILIARY TRANSISTOR DYNAMIC CHARACTERISTICS*

Current Gain Bandwidth Product (V_{CE} = 3.0V)	f_T	-	500	-	MHz
(I_C = 3.0mA)					

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PCBs

G3BIK BATTERY OPERATED AF OSCILLATOR AND WAVEFORM GENERATOR (September 1990)

PCB Layout	93990	£4.70
Full Kit (including box)		£25.85

G4WIM 50/70MHz TRANSCEIVER (May/June/July 1990)

Complete set of boards	567WIM90	£67.56

G4PMK SIMPLE SPECTRUM ANALYSER (November 1989)

RF Board	118946	Prices on request
Video/sweep board	118947a	
Marker generator/PSU	118947b	
Complete set of 3 boards	1189SSA	£17.62

G3TXQ TRANSCEIVER (February/March 1989)

Main IF/Audio	028945	£11.75
VFO	028946	£5.55
Driver/Preamp	028947	£6.75
Low pass filter	028948a	£7.65
Band-pass filter	028948b	£4.70
Control board	038942a	£5.30
Regulator board	038942b	£2.35
Complete set of 7 boards	0289TXQ	£27.61

BRS54049 DUAL CONVERSION MULTIMODE RECEIVE IF/AF STRIP (May/June 1985)

PCB LAYOUT	643585	£12.75

All prices include VAT, postage and packing

These PCBs are not available from RSGB HQ, but direct from Badger Boards, 87 Blackberry Lane, Four Oaks, Sutton Coldfield, B74 4JF. Tel: 021 353-9326.

KITS

KITS ARE AVAILABLE AS ELECTRONIC PARTS ONLY. PCBS ARE AVAILABLE FROM BADGER BOARDS.

G3TSO	Multiband Transceiver	POA
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G3TSO	Frequency Display (Excl LEDs)	£25.30
G3TSO	80m SSB Transceiver (Excl Tune Cap)	£87.00
G4WIM	Dual Band Project	POA
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G3RVM	Ultimate Keyer	£13.90
G3TDZ	White Rose Rx (Main Board)	£18.50
G3TDZ	White Rose Con Fundamental*	£7.10
G3TDZ	White Rose Rx Conv SS O/T Osc*	£9.20
G3TDZ	White Rose Rx Conv SS O/T Osc and mult*	£10.95

* Converters exclude crystals which must be ordered as a separae item from our catalogue selection

G3BIK	AF Oscillator	£16.30
G4ENA	QRP + QSK Transceiver 80m	£32.10
G4ENA	QRP + QSK Transceiver 160m	£33.10
G4ENA	QRP + QSK PCB only	£5.90
G4ENA	QRP + QSK Ready Punched Case	POA
Technical Topics 144MHz Doppler		£4.00
First Steps. John Case PSU		£29.00
First Steps. John Case PSU (case and metalwork)		£6.70

Prices shown are inclusive of P&P.
Kits for *D-i-Y Radio* projects also available

The above prices are for full component kits. The bigger kits are produced in module form if the constructor wishes to spread the cost. Please telephone for a full list. JAB's aim is to have kits available off the shelf. When demand may be high following publication you are advised to allow up to 28 days or check availability by phone first.

Available from:-
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The Industrial Estate, 1180 Aldridge Road, Great Barr, Birmingham B44 8PE. Tel: 021-366-6928

The Peter Hart Review

ICOM IC-729

HF + 50MHz Transceiver

SEVERAL YEARS AGO, Icom introduced the IC-725 small, budget-priced HF transceiver. This was later followed by the IC-726 which also included 50MHz. In my reviews [1, 2] I found them good all-round performers and was sufficiently impressed to buy the IC-726 for my own use.

Last summer Icom introduced the IC-728 and IC-729. These are fundamentally the same as the IC-725 and IC-726 but include passband tuning and a speech processor. The radios have been re-styled and there are several performance improvements. The IC-728 covers the HF bands 1.8 - 30MHz. The IC-729 is essentially the same but also covers 50MHz.

PRINCIPAL FEATURES

THE IC-729 IS a small 12V operated transceiver covering USB, LSB, CW, AM and FM modes. The IC-728 requires the UI7 optional unit to be fitted to cover FM (and AM transmit). The handbook specifies that the IC-729 receiver tunes from 500kHz to 30MHz and 50 to 54MHz but the actual range is 30kHz to 33MHz and 46.2 to 61.1MHz with some reduction in sensitivity outside of the specified range.

The rotary tuning knob tunes in steps of 10, 20 or 50Hz and this corresponds to 2, 4 or 8kHz per revolution of the tuning knob. This is quite a slow rate. However, when operating with 10Hz or 20Hz step sizes, turning the tuning knob quickly engages speed-up which automatically selects the 50Hz step size. For more rapid frequency changes, 1kHz or 1MHz step sizes may be selected (100kHz or 10MHz per revolution of the tuning knob). A band button allows the amateur bands to be selected, returning to the frequency and mode set when that band was last used.

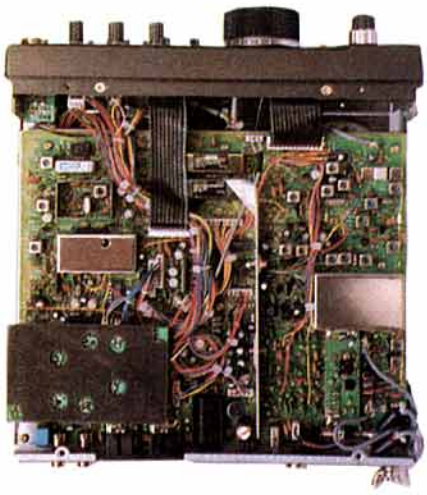
Twin VFOs are incorporated which may be operated split in the usual fashion. There are 26 memories to store frequency and mode. Two memory channels (23 and 24) will each store independent transmit and receive frequencies for split operation and two other memories (25 and 26) store scan frequency limits. The usual read, write and VFO transfer functions are provided including direct VFO from memory, but there is no memory contents preview facility. The memory and VFO contents are retained by a lithium back-up battery with a life of at least five years.

Scanning is provided between two frequency limits or across the memory channels. In addition, scanning can be limited to those memory channels operating on the same mode.

The backlit liquid crystal display (LCD) is bright and easy to read with a wide viewing angle. The display indicates frequency to 10 or 100Hz resolution (as selected by the user), mode, memory number and various status indicators for VFOs, scanning and memories.

Receiver functions include a noise blanker, switchable 20dB input attenuator, switchable input preamplifier, all mode squelch, fast/slow AGC and RIT. The RIT operates on receive only, over a range of +/-1.26kHz in 10Hz steps and the offset may be added onto the basic operating frequency. There is no RF gain control or notch filter but passband tuning is provided. This is a major improvement.

The transmitter provides 100W output on the HF amateur bands and 10W nominal on 50MHz. The power output is variable down to a few watts. CW break-in is incorporated with variable delay. On SSB, there is no VOX but an audio based speech processor is provided, another improvement over the IC-725. The hand microphone supplied (HM-12) uses an electret insert which is polarised to 8V DC via the active mic line. This includes up/down buttons for stepping frequency or memories. Other microphone types are likely to require a DC blocking capacitor.



The three-section construction gives easy access to the circuit boards.

The rig is cooled by an exceptionally quiet fan which comes into operation on transmit and when the heatsink temperature rises. Metering is provided for S-meter on receive and relative power output on transmit. ALC is indicated by brightening the transmit LED.

The rear panel is pictured overleaf. Relay controlled T/R switching and ALC is provided for external linear control and there are three main accessory sockets for interfacing to auto ATU (AH-3 or AT-160), data terminals for RTTY and packet TNCs and general audio lines. There is no provision for low power RF output to drive transverters.

The Icom CI-V serial computer control interface is provided which, via the CT-17 level converter accessory, will allow a PC to control up to four Icom rigs. The format is fully compatible with the IC-725/726 and a useful stand alone remote controller for these Icom radios has been described in *RadCom* [3].

A 52-page instruction manual is provided which is common to both the IC-728 and IC-729. This is an excellent manual and gives clear instructions on installation and operation, external connections, installation of options and some maintenance information. A set of circuit diagrams is included.

Internal options available as extra include narrow CW filter (500 or 250Hz), high stability reference oscillator and programmable tone encoder. These are straightforward to fit. A wide range of external accessories is also available. A carrying handle is available as an extra.

DESCRIPTION

THE IC-729 MEASURES 24.1(W) by 9.4(H) by 23.9cm(D) and weighs 4.6kg. It is ruggedly constructed in three sections which gives easy access to the circuit boards. The lower section contains two large PCBs on either

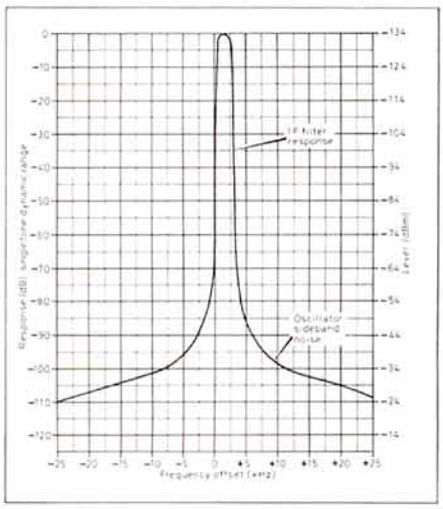


Fig 1: The overall selectivity is very good.

side of a supporting frame. The upper section is an aluminium diecast assembly containing the power amplifier, output filter and fan. A 6.5cm diameter upward facing speaker uses the diecast assembly as a baffle. The third section is the front panel assembly.

The receiver is triple conversion with IFs of 70.45MHz, 9.01MHz and 455kHz. Compared with the IC-725/726 which uses only the first two IFs on SSB/CW, the IC-729 provides a third conversion to 455kHz to implement passband tuning. The main selectivity is provided at the second IF and this is where the optional narrow CW filter is fitted. The transmit signal is generated at 9.01MHz and mixed via 70.45MHz to the final frequency. Separate PA stages are used for HF and 50MHz. The RF amplifier and mixer both use twin FETs which are used also on 50MHz. A second RF amplifier is used on 50MHz only.

A single microcontroller is used to control all functions. The frequency synthesiser uses a combination of DDS (direct digital synthesis) and PLL (phase locked loop) to give fast tuning and good spurious performance with small step size.

MEASUREMENTS

MEASUREMENTS WERE MADE with the IC-729 powered from a 13.6V PSU and are detailed in the table. Additional comments are as follows.

RECEIVER MEASUREMENTS

S-METER CALIBRATION

The calibration was similar on all modes except FM and is fairly typical of most transceivers. On FM, the range and linearity were very poor, again like many transceivers.

SPURIOUS REJECTION

The rejection of the first mixer image was in excess of 100dB and IF rejection was in excess of 90dB on all bands except 50MHz. This is extremely good. On 50MHz, however, the 70.45MHz IF rejection was only 50dB which might cause problems if strong 4m signals operate on this frequency. All other responses were in excess of 100dB which is very clean.

SELECTIVITY

The review radio was fitted with the FL-100 500Hz bandwidth CW filter and this is selected in the narrow CW position. With the IC-725, reciprocal mixing limited IF selectivity measurement to -50dB. With the IC-729, this was not a limitation and measurements at -60dB were easily achieved. The skirt selectivity measured was considerably better than the IC-725.

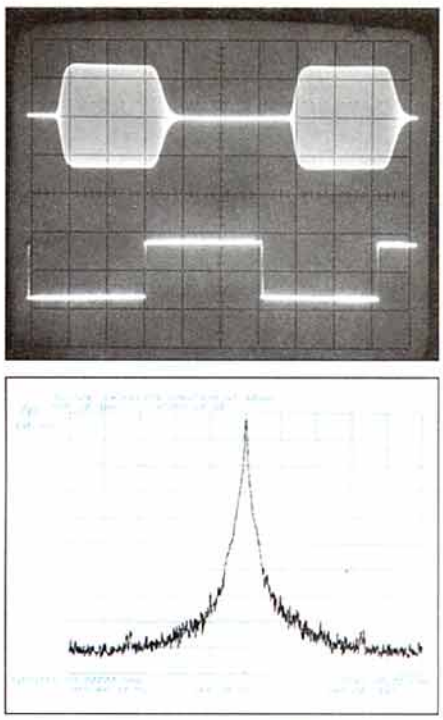


Fig 2: Keying waveform at 40WPM (horiz scale: 10ms/div) and equivalent spectrum (horiz: 1kHz/div; vert: 10dB/div).

STRONG SIGNAL PERFORMANCE

The front-end third order intercept and dynamic range measured with 50kHz tone spacings was extremely good, some of the best figures I have measured on any radio regardless of price. The reciprocal mixing figure is also very good and a considerable improvement on the IC-725/726. This was the one performance limitation of the earlier radio. The close-in dynamic range, however, is rather poor and very much worse than the IC-725. This is surprising considering that the circuitry used in the two radios is identical in this part of the signal flow. Possibly the 70.45MHz IF filter is the culprit? The overall effect of IF filter selectivity and reciprocal mixing is shown in **Fig 1** - a very good result.

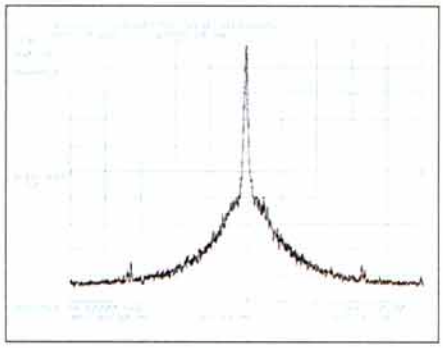


Fig 3: The much improved transmitter noise output.

FREQUENCY CALIBRATION

When measured at room temperature, the receive and transmit frequencies were accurate to within 75Hz. The CW frequency reads correctly for a beat note of 800Hz.

TRANSMITTER MEASUREMENTS

POWER OUTPUT

The power output was variable from the figures given in the table down to 10W on HF or 1W on 50MHz. The power meter, although calibrated in percentage output, read remarkably close to the true power in watts. Into a mismatched load, the power output reduced quite substantially and an ATU would be desirable in this case.

SPURIOUS OUTPUTS

Harmonic and spurious outputs were generally at a very low level.

SSB PERFORMANCE

A fairly typical result for a 12V operated PA. The audio speech processor did not substantially effect the level of distortion products. Higher order products were -60dB at +/-10kHz and -75dB at +/-20kHz.

CW KEYING PERFORMANCE

Fig 2 shows the CW keying waveform at 40WPM and the equivalent keying spectrum. This is close to an optimum result. The first character of a group was noticeably shortened at this speed.

TRANSMITTER NOISE OUTPUT

Transmitter noise output is very much improved over the IC-725. This is illustrated in **Fig 3** and can be compared with the similar plot in the IC-725 review [1].

TRANSMIT-RECEIVE SWITCHING SPEED

The measured figures are good and should

The rear panel carries connections for DC power, key, external speaker and separate antenna sockets for HF and 50MHz.

ICOM IC-729 MEASURED PERFORMANCE

RECEIVER MEASUREMENTS

FREQUENCY	SENSITIVITY SSB 10dBs+n:n PREAMP IN	PREAMP OUT	INPUT FOR S9 PREAMP IN	PREAMP OUT
1.8 MHz	0.13µV (-125dBm)	0.32µV (-117dBm)	25µV	79µV
3.5 MHz	0.13µV (-125dBm)	0.32µV (-117dBm)	20µV	89µV
7 MHz	0.13µV (-125dBm)	0.28µV (-118dBm)	20µV	71µV
10 MHz	0.16µV (-123dBm)	0.28µV (-118dBm)	22µV	71µV
14 MHz	0.14µV (-124dBm)	0.25µV (-119dBm)	22µV	63µV
18 MHz	0.14µV (-124dBm)	0.25µV (-119dBm)	22µV	63µV
21 MHz	0.14µV (-124dBm)	0.25µV (-119dBm)	23µV	63µV
24 MHz	0.14µV (-124dBm)	0.25µV (-119dBm)	25µV	63µV
28 MHz	0.14µV (-124dBm)	0.32µV (-117dBm)	22µV	71µV
50 MHz	0.1µV (-127dBm)	0.16µV (-123dBm)	9µV	25µV

S-READING (14MHz)	INPUT LEVEL SSB	FM
S1	2µV	0.5µV
S3	3.2µV	0.9µV
S5	5.3µV	1.3µV
S7	10µV	1.7µV
S9	22µV	2.1µV
S9+20	224µV	3.3µV
S9+40	1.4mV	4.2µV
S9+60	14mV	6.3µV

MODE	IF BANDWIDTH -6dB	-60dB
SSB	2240Hz	3410Hz
CW(N)	595Hz	1520Hz
AM	7280Hz	13.7kHz
FM	11.5kHz	23.7kHz

AM sensitivity (28MHz): 0.9µV for 10dBs+n:n at 30% mod depth

FM sensitivity (28MHz): 0.2µV for 12dB SINAD 3kHz pk deviation

AGC threshold: 0.5µV

100dB above AGC threshold for +3dB audio output

AGC attack time: 3ms

AGC decay time: 0.2s (fast), 1.2s (slow)

Max audio before clipping: 2.1W into 8Ω at 1% distortion

Inband intermodulation products: -30 to -40dB

Frequency	INTERMODULATION (50kHz Tone Spacing) PREAMP IN 3rd order intercept	2 tone dynamic range	PREAMP OUT 3rd order intercept	2 tone dynamic range
1.8 MHz	+7dBm	95dB	+20dBm	98dB
3.5 MHz	+12dBm	98dB	+25dBm	101dB
7 MHz	+14dBm	99dB	+27dBm	103dB
14 MHz	+20dBm	103dB	+27dBm	104dB
21 MHz	+23dBm	105dB	+29dBm	105dB
28 MHz	+15dBm	99dB	+23dBm	100dB
50 MHz	-3dBm	89dB	+2dBm	90dB

TONE SPACING (7MHz BAND)	3rd ORDER INTERCEPT	2 TONE DYNAMIC RANGE
5 kHz	-42dBm	62dB
10 kHz	-28dBm	71dB
15 kHz	-13dBm	81dB
20 kHz	+5dBm	93dB
30 kHz	+8dBm	95dB

FREQUENCY OFFSET	RECIPROCAL MIXING FOR 3dB NOISE	BLOCKING	TX NOISE IN 2.5kHz BANDWIDTH
3 kHz	86dB	-27dBm	-81dBC
5 kHz	91dB	-27dBm	-87dBC
10 kHz	100dB	-27dBm	-92dBC
15 kHz	103dB	-24dBm	-94dBC
20 kHz	106dB	-18dBm	-96dBC
30 kHz	110dB	-8dBm	-98dBC
50 kHz	114dB	0dBm	-101dBC
100 kHz	120dB	0dBm	-103dBC
200 kHz	125dB	0dBm	-104dBC

TRANSMITTER MEASUREMENTS

FREQUENCY	CW POWER OUTPUT	SSB(PEP) POWER OUTPUT	HARMONICS	INTERMODULATION PRODUCTS 3rd order	5th order
1.8 MHz	116W	118W	-70dB	-40dB	-42dB
3.5 MHz	118W	118W	-65dB	-34dB	-40dB
7 MHz	118W	116W	-58dB	-26dB	-40dB
10 MHz	118W	116W	-62dB	-26dB	-34dB
14 MHz	118W	118W	-64dB	-32dB	-32dB
18 MHz	118W	118W	-70dB	-22dB	-31dB
21 MHz	120W	119W	-70dB	-21dB	-30dB
24 MHz	122W	122W	-64dB	-20dB	-29dB
28 MHz	116W	115W	-75dB	-22dB	-30dB
50 MHz	13W	14W	-72dB	-26dB	-38dB

Carrier suppression: 60dB. Sideband suppression: 70dB. Transmitter noise: see table above. Transmitter AF response at -6dB: 460-2820Hz (USB), 315-2590 (LSB). Transmitter AF distortion: <1%. Microphone input sensitivity: 6mV for full output. T/R switching speed (SSB): mute-TX 7ms, TX-mute <1ms, mute-RX 17ms, RX-mute 1ms. Power into load mismatch: 2:1 VSWR 30-40W, 3:1 VSWR 15-16W

NOTE: All signal input voltages given as PD across antenna terminal. Unless stated otherwise, all measurements made on SSB with the receiver preamp switched in and operating from a 13.6V PSU. All two-tone transmitter intermodulation products quoted with respect to either originating tone.

permit entirely satisfactory operation on all data modes.

ON-THE-AIR PERFORMANCE

I USED THE IC-729 side by side with my IC-726 and it generally performed similarly. With crowded band conditions, the IC-729 had a slight edge due, no doubt, to the improved selectivity and synthesiser noise performance. The passband tuning was very useful and the extra punch provided by the speech processor on transmit was a definite advantage. The radio is easy to drive with some good ergonomics. However, I am not keen on the auto speed-up which is used with 10Hz and 20Hz tuning step sizes and I tended to use 50Hz steps as much as possible.

The receiver sensitivity was good, no strong signal problems were experienced and the tuning was entirely free of clicks. I never found it necessary to use the receiver input attenuator. However, the audio quality was a little 'boxy' and on CW the 800Hz netting offset rather high. I prefer a lower pitch.

Good reports were received on transmit. The speech processor added extra punch and the CW was free of clicks and noise. With the CW delay at minimum, full break-in was possible at speeds approaching 30WPM. However, as the delay control is a screwdriver adjustment on the rear panel it is more in the category of adjust and leave alone. I used the radio in conjunction with a TL922 linear which it drove with no problem. Note that the linear switching contacts are only rated at 16V 2A and for switching linears such as the TL922, which use higher voltage relays, an additional external relay is needed. I use this arrangement also with my IC-726.

CONCLUSIONS

THE IC-729 IS A GOOD all purpose radio for HF and 50MHz. It has good features and performance for home use yet it is small enough to be taken on holiday or used in the car. It is easy to use and the overall performance is excellent. The synthesiser noise is very much better than the IC-725/726 - did the Icom engineers read my review I wonder?

The list price of the IC-729 at the time of writing this review was £1185 inc VAT and the IC-728 was £925. These prices compare most favourably with other similar radios on the market. The narrow CW filters cost an extra £60 for the 500Hz FL100 or £64 for the 250Hz FL101. In addition for mains power use, a 12V power supply is needed capable of delivering around 20A.

ACKNOWLEDGEMENT

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

REFERENCES

[1] 'ICOM IC-725 HF Transceiver', Peter Hart, G3SJX, *RadCom*, September 1989, p56.

[2] 'ICOM IC-726 Review', Peter Hart, G3SJX, *RadCom*, February 1990, p 44.

[3] 'A Remote Controller for the IC725/726/735', Bob Harris, G4APV, *RadCom*, October 1992, p 27 and November 1992, p49.

Peter Hart, G3SJX

RADCOM TECHNICAL FEATURE

The G8PO Triangle Sloper

by Ted Ironmonger Cdr, OBE, RN (Rtd), G8PO.

A simple directional antenna for 80 metres and other low bands

CONTACTS WITH New Zealand, via the long route on 80 metres, have fascinated me for many years. The perplexing question as to whether propagation is by normal multi-hops, chordal-hops etc, or even increased by 'antipodal focusing' has always been a compelling incentive for experiments with many friendly ZLs. Perhaps memories of the first ever G-ZL contacts by G2DX and G2NM, way back in 1927, also drives me on.

The antennas used for such observations at a favourable location near the sea have, in the past, been a relatively simple inverted V, and a gamma-fed tower. However, with deteriorating sun spot activity creating even more interest in the lower bands, it became evident that an improved simple directional radiator was required to compete with the mushrooming LF Quads, yagis, vertical arrays etc.

INITIAL DEVELOPMENTS

SPACE LIMITATIONS AT G8PO precluded anything very elaborate, so a $^1/_4\lambda$ sloper was investigated. The garden is 70 x 150ft with a 40ft tower, TH3 Yagi on top, and facilities to haul up wire antennas. The conventional arrangement was tried, ie coaxial feed to the top of the existing 40ft metal tower, braiding bonded to the top of the tower and inner conductor connected to approximately 66ft of wire sloping at 45° to the SW.

Results were average for a sloper, with some gain compared to a permanently rigged reference inverted-V but the system was difficult to match. I felt this was due to the 'relatively' high impedance point at the base of the 40ft mast being earth, ie 40ft down from the low impedance feed braiding connection - workable but not ideal. A further major problem was the need to lower the tower for installation and repairs.

Instead of connecting the braiding to the top of the tower a separate 38ft wire conductor was used alongside the mast and the whole sloper hauled into position on a halyard. The 38ft vertical wire was spaced approximately 12 inches from the tower by fixing at the base, and insulated from ground.

Results were similar to the tower connection, but the fitting arrangements were an advantage for experimentation and repairs. Matching was still a problem, however.

MATCHING TRIALS

IN AN EFFORT TO PROVIDE facilities for better matching, the spaced 38ft vertical wire was lengthened to approx 66ft (ie as for the sloping element) and the 28ft extension run horizontally at ground level - approximately 12in above ground to the *rear* of the mast.

The coaxial feeder was cut to a half wavelength on 3.5MHz, allowing for its velocity of propagation. This is approximately 88ft for the present sloper. With the above arrangement, satisfactory matching was achieved by lengthening or shortening the wire elements and checking SWR at the shack.

This may appear tiresome but is in fact a most simple and effective method - a low SWR can be achieved with patience, and neither a balun nor ATU is required. On the air checks with ZL indicated that progress was being made, but I still felt a better configuration could be developed.

FURTHER INVESTIGATIONS

VARIOUS HANDBOOKS were consulted to ascertain how a sloper really works [1, 2] and the following came to light. Firstly, some directivity is obtained by sloping the wire in the direction required and this holds good even when the radiator is only a quarter-wave long. Secondly, from W6SAI's *Antenna Handbook*, a quarter-wave sloper can be considered as a 'tilted', one radial ground plane.

It should be noted that such a ground plane has maximum radiation in the direction of its simple radial. Deductions from the foregoing indicated the directivity could perhaps be due to a combination of factors:

(a) Maximum radiation in the direction of the slope.

(b) Some radiation from the direction of the 'built in' tilted ground plane's radial element, which could possibly be modified to advantage.

I wondered whether these two directional properties (if they both exist!) could be made to add by element rearrangement? It was not possible to tilt *both* the wire elements (the sloping and vertical sections) - this had appeared as a possible way of combining the directional properties of each. However, another compromise was found.

FINAL ARRANGEMENT

AFTER FURTHER STUDY AND TRIALS, the arrangement of **Fig 1** was found to be the best practical solution. It is simple to put up and can be accommodated in the average garden.

Note how the lengths have been changed from the original experiments - those shown

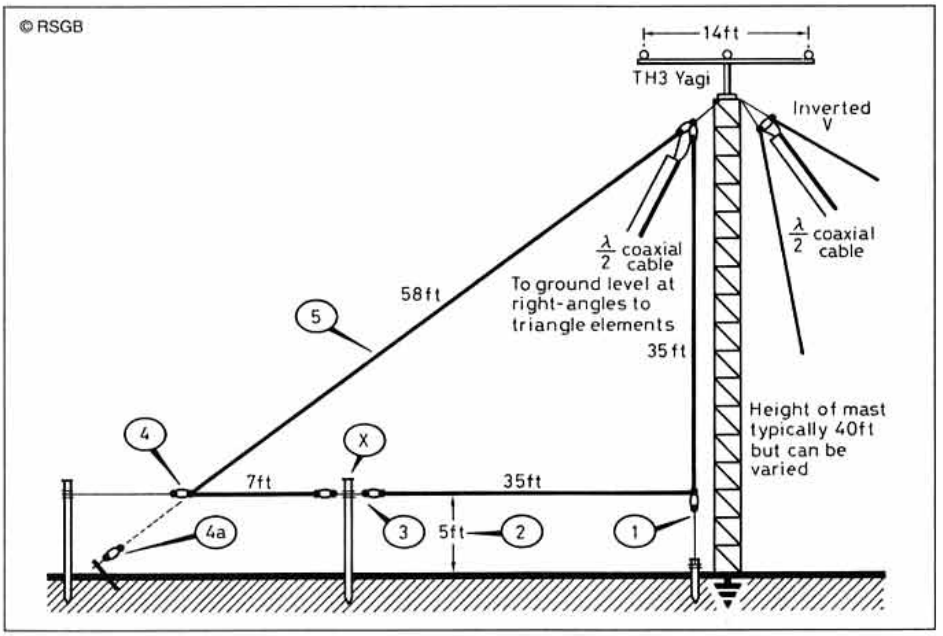


Fig 1: The Sloper is fed with 52Ω coax. The numbers are explained in the notes on the opposite page.

are typical for the shape depicted and achieve the lowest SWR at my own QTH. The lengths are given as a guide only and must be finalised on site, when the shape to suit the user's location has been decided.

Start with approximately the lengths shown. Remember that the two high impedance ends, readily available at ground level, are adjusted for length and end spacing to give the lowest SWR. Also, the spacing between the down side of the triangle sloper and the metal mast also affects matching. This too should be adjusted as necessary.

To aid initial installation and allow speedy length changes, it is recommended that the last 5ft of the ground level elements be temporarily made from easily stripped and twisted wire. All the above is an area for on-site experimentation and, being so accessible, I find it a pleasure to adjust for best results!

REFERENCE ANTENNA

AN INVERTED-V REFERENCE antenna, is permanently rigged on the same mast as the 'Triangle Sloper'. Both antennas are fed with half-wave coax feeders and separation of feed points is approximately 2ft, some interaction must take place but checks indicate degradation is minimal. Both feeders come away at 'right-angles' to the triangle sloper elements. For receive comparison tests, I monitor the Portuguese commercial station CTP (3782.9kHz) which is roughly in the ZL long-path direction and a useful indicator. A low take-off angle is required for this station at midday and the signal is invariably stronger on the Sloper - often plus 12dB.

MAST INTERACTION AND RADIALS

THE 40FT METAL MAST is top loaded with a three element all metal yagi. Readers may wonder what part this plays in the triangle slopers performance? This is not known, it is not easy to remove for a trial!. However other stations have used normal slopers hung from wooden masts and they have performed satisfactorily (see pages 133-137 of [2]). I am aware that the metal structure must have some effect - a computer simulation would show that it affects both performance and feed impedance.

However, unlike a 3.8MHz gamma-fed tower - where top loading for resonance, with a 40ft mast, is a big advantage, this is possibly not the case with a triangle sloper. Many users are certain that a top loading Yagi is essential in similar circumstances (ELNEC checks indicate this). However see the section on 'suggested experiments' with regard to this. Ground radials were tried with the triangle sloper, but many tests with ZL indicated they gave no improvement. Note the voltage and current distribution in **Fig 2**, this is most interesting, perhaps the experts should analyse it?

SAFETY CONSIDERATIONS

PROTECTION IS RECOMMENDED at point X (Figs 1 and 2), as the RF voltage here can be very high and dangerous. I am not aware of many other antennas where one can put fingers across both ends of the driven element!

CONCLUSIONS

THE NORMAL SLOPER is an effective, simple, directive antenna but the triangle arrangement appears to give an improved performance - perhaps a further 3dB of gain and lower angle of radiation although this is difficult to measure. However, reports and reception from ZL are most encouraging, after 14 days of use in October 1992, many ZLs on 80 metres were asking over the air, "What has happened at G8PO?" - the signal had apparently improved significantly!

It should be remembered that the only change made was to a triangle configuration, and that the metal mast had also been used with the two previous types of sloper! The antenna is easily rigged and matched for the designed band, and is particularly useful on 160, 80 and 40 metres as a compact system. It can be 'hand rotated' around 360° for directivity, even on 160 metres! I still feel the less fortunate could be surprised when they make trials using other types of antenna supports and if necessary try three fanned wires behind the support.

A polar diagram has not been taken but beam width would appear about 60°, covering from ZL1 to ZL4 adequately. Front to back ratio, against the reference inverted-V, is approx 12db. Radiation is relatively low angle (G3GSI/G3FYS 'ELNEC' checks indicate about 20°), and bandwidth at least 250kHz.

Recent tests have indicated the antenna can easily be screened and a clear take-off particularly at very low angle is essential if the system is to perform satisfactory.

IDEAS AND SUGGESTIONS

READERS MIGHT LIKE TO TRY one or more of the following:

1) Try the triangle at different heights and in different related shapes.
2) Experiment with possible multi band operation, eg where harmonically, the feed point becomes low.
3) Try a 40/80 metre trapped inverted-V in a semi-triangle sloper configuration. It could possibly work as a triangle on 80 metres and a normal sloper on 40 metres.
4) If both wooden and top loaded metal masts are available on site, rig a triangle sloper on each and compare the results!
5) Try the sloper as a self supporting metal rotating device, on one of the higher bands.

ACKNOWLEDGEMENTS

THE WRITER WISHES TO THANK the very many 80 metre operators for their time and patience in reporting and commenting on the Triangle Sloper 'trials'. In particular ZLs: 1BOQ, 1CCR, 2JR, 2SN, 2APW, 3GS, 4AP, 4BO and last but not least 4KF.

REFERENCES

[1] *The ARRL Antenna Handbook*, ARRL [16th edition now available from RSGB sales - see *BookCase* pages - *Ed*].
[2] *The Radio Amateur Antenna Book*, by W6SAI and W2LX.

FIG 1: NOTES

1) Spacing adjusted (approx 12in) for minimum SWR.
2) Adjust height as required.
3) End spacing and length is trimmed for lowest SWR.
4) Turn-under of sloping wire is not critical.
4a) Ground level fixing could be used in lieu.
5) Slope not critical, can be 40-60°.
X) Volts at point X are high, protection recommended.

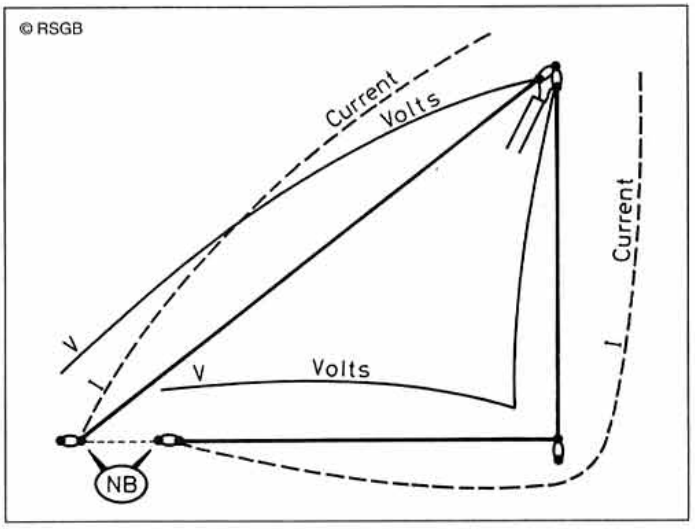


Fig 2: Current and voltage distribution along the antenna.

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Trade Stand enquiries welcome to E and R Chairman, Norman Miller, G3MVV, 178 Warley Hill, Brentwood, Essex, CM14 5HF (tel: 0277 225563).

Pat Hawker's Technical Topics

DIRECT-READING CAPACITANCE METERS

IN THE MAY 1976 ISSUE of *Television*, Alan Willcox described a flexible direct-reading capacitance meter suitable for values from a few picofarads up to about 10µF. It seemed well-worth reproducing in *TT* and subsequently in several editions of *Amateur Radio Techniques* including the reprinted 7th edition. The design was also reproduced in *Electronics Australia* (October 1976) and *QST* (January 1983).

The principle of this type of meter is to charge the unknown capacitor to a fixed voltage (4.5, 5 or 6V) and then to discharge it into the meter circuit; the average current is directly proportional to the capacitance; the whole process being continuously repeated by the astable operation of a 555 timer IC. The meter needle remains steady, although some vibration can be seen on the higher capacitance ranges.

To avoid overloading the meter movement, large value capacitors should not be used on the low-capacitance range. It is advisable to arrange the switch so that one starts at the highest value range, rotating the switch clockwise until reasonable deflection is obtained. The value can then be read off.

In the original design (**Fig 1**), the five range switch (S1) positions gave FSD ranges of 1µF, 100nF, 10nF and 100pF. There was also a x10 range extender switch (S3) effective on all ranges, and a divide-by-two switch (S2) facility which lowered the accuracy of the readings but permitted an estimation of values down to 1 or 2pF. The divide-by-two facility was omitted from the *QST* design, with W6QB finding it difficult with this type of unit to achieve good stability below about 200pF.

Trevor King, ZL2AKW, in *Break-in* (September 1992), presents a modified version of this capacitance meter: **Fig 2**. He explored the stability aspect in some depth, as a result of which his meter incorporates the following modifications:

(1) 5k6 resistor from pin 5 of the 555 to earth.

(2) 6V three-terminal voltage regulator (7806) instead of the more temperature and current sensitive zener diode.

(3) Plastic cabinet body to avoid stray capacitance of the metal front panel.

(4) Timing resistor on the 50pF range is adjusted for the individual 555 after the other ranges have been preset, so as to provide a customized accurate full scale reading.

(5) It is also convenient, although not essential, to have an adjustable resistor for the 500pF range.

ZL2AKW gives several practical hints: "Short internal wiring is recommended and the IC PCB mounted right at the test terminals. For peace of mind, the 555 is socketed. For calibration, use a good 47nF capacitor on range three to set the 50kΩ calibrator to give a reading of 47µA. Then set the x10 range (using appropriate switch settings) with its preset to read 5µF full scale. Next, adjust the 50pF and 500pF controls. You are now able to see accurately the difference between 2.7pF and 3.3pF. The unit has a small mains power supply providing between 9 and 14VDC after rectification, but could be run from a 9V alkaline battery provided the voltage regulator is included."

ZL2AKW built his unit in a 195 x 115 x 60mm plastic cabinet, with a 50µA Micronta meter with 3500Ω internal resistance, but equivalent meters could be used. The 10nF polystyrene timing capacitor is the heart of the 555 circuit so it is worth finding a really good component, preferably the larger 250V size as the miniatures have less area and thinner polystyrene. The voltage regulator needs 0.1µF capacitors mounted directly on the pins to keep RF energy from the station equipment and to guarantee stability. For the filter capacitor, 16V 220µF is adequate. He checks calibration from time to time using a few 2% capacitors of known value as reference.

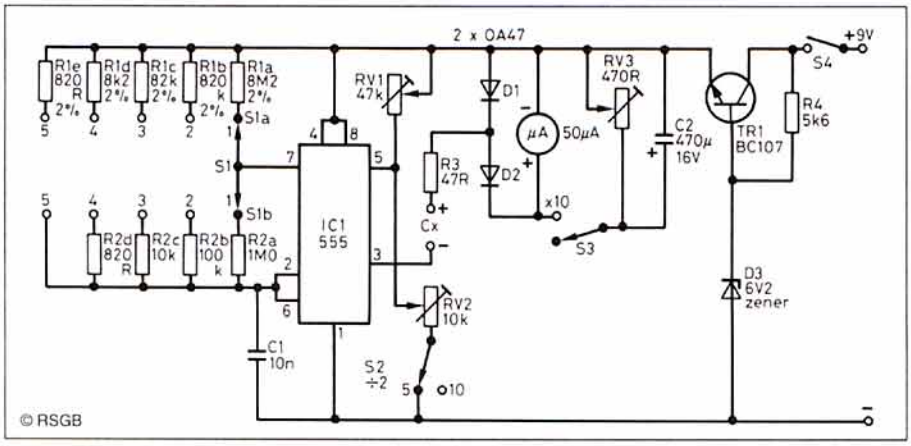


Fig 1: Direct-reading capacitance meter as described by Alan Willcox in 1976.

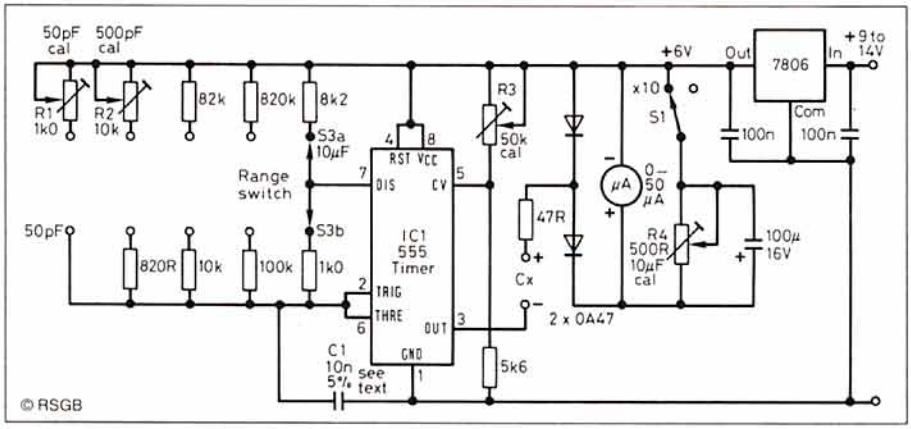


Fig 2: The ZL2AKW direct-reading capacitance meter. All fixed resistors are 5%, 0.25W carbon types. R1 1k, R2 10k and R3 50k are PC-mount trimmers. S1 SPST switch, S3 2-pole, 5-position rotary switch.

ANTENNA AND SWR FOLLOW-UPS

THE DECEMBER ITEMS 'Persistent SWR myths' and 'Earths and Marconi Antennas' both attracted considerable interest and a number of relevant comments have come in - only some of which can be dealt with briefly this month.

Also, it seems appropriate to draw attention to a recent American publication, *Aerials*, by 'Kurt N Sterba & Lil Paddle' (noms de plume of a husband and wife team) a 94-page compilation of articles that have appeared during the past decade in *Worldradio*. It is based on the well-founded belief that transmission lines, standing waves, antenna matching, reflected power and ATUs are all topics that have attracted myths and old-wives tales in abundance, despite all the efforts of Walt Maxwell, W2DU (who contributes the foreword to this book), and others. The articles reproduced contain hard-hitting, sharply-aimed rebuttals, targeting many of the misleading or ludicrous statements and claims that still appear in amateur radio literature, editorial as well as advertisements, and manufacturers' catalogues.

The book is not a 'how to do it' saga - indeed there are virtually no illustrations, the style is deliberately abrasive and the collected articles are a shade repetitive. As the *QST* reviewer puts it: "Their debunking of common myths and pronouncements - most of which are right on the mark - will make many readers cringe, writhe and quiver with outrage .... as they slash away at the waist-deep barrage of 'conventional wisdom' .... whether you laugh at, learn from or loathe their writing, you'll find *Aerials* hard to put down." A fair enough comment and warning. It is available for $10 + $2 postage (VISA accepted) from 'Worldradio', 2120 28th Street, Sacramento, CA 95818, USA (916-457-3655).

But back to our own correspondents: Tony Plant, G3NXC, professes surprise at how

often many of the SWR myths appear in various articles, including those by people who really should know better. He writes:

"I often think that the ubiquitous SWR meter is to blame for many of the myths because it implies that SWR can be measured at a single point on the line and is a phenomenon that can be attributed to that point. This then leads to the belief that SWR can actually vary along the line, simply because the meter shows different readings at different points. Once it is realised that SWR relates to the ratio of two voltages (or currents) spaced a quarter-wave apart on the line then many of the myths crumble to dust. Try asking exponents of 'trim the SWR by varying the line length' to draw the standing wave pattern that this concept implies!

"Let us start a campaign to erase all non-linear SWR scales from meters and substitute linear reflection coefficient scales. It would then become difficult for anyone to argue that the amplitudes of reflected or forward waves can vary along a line, other than as a result of losses or discontinuities. I suppose we might even go for 'return loss' as the displayed parameter although I suspect this would then be used to justify the 'reflected power is lost power' myth.

"Another cause of misunderstandings is use of the expression 'output impedance' when talking about the output socket of a transmitter or transceiver. Too often this is taken to be synonymous with 'source impedance' which then leads to the idea that reflected power is absorbed because the output socket is thought to be matched to the line. We should abandon the use of 'output impedance' in favour of something like 'design load impedance' - better still change 'impedance' to 'resistance' since few transmitters would be happy with a load of 0 + j50 ohms!"

G3NXC points out that there are valid reasons, apart from the action of protection circuits with solid-state power amplifiers for trying to get a low SWR at the transceiver socket:

(1) Low pass filters have characteristics that can be very dependent upon the load impedance that they 'see', and

(2) the terms of the Amateur Radio Licence specify the RF power delivered to the antenna.

Most, if not all, the in-line power meters are calibrated on the basis of a 1:1 SWR, in other words with a 50Ω resistive load on the output. Any divergence from this condition affects the calibration: a 2:1 SWR could result in an error of 12.5% in power measurement, in addition to all the other sources of error.

In the case of simple voltage sampling 'power' meters the measurement errors could be as high as +100% or -50% for the same 2:1 SWR and the reading will (and should!) vary with line length. As a final comment, G3NXC adds: "If an SWR meter does not give the same reading for all lengths of line then it can't be relied upon to give a sensible reading for any length."

It should be noted that G3NXC recognises discontinuities in the line as a potential cause of SWR varying with line length, and this tends to become important at VHF and more so at UHF. B Sykes, G2HCG, points out that in the real world, SWR readings may change as feeder length is altered, even in the absence of any outer-braid current, even at HF but more so on VHF/UHF. He writes: "The reason can only be that cable, plugs, even the SWR meter are not their stated impedance. The word 'nominal' is used on most cable specifications for example. A 'good' cable may be quoted as 48 to 54Ω. That wretched thing so wrongly called a 'UHF' plug (PL259) is a classic example of a non-50Ω plug having an impedance around 20Ω. Unfortunately, we live in a real world where an unqualified statement that (measured) SWR does not vary with feeder length needs some amendment."

Dennis Unwin, G0FMT, believes (as I do) that G3BDQ (*TT*, December) misread the original item on the earthing of his 1.8MHz Marconi antenna and failed to appreciate that the changes were only to the earth or counterpoise and not to the length of the antenna itself. G0FMT stresses that he was using feed impedance solely to indicate the effectiveness of the earthing system without making any changes in the antenna itself. He still considers this a reasonable way to proceed but adds:

"Your remarks about the use of RF ammeters induced me to make one and connect it in the antenna lead. I soon discovered that you have to be very careful to adjust the ATU following every change in the earthing system, and also to standardise the output level. I was unable to duplicate all my earlier measurements (*TT*, October) since the wire counterpoise has been removed, but the five earth stakes and the underfloor system could still be compared. The current (in arbitrary units) using the five earth stakes was 5.43 and the current using the underfloor system alone was 5.99.

This appears to confirm the finding based on impedance measurements that the efficiency of the underfloor earth was slightly better than the earth stakes. the current using both together was 7.66. If we compare this with the five earth stakes alone, clearly the aerial current has substantially increased. Since we are measuring current, the improvement in power would be 20 x log (7.66/

EFFICIENT VOLTAGE LIMITING REGULATOR

TIM WALFORD, G3PCJ, WRITES: "For operation of a rig on either batteries or from mains supplies, I wanted a non-switching voltage regulator with very low input-to-output voltage differential but which would remain hard on when the input voltage fell below the desired maximum output voltage. The required input voltage range was 10 to 30VDC (from batteries or rough rectified AC) with an output of about 12V (or lower when the input voltage was less than 12V). It needed to handle up to about 2A and, when input was below 12V, to have very low 'on' resistance.

"The key to achieving this specification is to use power P-type Mosfets with their very low 'on' resistance of the order of 0.2Ω, thus dropping only 0.4V when passing 2A. This can provide a lower differential than 'low drop out' regulators of the LT10xxx type and makes for more efficient/cooler-running PSUs.

"**Fig 3** shows a basically simple regulator circuit with a P-type Mosfet controlled by a common-base NPN error amplifier. Since the Mosfet is voltage controlled there is very little wasted current; load currents of up to tens of amperes are possible given adequate heatsinks!

"Regulated output voltage is (V_{ref} - 0.6) x (R1 + R2)/R2. V_{ref} needs to be less than (V_{out} - 5V). In my case V_{ref} is provided by a 78L05 integrated 5V fixed voltage regulator which can handle the input voltage range to 30V.

It can also provide an additional 5V regulated output. Line and load regulation are both about 0.5%. The output 100µF capacitor improves the transient response but is not essential. Over-current limiting (with an extra 0.6V drop) and remote voltage sensing can be added as shown in Fig 3, although my application did not need them. Because it was available, I used a 2SJ221 Mosfet but a 2SJ174 would be better and can handle up to 20A and input voltages to 60V, with an 'on' resistance of 0.13Ω and maximum dissipation of 75W.

"Finally, the circuit can easily be modified for other fixed or variable output voltages. R1 and R2 are best kept in the range 1k to 10kΩ.

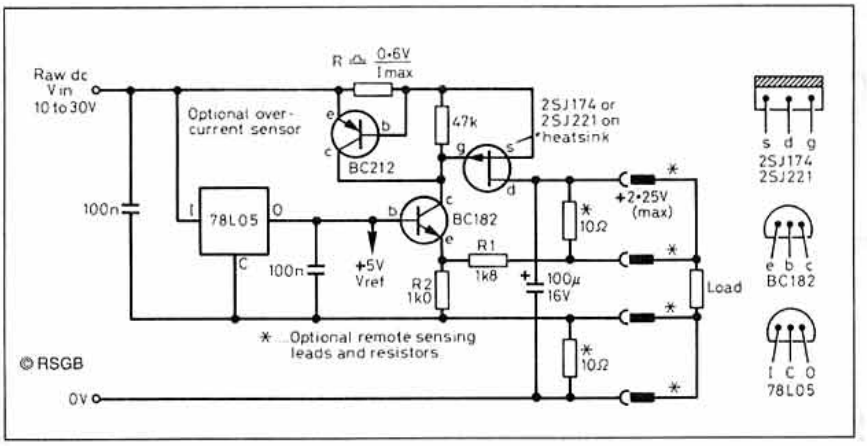


Fig 3: G3PCJ's efficient voltage limiting regulator drops only 0.4V for low input voltages.

5.43) = 2.99dB, indicating that the radiated power had almost doubled. My previous estimate based on impedance measurements was that efficiency had increased from 33% to 60%. It is power this time, so 10 log (60/33) = 2.6dB, a remarkably close agreement between two very different measurement techniques. It does also highlight the value of the 'old-fashioned' RF current meter in settling antenna arguments."

For my part I have always used RF current to optimise tuning up 'long-wire' and some other antennas, using torch bulbs shunted with a loop of wire as a crude and inexpensive form of 'current meter'.

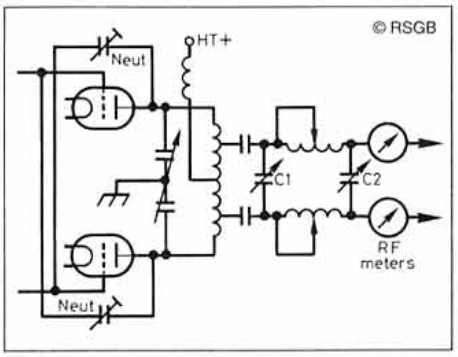
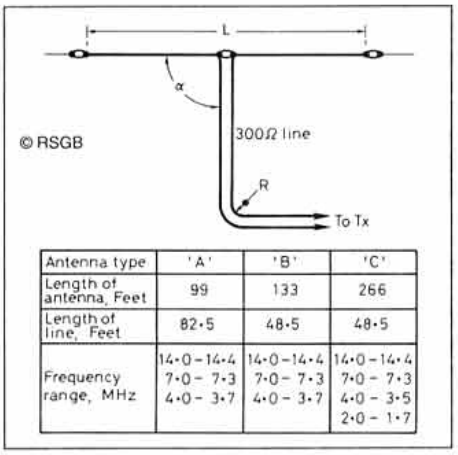


Fig 4: One form of the original Collins Universal Coupler that provided balanced output over a wide range of resistive or reactive impedances.



Antenna type	'A'	'B'	'C'
Length of antenna, Feet	99	133	266
Length of line, Feet	82·5	48·5	48·5
Frequency range, MHz	14·0-14·4 7·0- 7·3 4·0- 3·7	14·0-14·4 7·0- 7·3 4·0- 3·7	14·0-14·4 7·0- 7·3 4·0- 3·5 2·0- 1·7

Fig 5: The Collins multi-band dipole antenna of 1935.

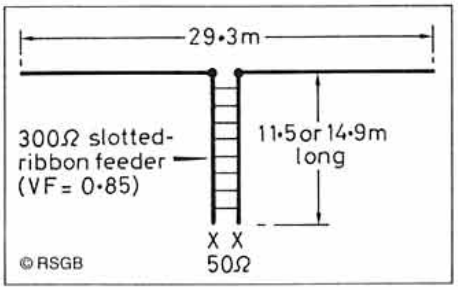


Fig 6: The 1992 G0FAH all-band dipole antenna.

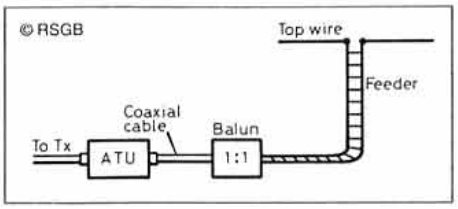


Fig 7: Use a simple current balun and L-network ATU where an SWR of less than 2:1 is needed for solid-state transmitters or for 1.8MHz.

This approach has always served me well in finding the correct inductance and correct capacitance and showing the significant difference when using various lengths of 'counterpoise' as an upstairs 'earth'.

MULTI-BAND AND ALL-BAND HF DIPOLES

AS A PRE-WW2 AMATEUR, I soon became acquainted with the idea of open-wire feeders for resonant elements (both end-fed and so-called centre-fed Zepp) and also low-impedance feeders (often twisted electric flex before coaxial cable became readily available). But I was not really aware of using open-wire transmission lines to non-resonant elements.

Exactly 50 years ago, I arrived at a radio station at Upper Weald, near Stony Stratford, from where we keyed transmitters about a mile away at Calverton. It was something of a surprise to find that fixed-length dipole (doublet) transmitting antennas with open-wire feeders were used on all frequencies between about 3 and 10MHz with the aid of ATUs - probably based on the original balanced form of Collins Universal Coupler (pi-network): eg **Fig 4**.

In recent years, particularly since the arrival of the WARC non-harmonic bands, the attractions of open-wire feeders (or the slightly more lossy 300Ω ribbon feeders) have become ever more evident. It is convenient, though not essential, where the ATU sees a reasonably low (current fed) impedance rather than a voltage feed. It is for this reason that multiband dipoles based on the G5RV/ZS6ABW principle have special appeal.

The February *TT* quoted Bill Orr's belief that the G5RV is an offspring of the 1935 three-band antenna originated by Art Collins, ex-W9CXX, and L M Croft. However, I had forgotten that a few months earlier, Dean Manley, KH6B, writing from the Hawaiian Islands, had sent me details of the Collins antenna as reprinted in *Electric Radio* of April 1991 by Bill Stewart, K6HV. The reprint included the original data as shown on a Collins Radio Company drawing of March 1935. K6HV pointed out:

"I think Varney came up with the idea not knowing of Art's work." Art Collins's design brought the 300Ω transmission line all the way to the transmitter, whereas a feature of Louis Varney's design has always been the connection of the shortish 300ohm section to any length of (70Ω) coaxial cable.

From the original Collins Radio drawing it is clear that the antenna (**Fig 5**) came in three versions. 'A' had an element (L) length of 99ft, with 82.5ft of line, intended for 14.0-14.4MHz, 7.0-7.3MHz and 3.7-4.0MHz. 'B' with 133ft top, 48.5ft line for 14.0-14.4MHz, 7.0-7.3MHz and 3.7-4.0MHz and 'C' 266ft top, 48.5ft line for 14.0-14.4MHz, 7.0-7.3MHz, 3.5-4.0MHz and 1.7-2.0MHz. It does seem however that L M Croft in his *Signal* article also recommended 103ft for L, very close to the full-size G5RV.

The Collins work sheet shows L comprising No 10 B&S hard drawn enamelled copper with six inch insulators at ends and centre, supported 40ft or more above ground. The transmission line, as mentioned in the February *TT*, was formed from 0.25 inch copper or aluminium tubes spaced 1.5in by means of isolantite (a ceramic material) or impregnated maple blocks at intervals of 20in with bends (R) not less than 1ft radius.

Bill Wright, G0FAH, has drawn my attention to his 'All-band dipole' published in *Sprat*, Spring 1992, as "One antenna for every band - almost!": **Fig 6**. This antenna draws on the work of ZS6AKW/G0GSF in using computer modelling to optimise the number of bands on which the impedance seen at the transmitter is reasonably close to 50Ω and can be connected to coax cable via a simple 1:1 current balun.

The problem of covering 10MHz and 21MHz is solved by changing the length of the 300Ω feeder from 11.5m to 8.8m. With a good ATU it will also work on 1.8MHz either 'as is' or as a top loaded vertical.

With a 'top' length of 29.3m and 11.5m of 300Ω slotted ribbon (velocity factor 0.85) the computer results were:

Frequency (Mhz)	Resistance (ohms)	Reactance (ohms)	SWR into 50ohms
3.56	6.7	-4	7.6
7.03	35	+28	2.1
14.06	40	-3	1.2
18.07	39	+69	4.3
24.90	98	-31	1.9
28.06	46	+81	3.5
With Feeder Length 8.8m			
10.1	27	+234	1.8*
21.06	24	-4	2.0
With Feeder Length 14.9m			
10.1	52	-422	1.0*
21.06	24	+3	2.0

* Negative reactance is capacitive (positive is inductive) in series with the resistive part of the impedance. To get a good match on the 10.1MHz band it is necessary only to tune out the series reactance - with 8.8m feeder a 130pF capacitor put in each leg of the feeder right at the base (with 14.9m feeder inductors of 3.3μH in each leg).

Efficiency should remain good with any SWR below about 10, although for solid-state transceivers this can be reduced by a 1:1 balun followed by a simple L network ATU: **Fig 7**. The current choke balun can be formed by coiling up a length of the coax, or a ferrite or steel wool. Alternatively, the one-coil Z-match ATU could be used without a balun.

Howarth Jones, GW3TMP, who, after experimenting with fitting ferrite sleeved baluns to G5RV antennas over several years, eventually marketed his 'choke balun' under the name Ferromagnetics, queries the comments by G0GSF (*TT*, January) that fitting such baluns is not justified since "Its effect on the measured impedance Z3 and hence on the VSWR was minimal."

GW3TMP writes: "I would have been very surprised if there had been any effect on the measured impedance or the VSWR. The insertion of the balun at the junction of L2 and Z4 will have no effect on line impedance or VSWR but it has a marked effect on the current balance on the output side of the balun as measured in the balanced line L2. The other significant difference is in the current flow on the coaxial screen outer on line Z4. If this is measured before and after insertion of the balun, using a current probe, it will be found that without it there will be quite a large amount of current flowing on the braid

outer on some bands. The ferrite sleeved balun will stop this happening. It is this outer braid current that causes most problems with TVI or RFI etc. Many of my customers have solved their EMC problems by fitting sleeve baluns . . . ."

THE PASSING OF 'MR B-2'

ONE OF THE SADNESSES of compiling a *RadCom* column for 35 years is that inevitably many of those who contribute to the column - and who in the process establish a friendly relationship with your columnist - must inevitably become Silent Keys. But the recent death of John Brown, G3EUR, leaves a particular void.

It was not until 1975 that I had the pleasure of meeting him in person when he invited Tom Ivall (then Editor of *Wireless World*) and myself to the Special Forces Club in Knightsbridge, bringing along some of his many photographs of SOE communications equipment and stations. These included the 'suitcase sets' and 'miniature communications receiver (MCR1)' for which, as an officer in SOE's Signals Directorate, he had been responsible between 1941-45.

These included his still famous B-2 (Type 3 Mk 2) transmitter-receiver which I had first used at Nijmegen in November 1944 during a brief stay with the escape and evader unit IS9 (now known as MI9), who at that time were still bringing back more survivors from the Arnhem disaster, hidden by the Dutch Resistance. Some 7000 B-2 suitcase sets were built by SOE at their factory at Stoneleigh Park, Northwest London and many were used for paramilitary as well as clandestine operations.

After the war, many came into the hands of amateurs as low cost and extremely good value 'surplus' - a few are still in use, others are to be found in private and public collections. The two-stage EL32-6L6 transmitter with pi-network has an output of some 15-20 watts between 3 and 15.5MHz. The four-stage superhet receiver has loctal valve types 7Q7-7R7-7Q7-7R7. Total weight in its suitcase about 32lb (14.5kg). It was sturdy and reliable, rather than lightweight, but truly outstanding for a 1943 design. (A B-2 is in the RSGB Museum in fine condition.)

At that meeting, he told us about the 30th anniversary dinner of the SF Club at which Prince Charles had been guest of honour and where there had been a special display of SOE's communication and power generating equipment. SOE even had a steam generator fuelled from charcoal or wood blocks, although few have survived. It proved a fascinating and revealing discussion since my own wartime involvement with clandestine radio was with the rival Special Communications organisation as an operator rather than an engineer.

Since then, John has proved a unique source of information not only on clandestine equipment but also on such matters as voltage doubling circuits for PSUs (see, for example, *TT*, October 1989) and mains transformers with toroidal cores (*TT*, March 1986). But undoubtedly it was his SOE work at The Frythe, Welwyn, and his subsequent membership of the Special Forces Club, that remained closest to his heart. *Vale* Mr B-2, we shall miss you.

NEW MIXER NEEDS LESS OSCILLATOR POWER

THE FEBRUARY *TT* in the item 'Advances in HF Receivers' drew attention to Dr Ulrich Rohde's belief, expressed in *QST*, November 1992, that "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 requirement for mixers of very wide dynamic range has been emphasised by modern design practices that result in large numbers of strong signals - particularly those stemming from 500kW HF broadcast transmitters - reaching the broadband mixer(s). Without good pre-mixer RF selectivity, even in the absence of any signal frequency amplification, solid-state mixers and noisy synthesizers have become, in effect, the 'Achilles heel' of modern HF receivers.

Peter Chadwick, G3RZP, has commented in detail on commutative (switching) mixers based on bipolar transistors, as in the SL6440 chip, and on the phase noise of synthesizers. I hope to return to his letter another time. For the moment, it may be helpful to quote his summing up:

"An interesting question is 'How much dynamic range do you need?' We all know that the more the better, but what is the requirement? As I said in my lecture at the Dayton Hamfest last year, a +20dBm third order intercept appears adequate, even on 7MHz at night. More of a problem can be phase noise, especially with some modern rigs - the LF Cumulative Contests show up the transmitted phase noise of some modern rigs quite well, although whether the owners are happy with receiver performance on strong close-in stations is another matter.

"I still maintain that antenna attenuators are an admission of defeat of the ability to design good front-ends. As far as pre-mixer RF gain is concerned, I have wondered about my very much modified FT102. However, on a recent day when the external noise on 28MHz was very quiet and with my beam pointing in the quietest direction (not that there was much to choose from as it was quiet in all directions!), the difference in the receiver between the connected antenna and a 50-ohm load was about 5.5dB, so that receiver noise (measured as a 9dB noise factor) seems nothing to worry about. Listening to the difference, I would not have believed it this great."

TT has commented a number of times on the problem of synthesizer phase noise affecting close-in dynamic range due to reciprocal mixing, and I was interested to learn from a BBC TV engineer that they regard current levels of UHF phase noise in domestic-type synthesizers as a formidable problem. This will have to be overcome if the digital system developed in conjunction with Thomson-CSF of France using 64-QAM digital modulation of some 500 OFDM closely spaced carriers (resulting in the extremely high spectral efficiency of about 7.5bits/s per Hz) is ever to become operational.

Getting back to the topic of mixers, it seems worth drawing attention to an article in the September 1992 issue of *RF Design*: 'An ultra low distortion HF switched FET mixer' by Eric Kushnik of the American LTX Corporation. It is claimed that this new mixer design, based on an SD5000 quad FET device, is capable of superlative performance in providing excellent intermodulation distortion yet requiring relatively low oscillator power injection.

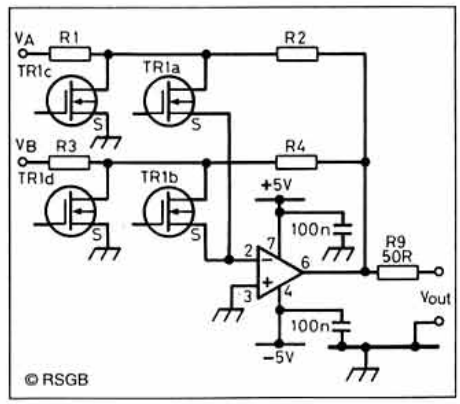


Fig 8: Basic form of the Kushnik double-balanced FET switching mixer.

Kushnik notes that diode ring double balanced mixers (DBMs) are capable of third-order intercept points of +25 to +35dB but this needs oscillator power levels in the +20 to +30dBm range for diode ring DBMs, and in the range of +10 to +15dBm for switched FET DBMs even when using resonant drive circuit techniques which tend to be inconvenient for broadband mixers [Note the resonant drive FET mixer was developed by Ed Oxner, KB6QJ, of Siliconix and described in *TT*, March 1986 pp 187-8, with the relevant Siliconix Application Note 'Designing a super-high dynamic range double-balanced mixer' AN85-2 mentioned in *TT*, August 1986, p574 - *G3VA*].

Kushnik stresses that a requirement for a high level of oscillator power means more local oscillator design problems, and more shielding and filtering to prevent oscillator noise leaking into the IF stages or RF radiation from the antenna etc. There thus remains a need for a mixer that can achieve high dynamic range, as measured by its third-order intercept point, while operating on relatively low local oscillator power.

He then discusses why Mosfet switching mixers require high level injection in spite of the fact that Mosfet gates do not consume or dissipate power. But they require a large switching voltage for the mixer to operate properly: "The problem is that there is considerable signal voltage across the FET switch, and considerable signal current through the FET switch . . . . The solution can be found, without driving the FET gates with higher voltage, by not allowing signal current to pass through the FET, and not to allow signal voltage to appear across the FET."

Fig 8 shows the basic arrangement of his double-balanced FET switching mixer while **Fig 9** presents the practical design as built and assessed. R6 is chosen for input matching (approx 56Ω for a 50Ω system). T1 accomplishes the signal inversion from V_A to V_B ($V_A = -V_B$). T1 has a 6dB loss due to its turns ratio, so R2 and R4 have been made twice the value of R1 and R3 to make up for this. Transformers T3 and T2 take the local oscil-

lator signal and apply it in the proper phase to the gates of the FETs. A DC bias voltage is added to the gate drive signals to give them the proper DC level with respect to the FET gate threshold voltage. The output of the circuit is taken through R9, the 50Ω series terminating resistor. This produces a 6dB drop when driving a 50Ω load. Kushnik's tabulated measurements show that a +25dBm intercept point can be achieved with a local oscillator power of -3dBm. Selected measurements include:

LO (dBm)	Vbias (V)	i/p each tone (dBm)	o/p each tone (dBm)	3rd order products (dBm)	3rd order i/p intercept (dBm)
+13	3.4	9.5	– 5.2	–76	44
+13	2.2	2.7	– 6.8	–67.4	33
+3	2.4	2.7	–10.9	–83	38.7
–3	2.2	2.7	–11.8	–67.4	30.7
–3	2.2	2.7	– 5.7	–49.2	25

IMAGE REJECTION MIXER

THE CURRENT POPULARITY of up-conversion to VHF in the first mixer of HF receivers has resulted in a return to multi-conversion designs. It has long been considered that subsequent down-conversion mixer stages should not change the frequency by more than about 10:1, or preferably less, in order to minimise the 'image' response. Thus a receiver with a first IF of the order of 70MHz and a final IF of, say, 455kHz or less (in order to take advantage of digital signal processing etc) will conventionally require an intermediate IF of, say, 9 or 10.7MHz. With triple or even quadruple conversions, it becomes increasingly difficult to achieve a design free of spurious responses and of wide dynamic range.

A review of the Drake R-8 receiver by Scott D Prather, KB9Y, (*Communications Quarterly*, Fall, 1992) draws attention to the use of an image-rejection mixer (IRM), based on a pair of double-balanced mixers, that permits the first 45MHz IF to be directly converted down to the second and final IF of only 50kHz. **Fig 10** outlines the basic configuration of this unusual mixer which was originally developed over 20 years ago for microwave applications by G P Kurpis and I J Taub 'Wideband X-band microstrip image rejection mixer' (*IEEE Trans on Microwave Theory and Techniques*, December, 1970, pp 1181-2) but which does not appear to have been used previously for HF communications receivers except in the form of two-phase SSB demodulators.

KB9Y writes: "One of the benefits of eliminating a mid-IF stage is an improvement in the receiver's dynamic range. . . . Eliminating an additional mixer stage and its associated IF amplifiers helps to improve the dynamic range and minimize the generation of spurious responses. Another benefit is that by converting to 50kHz directly, no expensive bandpass filters are required for a second IF in the 2 to 9MHz range. L/C filtering that provides excellent selectivity is easy to design for an IF frequency this low, eliminating the cost of expensive mechanical or crystal filters in the IF altogether. [It would also be possible to utilise DSP with analogue to digital conversion at 50kHz although this is not done in the R-8 which appears to be intended as a general coverage HF receiver (with synchronous AM demodulation) for short-wave listening, etc - *G3VA*].

KB9Y provides a circuit diagram of the IRM as used in the R-8 but note that full copyright is retained by the R L Drake Company. He describes the front-end design as follows: "Most of the front end in the R-8 appears to have been borrowed from the design of the R-7. Nine PIN-diode switched Chebyshev bandpass filters provide selectivity for the RF preamp and mixer. Drake also use the same transistor for the RF preamp in the R-8 as they did in the R-7. A roofing filter to improve the first IF rejection precedes the first mixer.

"As with the R-7, Drake use a DBM to up-convert to a 45MHz IF . . . . A non-AGC-controlled JFET amplifies the 45MHz IF from the DBM before it's routed to a four-pole crystal filter. This filter provides a 12kHz (-3dB) bandwidth. From the crystal filter, the 45MHz IF signal is routed either to the AM or the FM IF chain . . . . and routed to the pair of SBL-1X double-balanced mixers forming an IRM."

Unfortunately no laboratory measurements on, or operational critique of this receiver, introduced in 1991, are included in the article, but it was reviewed by Peter Hart, G3SJX, in *RadCom*, February 1992 [Reprints available from *RadCom* office price £1.50 to members - *Ed*]. The use of an IRM circuit based on two double-balanced mixers is an interesting development for a model which, in a Drake advertisement, is claimed to outperform "receivers costing much, much more."

MATTERS ARISING

SEVERAL READERS HAVE CHIDED me for not correcting the use by G8GS (Impedance/power meter, *TT*, January 1993, p41) of the spurious term 'RMS power'. As Bob Pearson, G4FHU, puts it: "It seems a shame that this error has been repeated down the decades. The product Irms x V_{rms} x cos phi is in fact the average power (averaged over a number of complete cycles).

It all went wrong after WWII when, in competition with foreign manufacturers, British makers of loudspeakers and amplifiers got fed up with foreign rivals quoting peak power ratings instead of the single tone average. Attempts were made to point out that with a single tone rating, the peak power is twice the average but then, some advertiser thought the RMS suffix looked good as a way of spiking the opposition and used it incorrectly.

"But alas, almost every advertiser since has followed the daft practice. Further complications arose later with other terms used to bamboozle buyers of audio equipment: 'music power' for instance. The irony of course is that for a loudspeaker, the ability to tolerate a high power may not be a desirable feature at all, especially if it arises because of poor sensitivity". I must take at least part of the blame for using 'RMS power' since I now recall that many of the points made by G4FHU have already been raised in *TT* - about a decade ago!

There was also an error in the circuit of the ATU providing balanced output (Fig 6 (d) of the Jan *TT* in which the 'hot' end of L2b is shown joined to the outer of the coax feed to the SWR meter instead of a 'cross over'.

Amateur Radio (February 1993) has published a correction to the circuit diagram of the VK5BR interference cancelling circuit (*TT*, March, Fig 4). R4 the source resistor for the MPF102 should be 1000Ω not 100k. ***G3VA***

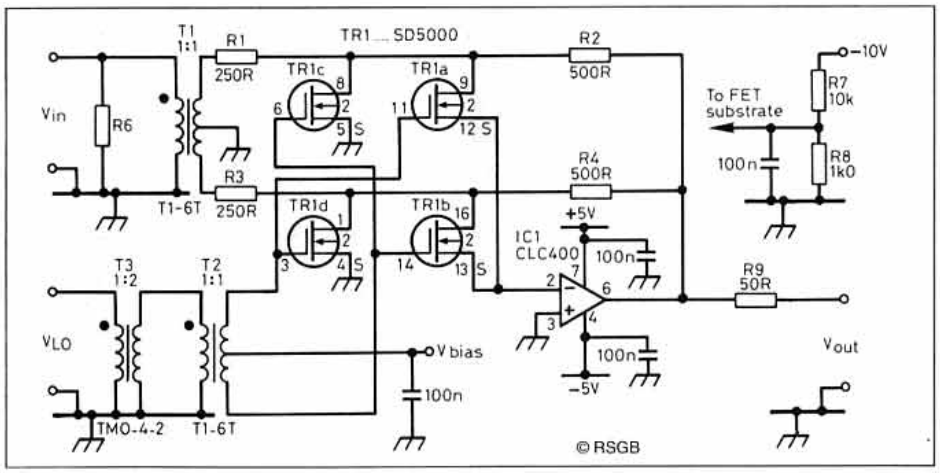


Fig 32: Practical design of the mixer built and investigated by Eric Kushnik as described in *RF Design* (Sept 1992).

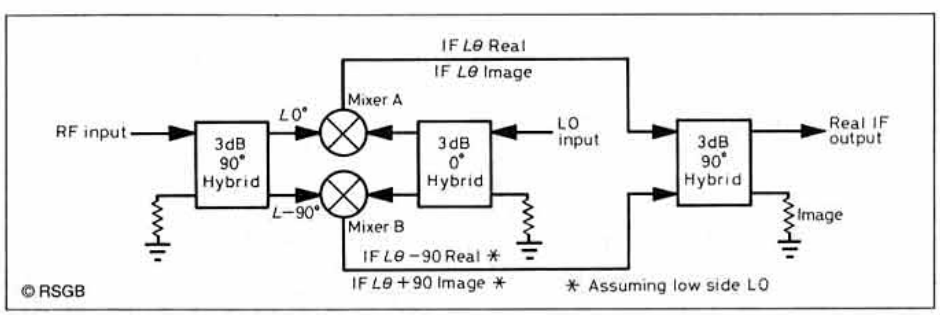


Fig 32A: Microwave image rejecting mixer, from *Microwave Solid-state Circuit Design* by Bahl & Bhartia (1988) akin to the two-phase SSB demodulator.

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My congratulations go out to two 'old timers', both called **'HARRY'**, one living in **BRISTOL**, the other near **READING**. Thanks chaps, for supporting me once again. Harry B. buying himself a Yaesu FT-890 and Harry C. going the whole hog and and forking out for a new KENWOOD TS-950SDX. I've dealt with you both for many years and it's always a pleasure to do business with the experienced operators amongst our great hobby.
Thank you.

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RADCOM EQUIPMENT REVIEW

Sender-450 Transceiver for 70cm

by Dave McQue, G4NJU

THIS LITTLE FM HANDHELD rig for 70cm is one of the latest offerings from Taiwan. Weighing under 450g (1lb) with antenna and batteries it is conveniently sized for pocket or handbag. The frequency coverage is from 430 - 439.995MHz, ie the whole of the 70cm band. While many amateurs, including myself, now go for dual band rigs, the single band units score where economy, size and weight are important considerations.

The transceiver should be especially attractive to Novices who now have access to most of the 70cm band. The receiver is a double conversion superhet, with a first IF of 23.05MHz and second of 455kHz. The quoted figures for sensitivity were found to be accurate at -10dBμ (0.3 microvolts) for 12dB SINAD (Signal + noise + distortion/noise + distortion). When the squelch was set for maximum sensitivity it lifted at just under 0.1 microvolts. The rig has an LCD display.

The receive frequency was set to 435.000MHz and only four inband spurious responses were found. The two at +/- 300kHz required +52dBμ (500 microvolts) to lift the squelch and the others at 433.27 and 434.63 needed +65dBμ (3 millivolts) to do so. At the second channel (388.90MHz) +46dBμ (400 microvolts) opened the squelch. In all, a performance which bears favorable comparison with other handhelds.

The squelched current consumption remained at 40mA over the entire operating voltage range of 5.0 to 16V. At full volume, unsquelched, it was 135mA at 16 volts and 120mA at 5 volts. On power save, with the Rx turned on for about a third of the time at one second intervals, the mean current was about 14mA. Auto power off was then selected and current dropped to a bare 5mA, after half an hour of nil activity.

The Tx has three power settings - Low, Medium and High. The actual output and current drawn at each setting depends on the power supply voltage - see the table opposite.

FAMILY RESEMBLANCES

THE MECHANICAL CONSTRUCTION bears a resemblance to the Standard 520 series. In fact the battery packs are interchangeable and I used mine fitted with nicads for portable tests. The transceiver has a stout metal back and plastic front. The back gets quite warm with protracted use at high power on 13.8V as there is about 15W warming it up! Clip it on a large sheet of 10SWG aluminium if you're a waffler who indulges in '10 mile overs'! For portable use, two battery pack cases are supplied one for four AA cells and the other for six. They will take nicads but it is best to make sure there is a sufficiently proud positive terminal to ensure a good connection. All cases of this type are somewhat flimsy and I have found a supply of superglue useful for repairing dropped items!

MANUAL OPERATION

IN COMMON WITH ALL modern rigs a modicum of computer literacy was required to drive it, although there is a comprehensive 53-page manual supplied with the unit. To test its effectiveness, I got some of my Novice pupils to set up the rig solely by use of the manual. The channel step is set to 10kHz initially but can be altered to 5, 10, 12.5, 20, 25, and 50kHz. The repeater offset (shift) was initially set to 5MHz and could be adjusted to +/– 0 to 39.995MHz.

After about half an hour most had managed to set the step at 25kHz and the repeater offset to 1.6MHz - the settings for normal operation. There are 20 memories plus a 'Call' memory, and it was a straightforward task to put the local repeater frequencies into the Call memory. The book did not say how to turn on the 1750Hz tone, but I discovered that this is done by pressing the Call button after first holding down the transmit button.

If you press the Call button first, you switch to/from the Call frequency which is why I recommend putting your local repeater channel in the Call memory. Frequencies can be set either by using the keyboard or the righthand selector knob. One feature I like is the use of a sunken knob for squelch setting - this rarely needs adjustment so you are prevented from moving it by mistake.

ADDITIONAL FUNCTIONS

THE TRANSCEIVER HAS all the usual options one has come to expect, such as memory scanning. However CTCSS (continuous tone code squelch system) requires the fitting of an optional board as does the paging option for which another DTMF (touch tone) board is required.

Accessories available include nicad packs and chargers, external power cables and spare battery cases. A 2.5mm socket for an external mic and a 3.5mm for speaker/phones are also provided - these could be used for connection to a TNC (Terminal Node Controller) for packet operation. PTT (Press To Talk) is via the microphone socket. When used on an external power supply, I would recommend the use of a remote antenna to avoid excessive fields near your head especially on high power.

When I think that I paid £25 for a single channel Pocketphone back in 1973 when most things were a tenth of the price they are now, then the price does not seem unreasonable. However my 11-year-old granddaughters will have to wait until they pass the Novice exam - maybe next Christmas!

The ADI Sender-450 is available price £219.99 inc VAT plus £5.00 P&P from: Waters and Stanton Electronics, 22 Main Rd., Hockley, Essex SS5 4QS. Tel: 0 7 0 2 206835/ 204965.

	LOW		MEDIUM		HIGH	
Supply Volts	Power Watts	Current Amps	Power Watts	Current Amps	Power Watts	Current Amps
5.0	0.4	0.467	0.7	0.730	0.8	0.744
9.25	0.47	0.523			3.0	1.200
10.0	0.5	0.537	2.3	0.986	3.5	1.258
13.8	0.65	0.620	2.35	1.038	4.75	1.446
15.0	0.7	0.661	2.4	1.040	4.8	1.450

Notes: a) I have put in the 9.25V figure to indicate the maximum supply for Novice use. b) Spurious signals were better than 60dB down as in the specification.

RADCOM TECHNICAL FEATURE

The World of Telegraph and Keys

by Dave Ingram, K4TWJ

HEARTY GREETINGS TO our key collecting friends and CW aficionados across the pond! My occasional articles featuring keys in *CQ* Magazine (USA) and my new book, *Keys, Keys, Keys* (available from *CQ* Bookstore) have generated substantial interest. I am honoured, therefore, to present the following article for *RadCom*.

Morse code communication is as old as amateur radio itself, yet as new and captivating as the latest pump key or paddle used with an electronic keyer. Collecting various keys and using them on the air adds a fresh new glamour to our great hobby, as well as reflecting our amateur radio heritage. You need not be a CW devotee to enjoy collecting keys, incidentally, but if you are inclined to 'let your fingers do the talking', the true joy of key collecting returns tenfold!

EVERY ONE A WINNER

EACH KEY COLLECTION is different and usually began with only two or three keys which the owner found interesting or appealing. There are collections which have 100 or more keys of different types, some specialize only in keys made by a particular company, while others consist only of genuine classics - new and old.

The photgraph above shows a selection of old, new, large and small keys. It demonstrates the three main styles of key, alongside the first HF SSB transceiver produced in the USA (Collins KWM-1 on bench) and one of the latest HF SSB transceivers, the Icom IC-729 [see review on page 43 - *Ed*].

The key on the far right of the table is the new 'VHS' twin lever paddle handmade by Gordon Crowhurst, G4ZPY [1]. The paddle's mechanism is brass, polished to the lustre of fine gold and fitted with silver screws. It sits on a black steel base and has wide oval amethyst-coloured fingerpieces to give the appearance of fine jewellery. This 'VHS' paddle has thick arms to defy abuse, precision adjustments, and is absolutely marvellous to use.

The adjacent round and triple chrome plated paddle with jade-coloured fingerpieces is the dual lever 'Mercury' custom-made by Steve Nurkiewicz, N2DAN/4 [2]. This paddle key weighs four pounds and uses magnets instead of springs - it handles like a dream. The large hand/pump key on the left is G4ZPY's 'Trophy' high precision model, made of 18 carat gold-plated brass on a beautiful mahogany base.

PHOTOGRAPH: JOE VERAS, N4QB

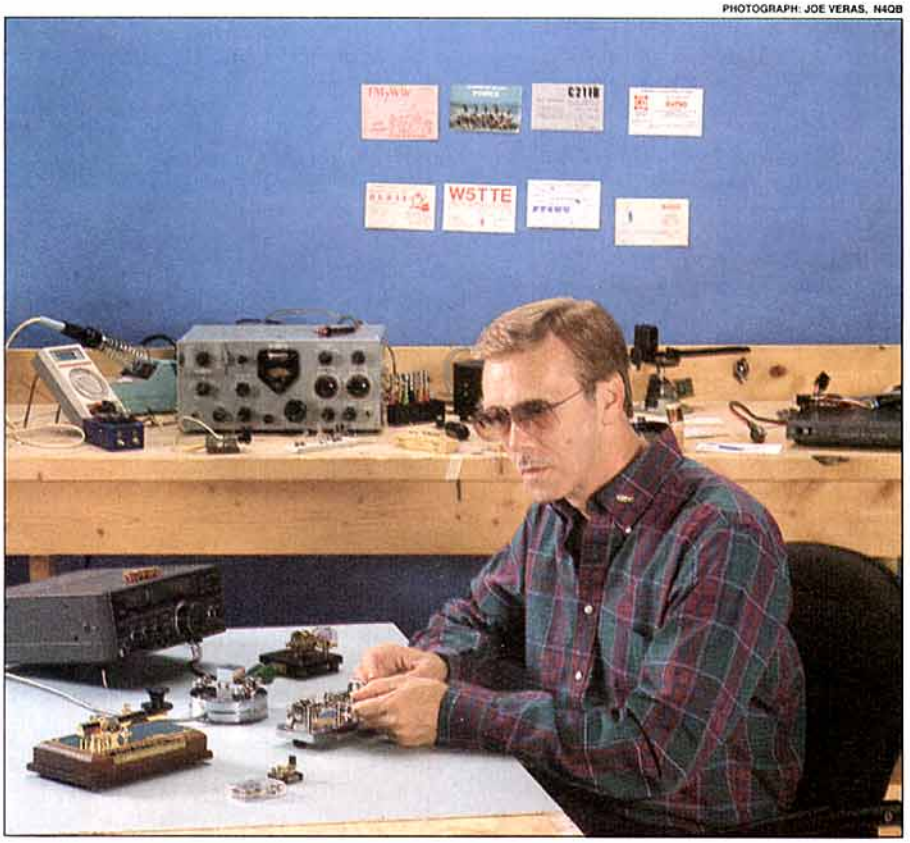

Photo 1: Part of the author's collection of Morse keys.

The tiny key on the desk's left side (beside my arm) is Serial No 1 of G4ZPY's new 'baby' miniature pump key. This delight measures only one inch square, has all the precision adjustments found on large keys, and it really works. I use it on the air quite often, especially when operating portable.

The bug I am adjusting is a deluxe model Vibroplex 'Blue Racer'. This particular bug was made during the 1950s, but its ancestor (the model 4) dates back to the 1920s. The vast number of parts on this narrow bug add real flair, and it is a joy to use. The little plastic cased item in the picture's lower area is a one-watt transceiver for 30 meters I have just finished homebrewing.

SHAPES AND SIZES

THREE VARIETIES OF PUMP KEYS are shown in **Photo 2**. The upper and largest item is G4ZPY's new 'kit key', which actually comes 80 percent completed - assembly takes only a few minutes. The key's mechanism is highly polished brass with fine race bearings at the fulcrum and precision thread adjustment screws. The key has a very good 'feel' and it also emits a rather romantic 'click clack' sound during use.

The lower item is a 'WT8 Amp MK III' key rescued from a WWII British tank. It is 80 per cent plastic and sports a mushroom type knob. This key is exceptionally well balanced and handles well. Notice the binding posts for these two British keys are on the left, whereas posts are usually on the right or rear of American keys.

The right hand key is one of my favourite items for portable QRP operations. It is a Japanese 'spy key' measuring only two inches long. This delightful item was a gift from fellow collector and CW enthusiast, JN1GAD, and looks like a miniature version of the ever popular J-38 key. Use your pocket magnifier to look closely and you will see tiny adjustment screws complete with locknuts on the key's front, rear and sides. By the way, this style of knob is quite popular in keys from the Far East. Miniatures such as this are great fun to use on-the-air, but finding even one is a super challenge. **Photo 3** shows some keys

Photo 2: Three varieties and sizes of pump keys.

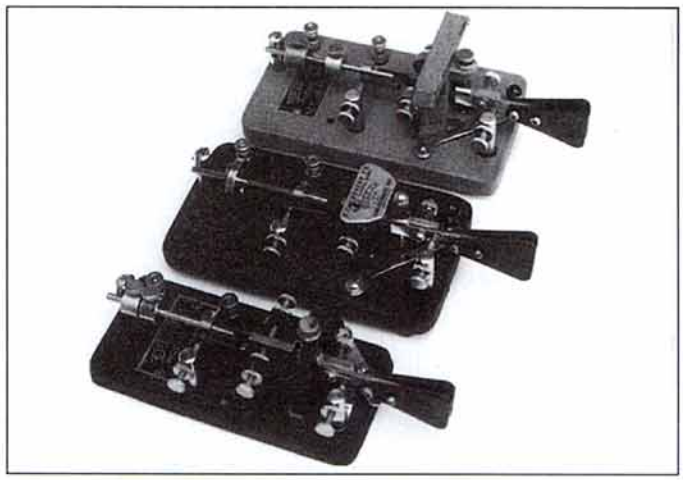

Photo 3: A trio of Speed-X bugs.

from the interesting Speed-X range, which are also popular with collectors.

ACQUIRING THE BUG

THE MOST FAMOUS MANUFACTURER of bugs was the Vibroplex Company, and three of their most popular models are shown in the colour photograph below (**Photo 4**). Vibroplex bugs are stamped with a serial number only - the only way to determine model is by design study.

The right bug is a 'Champion' model produced between 1940 and 1960, sporting a flat pendulum and square weight. It has a flat tripod-type mount and single-post rear damper. The high lustre chrome parts are mounted on a grey, 3.5in base. A similar model, the 'Lightning Bug' was used extensively during World War II and can be recognized by a flat bar supported by two round posts with a hanging rear damper. This semi-automatic key is ideal for new bug users, as its flat pendulum design produces slow and precisely spaced dots that sound really great.

The centre bug is a deluxe model 'Blue Racer' - all chrome with jewel movements and red knobs. This small key (base 2.5in wide) has a short round pendulum and rather stiff mainspring, so I used three weights to slow its dots down to the 20WPM range. Remove one weight and it is a real high speed contest treat. Manufactured from approximately 1929 until about 1960, it began life as the 'Number 4' which was later changed to the Blue Racer. The left bug is Vibroplex's 'Presentation Model'. It has a lustrous chrome upper mechanism with jewel movement mounted on a chrome base covered with a gold plate. This is the only bug key which has an adjustable mainspring.

VIBROPLEX PRESENTATION

THE 'PRESENTATION' IS ACTUALLY a Vibroplex 'Original' built almost identically to the first Vibroplex produced in 1904. The difference is that the Presentation model has a gold base with jewel movement and red fingerpieces. This is the only Vibroplex bug still in production, and can be purchased from Vibroplex in a standard/grey base model, deluxe all-chrome model, or gold Presentation model. If you would like to add a real sparkle and sense of history to your shack, this is the perfect key!

The new 'VHS Combo' from G4ZPY is shown in **Photo 5**. It consists of the famous 'VHS' paddle and a deluxe electronic keyer. The two pieces may be separated and interconnected via a small cable, or the paddle mounted directly on top of the keyer, as shown on the right of the photo. In the latter case, new style curved fingerpieces are used with the 'Combo'. If you presently own a G4ZPY 'VHS' paddle, curved fingerpieces and keyers are available.

The keyer is built in a small RF-proof cabinet with black vinyl coating and four small feet. It has dot/dash memories, selectable automatic inter-character spacing and selectable sidetone. Adjustments are from six to sixty words per minute (faster programming available upon request!), and it is powered by an external 6-15V source at just 4mA. I regularly use one of these keyers, with great success.

PADDLE TALK

NOW LET'S DISCUSS THE DIFFERENCE in paddles. Some CW operators prefer single lever paddles because they only move in one direction at a time. For those with 'cumbersome fingers' this makes sending CW easier.

Dual lever paddles, however, have the advantage of iambic action. This means that when combined with a modern iambic keyer, many letters and words can be made by squeezing both levers simultaneously. As an example, a 'C' is made by squeezing both levers with the right (dash) lever leading. Squeezing both levers with the left side leading (and holding it for one more dot) automatically produces a full stop.

A classic item from eras past is the rare Vertical Vibroplex bug pictured in **Photo 6**. Limited numbers of these were made during 1918/19. It was also known as the Martin Upright and nicknamed the 'Wirechief's key' because it occupied minimum space on a telegraphers desk!

The key's main mechanism stands straight up, attached to a heavy horseshoe-type base. Fingerpieces are angled horizontally, with the nameplate and circuit-closing switch on the

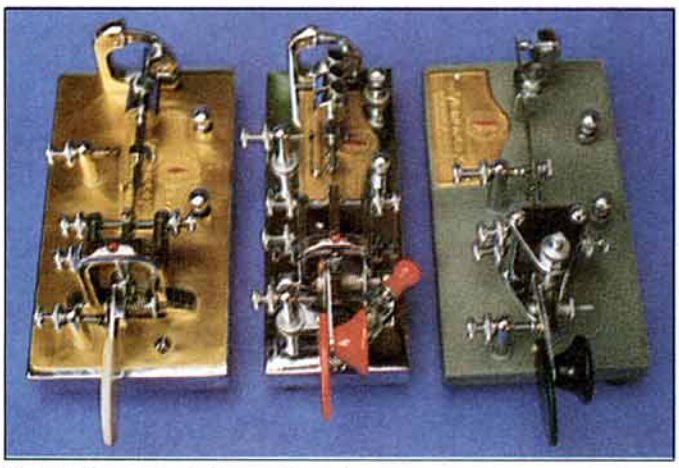

Photo 4: Keys from the famous Vibroplex range.

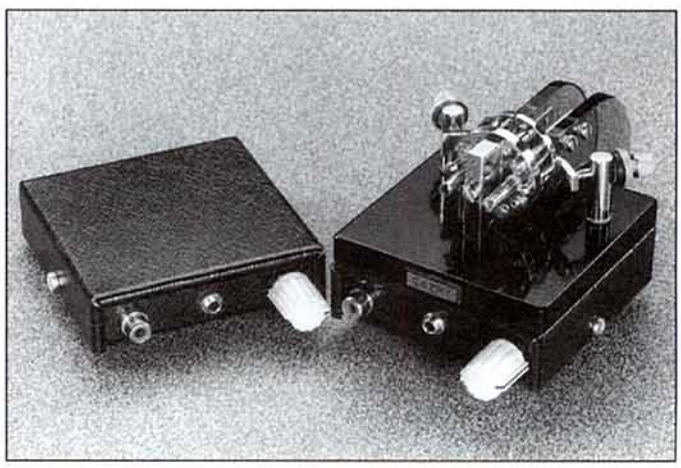

Photo 5: The new paddle and keyer combo from G4ZPY Paddle Keys.

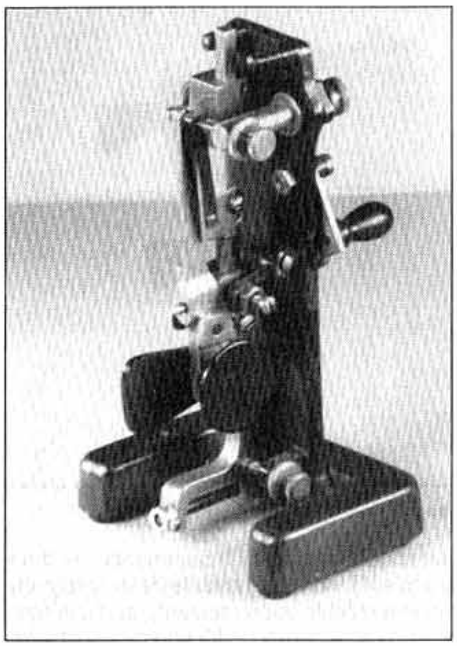

Photo 6: The rare, exotic and priceless Vertical Vibroplex. Truly the Mona Lisa of bugs!

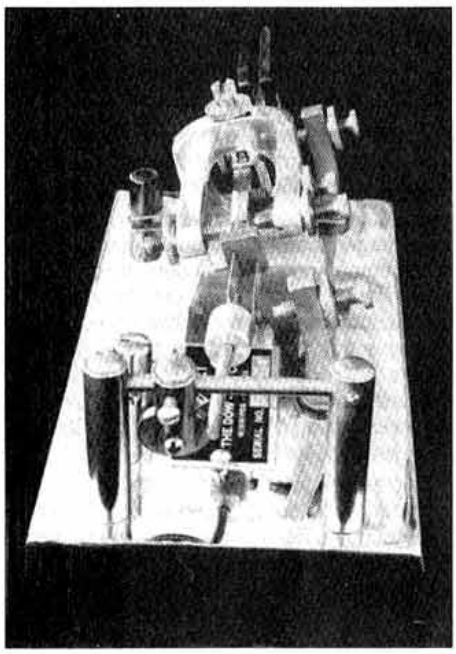

Photo 7: The unique Tilted Dow Key bug. Notice that the full mechanism is tilted at 30°. It was produced in all-brass and all chrome versions.

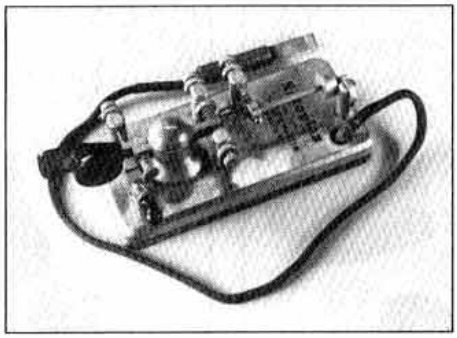

Photo 8: The rare Martin Rotoplex. This sports nickel-plated parts and moulded single fingerpiece.

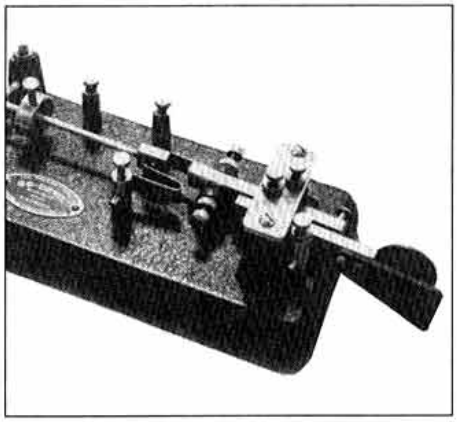

Photo 9: A H Emory's 'Go Devil' bug key made during the 1940s. The item could also be used as a 'Sideswiper.'

back. A single set of contacts is used for both dots and dashes. Moving the fingerpiece one way puts damped pressure on the centre contact to make dashes - moving it the other way removes damper pressure so the contact swings free to make dots. Only four Martin Uprights are presently known to exist. Quite obviously, they are in a class of their own.

KEYS BY DEGREES

ANOTHER UNIQUE-STYLE ITEM is the unusual Tilted Bug made by the Dow Key Company of Winnipeg, Canada during the 1950s. **Photo 7** shows how the mechanism of this semi-automatic key is tilted approximately 30° to the right, with both dot and dash contacts bent accordingly. Though designed for operator comfort, the key somehow seems to be tilted in the wrong direction! Dow Key addressed the problem in a subsequent model known as the Rotary Bug. It had a round yoke set into a circular assembly so the full mechanism could be rotated for right or left hand use at any angle, or turned horizontally for use as a regular pump key.

The famous Martin Rotoplex was made during 1941, and is illustrated in **Photo 8**. Horace G Martin designed most of the bugs manufactured by the Vibroplex Company, however this item was produced in Kentucky after Martin separated from Vibroplex. A large metal and rotating dome is used in lieu of the conventional yoke, and screws on the post on each side of the large dome set the arm travel. Particularly interesting on this key is the use of a spring on the left stop screw to adjust dot tension. These little delights are fairly rare today. **Photo 9** shows the 1940s 'Go Devil ' key.

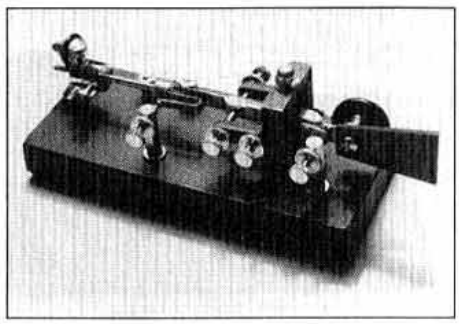

Photo 10: Unusual 'Kit Bug' produced by the Electric Specialities Company in Cedar Rapids, Iowa during the 1940s.

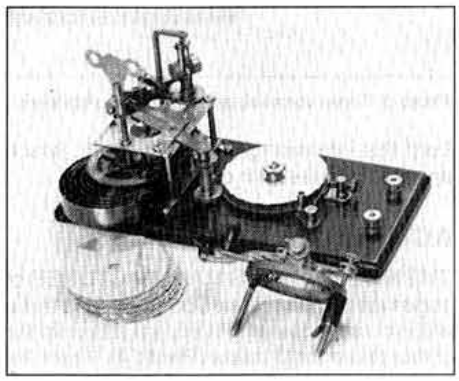

Photo 11: Deluxe model Omnigraph: a wind-up code practice machine made during the early 1900s. Metal disks in front of the Omnigraph contain various Morse practice characters and messages.

Only one semi-automatic key was ever produced in kit form, (see **Photo 10**), and finally a rather intriguing Morse code practice machine from the beginning of the century is illustrated in **Photo 11**.

GIVE IT A GO

AS YOU WILL SURELY AGREE, a discussion of keys and CW telegraphy could continue indefinitely. Indeed, many find this a fascinating pursuit - an interest to last a lifetime! I trust you have found this feature of interest - and perhaps re-awakened your interest in CW. Why not give it a shot? There's a good chance you'll get quite a buzz from Morse code and CW operation! I look forward to exchanging CW greetings with you on the air. I tend to frequent 10.100-10.110MHz week-nights, 0130-0200GMT and 14.000-14.025, Sundays 2230-2300GMT.

REFERENCES

[1] G4ZPY Paddle Keys, 41 Mill Dam Lane, Burscough, Ormskirk, Lancs L40 7TG

[2] Steve Nurkiewicz, N2DAN/4, 1385 Abner Street, Port Charlotte, Florida 33980, USA.

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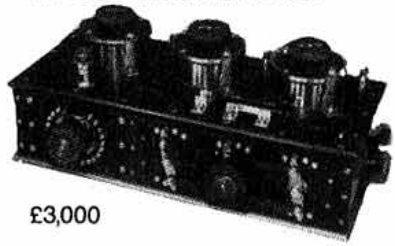

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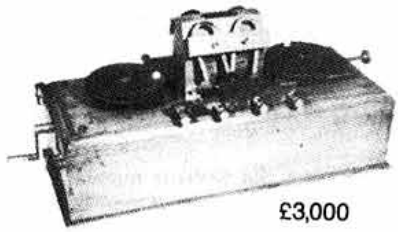

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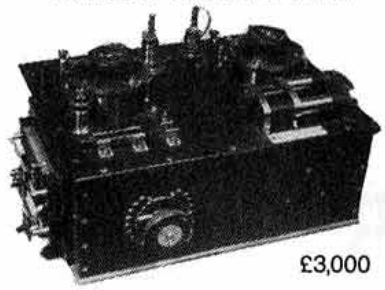

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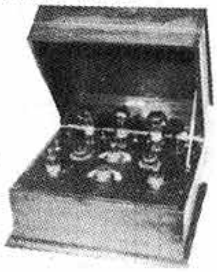

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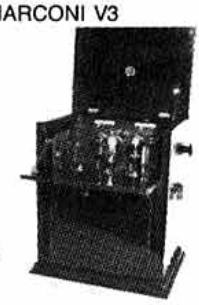

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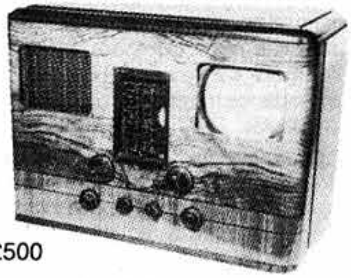

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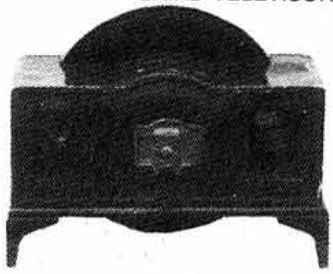

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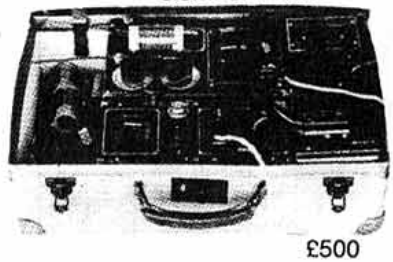

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RADCOM TECHNICAL FEATURE

How Big is a Bad SWR...

and how does it affect your transmitter?

Concluding a two part article by Bob Pearson, G4FHU

FOR ALL LOAD PHASE angles other than zero or 180°, the load line opens out into an ellipse, as in **Fig 8**. In the extreme states (90 and 270°) when the load is entirely reactive and can absorb no power, the elliptical path (locus) opens out to a circle (Well, it is a circle if the plotting scales are suitably adjusted).

It makes no difference whether the load is inductive or capacitive (except to the direction that the ellipse traces on each cycle). In both cases the tendency is for the ellipse to carry the operation into regions both of higher power and of lower power dissipation for the output devices. There may well be other reasons why an inductive load could be more troublesome than a capacitive one, including problems with neutralisation and with non-sinusoidal drive waveforms, but they are not relevant here.

The consequences of a reactive load are quite complicated, as can be seen in **Figs 9 and 10**. Here the SWR is maintained at a value of 2 but the resistive part of the load impedance is varied from its minimum $R_o/2$ to its maximum $2R_o$. The effects on power are shown in Fig 9 and the corresponding variations in impedance magnitude and angle in Fig 10.

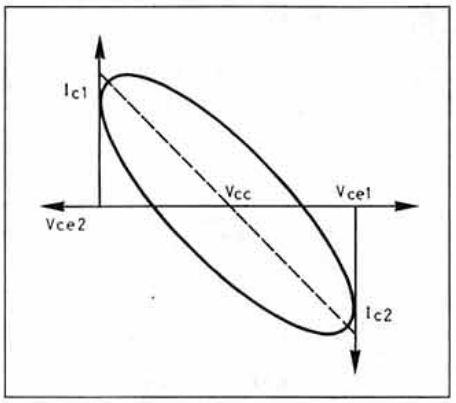

Fig 8: Elliptical load locus caused by a partially reactive load.

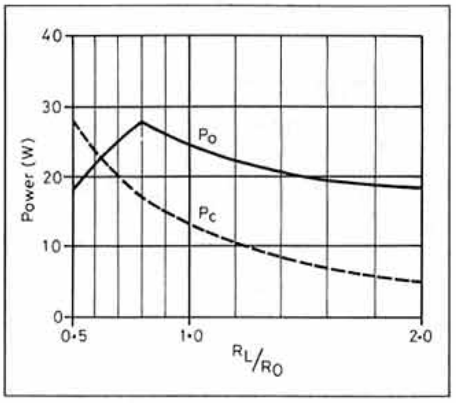

Fig 9: Power variations as the resistive part of a reactive load impedance varies from minimum to maximum, while the SWR remains at 2.

It is interesting that the peak power output occurs at the peak phase angle, which seems wrong at first glance, and would indeed be so if the falling power factor (cosine of the phase angle) were not being offset by the rising resistance component R_L. Even so, the peak output is way below normal (ie when the SWR = 1).

For an SWR of 2, the output power only reaches 28.8W instead of the normal 36W and the resultant internal dissipation is 17W instead of 9.84W.

The curious sudden change of direction at the peak of the output power curve in Fig 9 is simply the consequence of reducing the peak current below 12A to avoid clipping. At the same point the load impedance magnitude reaches the R_o level, ie $Z_L/R_o = 1$ as seen in Fig 10.

For all SWR values up to 4, the conditions at maximum phase angle with a reactive load impedance are shown in the final graph, **Fig 11**.

Comparing this with the purely resistive load conditions in the earlier graph of Fig 7 (see part 1), it is clear that the low resistance hazard is worse than the reactive one, at least in respect of excessive power dissipation and poor output.

CONCLUSIONS

1) The background algebra and computing needed for this article were undertaken entirely on a hunch that load *reactance* was going to be the most important factor and that this would justify a new type of meter to indicate reactance separately from resistance. The numerical results do not confirm that hunch at all in respect of power dissipation, but do give valuable guidance about what other factors are most important.

   But the calculations cannot take account of the more subtle, but dangerous hazard with a reactive load, namely the increased risk of passing through Region C (Fig 4 - see last month), owing to the elliptical load path. So it is indeed wise to be cautious with semiconductor power amplifiers using bipolar transistors which are prone to secondary breakdown troubles. FETs do not have this particular Achilles' heel.

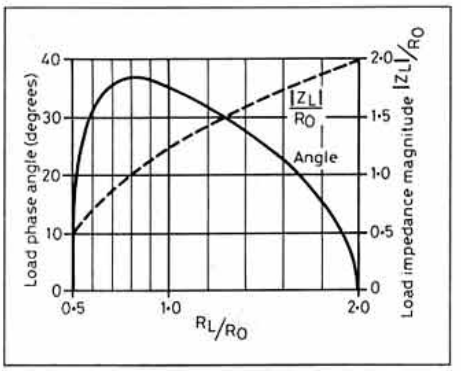

Fig 10: Load impedance-magnitude and phase-angle variations at SWR=2.

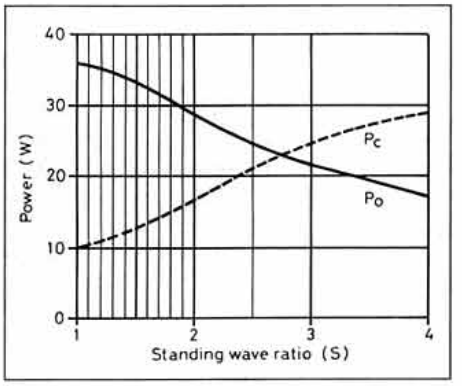

Fig 11: Output & device power versus SWR when the load is partially reactive and has the maximum phase angle.

2) There is no doubt at all that for push-pull transistor PA stages the worst danger comes from low load impedances, both in respect of excess currents if the drive is too great and excess power dissipation even if the drive is normal. If a mistake is made in assembling coaxial connectors and cables, it is vital to avoid a short circuit.
3) The protection offered by an ALC system should be responsive to SWR to cover all possible risks, but there might be scope for more subtle control based upon load impedance magnitude or output current in particular.
4) For single-ended stages one has to beware of loads that are of too high impedance. An open-circuit load or connector is the greatest risk.
5) The most common reflectometers/SWR-meters work by sensing load voltage and load current, then scaling and combining these as voltage phasors so that when added and rectified their sum gives the forward wave amplitude and when sub-

APPENDIX

Phase Angle

$$\phi = \arctan\left(\frac{X}{R}\right)$$

Maximum phase angle

$$\phi_m = \arctan\frac{(S^2-1)}{2S}$$

It occurs when

$$|Z| = R_o \text{ and } R/R_o = 2S/(S^2+1)$$

Reactance

$$X = R_o\sqrt{\left(\frac{R}{R_o}\right)\left(\frac{S^2+1}{S}\right)-\left(\frac{R}{R_o}\right)^2-1}$$

Impedance Magnitude

$$|Z| = R_o\sqrt{\left(\frac{R}{R_o}\right)\left(\frac{S^2+1}{S}\right)-1}$$

* Power from DC supply

$$P_s = \frac{V_{cc}\,I_{cpk}}{\pi}$$

* Signal power to load

$$P_o = \frac{|Z|\,I_{cpk}^2\cos\phi}{4}$$

* Power heating transistor

$$P_c = P_s - P_o$$

* For one transistor of the Class-B pair

tracted and rectified, their difference gives the reflected wave amplitude.

It is possible to separate these functions and so to monitor current and voltage simultaneously, from which impedance magnitude can be calculated mentally or derived electronically. This would offer a convenient method of detecting the dreaded low impedance load condition and short and open circuits.

However it is much simpler to make a crude current indicator using a shunted torch bulb or car lamp, excessive brightness warning of low impedance and no light warning of an open circuit. Many 'Old Timers' have been using this method since radio began!

6) The calculations assume rather idealised transistor characteristics in which collector current is independent of collector voltage. This is most unrealistic for high power transistors and for triode vacuum tubes. The practical effect is somewhat advantageous because too low a load impedance will show up as an abnormally high reading on the PA current meter, as if the drive has increased. Such an indication should always be treated with suspicion and remedial action taken.

Simplifying assumptions such as no losses in the transformer or in emitter ballast circuits make the power figures look very optimistic. Real circuits will produce less power, perhaps 30 percent less in many cases. But this does not invalidate the trends reported here.

7) Finally a small confession: until the work was nearly finished, I had always regarded those seeking low SWR (below say 1.5), as misguided fanatics because of the trivial effects upon signal strength at the remote station of the QSO. From now on I will be a little more careful, especially when using modes such as RTTY that really press the PA stage hard.

● FOLLOWING THE success of his 1992 lecture at the Dayton Hamfest, this year's RSGB President Peter Chadwick, G3RZP, has been invited back to the USA to talk on 'Transmatches, Feeders and SWR'.

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1993			
Feb	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
	13	North East	Seaburn Centre, Sea Road, Sunderland
	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	Scotland	Adam House, Chambers St., Edinburgh
	4	Scotland	City Hall, Candleriggs, Glasgow
	11	Brighton	Corn Exchange, Church St.
	17	Nottingham	Jesse Boot Centre, University
	18	West Midlands	National Motorcycle Museum J6 M42
	24	London	Novotel, Hammersmith
	25	West	Brunel Centre, Templemeads, Bristol
May	1	North East	Northumbria Centre, Washington, Dist. 12
	2	Leeds	Univ. Sports Centre, Calverley St., Leeds
	8	Cardiff	Pentwyn Leisure Centre, off A48
	22	London	Sandown Park, Esher, Surrey J9/10 M25
	23	Hemel H/stead	Dacorum Pavilion, The Marlowes
	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
July	25	West Midlands	National Motorcycle Museum J6 M42
Sept	11	West Midlands	National Motorcycle Museum J6 M42
	12	Brighton	Corn Exchange, Church St.
	18	Leicester	De Montfort Hall, Granville St.
Oct	2	London	Sandown Park, Esher, Surrey J9/10 M25

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IDEAS FROM ABROAD

Eurotek

REPORT AND PICTURES BY ERWIN DAVID, G4LQI

Angry Nine anyone? No, it is not a new computer game but an AM/CW/MCW ex-military HF radio, US-named **AN/GRC-9**. It was made and is now sold as surplus in several countries. Owners of this and many other military valve-era rigs have banded together in the **International Angry Nine Association** to use them on the air or to just restore and collect them.

INSTEAD OF COMPLAINING about the high cost of entry into HF radio, some new A licensees and a surprising number of old-timers find their sport in using 'dump sets' on the air. The prominence of the Angry Nine is only due to its abundance; operators of other rigs join in too. Actually, the station most envied is in PA0LCD's garden: a US Army/Hallicrafters SCR-399A divisional HQ station in its 'shelter', transportable only on a 6x6 lorry. It contains the famous QRO BC-610 AM/CW transmitter with BC-939 ATU and two operating positions with BC-312 and BC-342 receivers.

THE AN/GRC-9

OF LATE WWII VINTAGE, the AN/GRC-9 is a semi-portable 2-10MHz transmitter/receiver. RF output is about 4W AM or 11W CW. The built-in antenna tuner will match whips, dipoles and long wires. The power supply works off 6, 12 or 24V batteries, using a vibrator for 105V and a dynamotor for 550V HT. A hand-cranked supply is also available!

A German-made 85W PEP linear amplifier model LV-80 is also sold as army surplus. It comes with a transistorized power supply; input 24V, output -51V bias, 280V @ 50mA for the screen grids and 680V @ 280mA for the anodes.

Mains power supplies for both the GRC-9 and the LV-80 do exist but none has appeared on the surplus market.

THE ORGANIZATION

FIRST SEEN WITH A STAND at the annual *Day of the Amateur* in Dronten, NL, in October 1991, the International Angry Nine Association now has over 50 paid-up members. They have been back in Dronten with a bigger and better stand in 1992, had a meeting-cum-fleamarket attended by over 100, operate a most imposing Headquarters station, and have published the first two issues of a substantial magazine, *Q-Five*.

INTERNATIONAL ASPECTS

THE DUTCH ARE NOT ALONE in the 'mil' surplus game. They have several Belgian members and have made contact with CORMMA, *Club Operateurs sur Materiel Militair Ancien* (France, magazine *CHIRP*), *Norsk Radiohistorisk Forening* (Norway, magazine *Hallo-Hallo*) and CROSEM, *Club Radio Operatori Stazioni Ex Militari* (Italy, c/o IK0MOZ). The International Angry Nines are now looking towards Germany and the UK for new liaisons.

THE MAGAZINE

THE FIRST TWO ISSUES OF *Q-Five* (if you can read Dutch) are full of excellent technical articles. To pick a few: mains supplies for the GRC-9 and LV-80, a description of the Russian R-104 sets recently 'dumped' in East Germany, a French PA/modulator for the Angry Nine, the HRO Rx in the British army, a magnetic loop for 3.7MHz and a doleful request for identification of a minutely described piece of junk. An English-language issue is planned for mid-1993. Olbert Petersen, PA3FMK, does the very professional DTP job.

THE WEEKLY NET - JOIN IN!

I WAS INVITED TO the net control station in the Red Cross building in Utrecht. Angry Nine Chairman Wim Kramer, PA2GRC, is the honorary telecom officer of the Red Cross. The building's very spacious radio shop also houses Wim's enormous collection of ex-mil radios of which only a few can be accommodated at the two operating positions.

The net starts each Sunday at 0900 British time, currently on 3707kHz; not a good time and frequency for an AM and largely QRP net but that is when most members can join in. About twenty did, and many more listened. Having a high dipole, PA2GRC gets out well using a KL/GRC-3030 (a Dutch version of the GRC-9) and an LV80, but some of the stations, operating barefoot and with nothing but the original 15' whip, sometimes get lost in the QRM. For local participants, 29.6MHz FM is monitored on an RT-67, similar to the British *Larkspur*.

English and German speakers are welcome on the net and SWL reports are appreciated: PA2GRC, PO Box 3170, NL-3502 GD Utrecht. Packet: PI8UTR @ PA3FMK. 1993 membership costs £20.

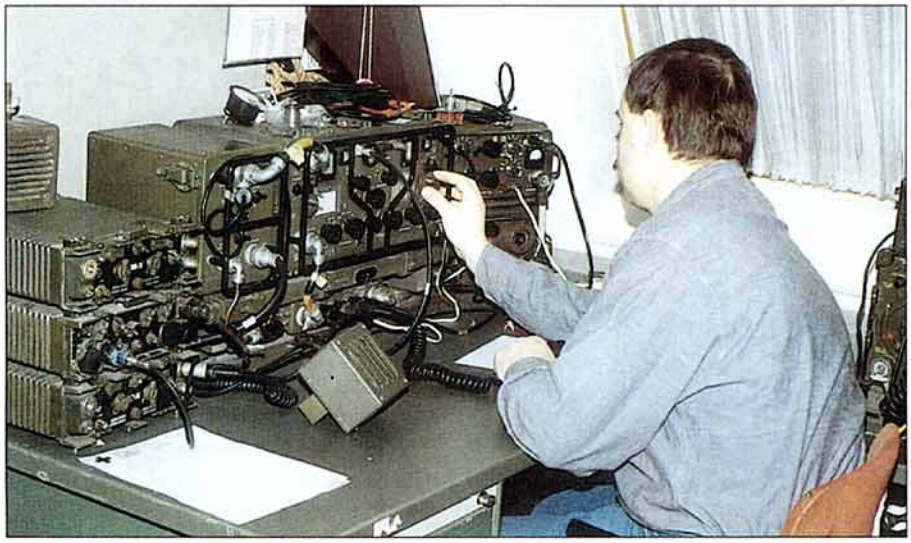


Photo 1: PA2GRC controls the Angry Nine net on 3707kHz AM. Wim uses a KL/GRC-3030, Dutch-made version of the Angry Nine; to its left the dynamotor power supply; to its right the LV-80 linear on its SS PSU. Behind Wim the RT-67 on 29.6MHz FM.

Photo 2: Olbert, PA3FMK, is working on the real Angry Nine. Below it, the modern Italian army receiver Elmer SP-466 and its RTTY and diversity unit.

TECHNICAL UPDATE

100W MOSFET AMPLIFIER

THE TELEPHONE NUMBER for kit suppliers, Airwave Systems, should have been 081 572 8615 - not the number shown last month.

The value of series resistor for the relay (R4) in the main power supply is dependent on the relay's coil resistance.

A value of 220nF for Capacitor Cx in the 12V power supply is normally satisfactory.

RSGB Presents Mencap Appeal Cheque

The cheque was presented to Lord Rix by Peter Chadwick, G3RZP.

ON FRIDAY 19 February, The Lord Rix, CBE, DL, G2DQU, RSGB Vice-President, visited our Headquarters to receive a cheque for £4,521.55 on behalf of the Royal Society for Mentally Handicapped Children and Adults (Mencap).

The money, which was presented by RSGB President Peter Chadwick, G3RZP, had been raised by RSGB members and staff specifically to help Mencap's work in Albania (see *RadCom*, April '92). Lord Rix, who is the Chairman of Mencap, thanked the members of the RSGB for their generosity, and said that the Albanian project was progressing well. He added that Mencap was most grateful for the Society's assistance in this project which helped people with a learning disability in Albania.

The presentation was made in the presence of members of the amateur radio trade who had put up valuable prizes to help encourage donations. Several of the winners attended to receive their prizes in person, and givers and winners were all able to meet Lord Rix afterwards. A guided tour of Headquarters rounded off the visit.

Our thanks to all the winners and runners up, and to those many members who gave so generously to this appeal. We're sure you will agree that the money raised will be going to a very worthwhile cause.

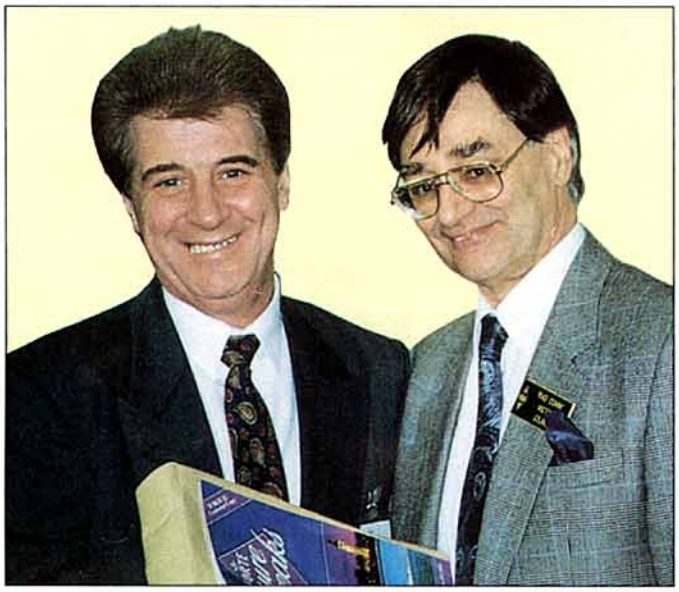
Lord Rix was keenly interested in the Museum exhibits.

An autograph for the RSGB Headquarters Visitors Book.

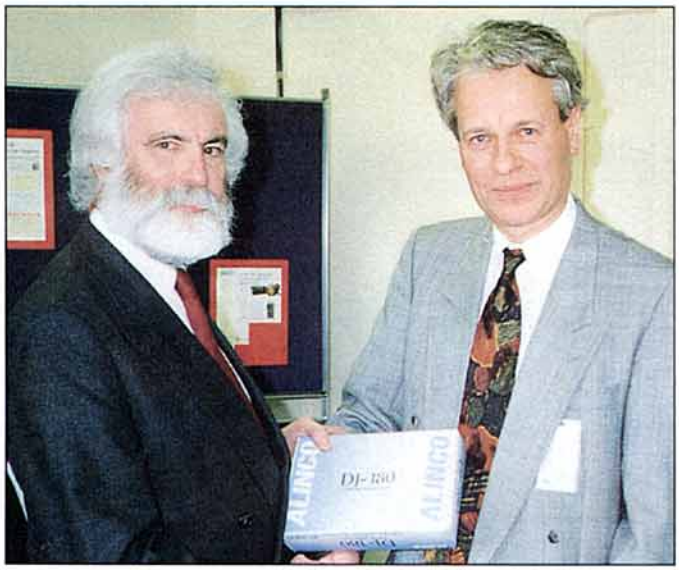
No tour of RSGB HQ is complete without a visit to the GB3RS shack.

Lord Rix unveiled a plaque commemorating his visit.

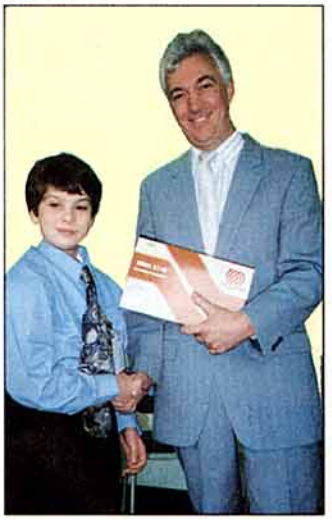
Alan Beasley, G0CXJ (left), receives on behalf of the Stratford-upon-Avon and District Amateur Radio Society, a winch handle and a voucher for the rest of the Versatower from Frank Weetman of Strumech Versatower.



Competition winner Chris Blackmur, G8FHN, is presented with his Weekend Holiday voucher by Victor Brand of VB Associates.



On behalf of the Civil Service Amateur Radio Society, John Pinnell, G3XWK, accepts a 2m Handheld from Geoff Stanton, of Waters and Stanton.



Mike Deveraux of Nevada Communications presented David Dennison (9) with a 430MHz Kenpro Handheld.

A 50MHz transceiver went to Hilary Claytonsmith, G4JKS. It was presented by AKD's John Armstrong.

As befits the prize of a Mini-Pak packet radio TNC, Lloyd Arrow of Siskin Electronics (top) made the formal presentation to new RSGB receptionist Susan Johnson, who passed it to the *RadCom* Editor the next day, who presented it to prize-winner Des Walsh, EI5CD, when he visited HQ the following week!

Bob Rylatt, G3VXJ, was awarded an ICS digital thermometer.

Martin Lynch made his presentation, of a 2m/marine Yupiteru scanner, to the RSGB President who was standing in for the winner Amanda Baird, G0RZX, as she could not be present.

Thank You

The following are thanked for their support in providing prizes to help us raise money for Mencap:

Strumech Versatower Ltd
AKD
Waters & Stanton
Nevada Communications
Martin Lynch
Siskin Electronics Ltd
Victor Brand Associates
Dewsbury Electronics Ltd
ERA
Bredhurst Electronics Ltd
G4ZPY Paddle Keys
AMDAT
Hately Antenna Technology
ICS Electronics
RN Electronics
Ferromagnetics
Datong Electronics

And all RSGB members

A complete list of prize winners appears on page 5 of the January 93 *RadCom*.

PRODUCT NEWS

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

TOP-LINE PORTABLE receivers are becoming all the rage, and one of the most sophisticated is the Grundig Satellit 700. This has microcomputer controlled PLL synthesized tuning and RDS (Radio Data System) reception which can display the station name, for broadcast stations which have this facility. The radio also features Direct Frequency Input, 64 memories, scan mode and an LCD quartz clock. Reception modes are AM/WBFM/USB/LSB.

Available from Grundig dealers or tel 0788 577155 for more information.

THE NEW IC-2iE from Icom (pictured in the photograph below) is one of the smallest handhelds around. It measures just 58 x 91 x 30mm and weighs only 260g including the BP-121 400mAh NiCad battery pack. Power output is selectable from 20mW with batteries, up to 5W when an external power supply is used. Features include 10 memory channels, programmed scan over a desired range or memory channels only, and advanced power saver functions. The LCD display with back lighting has a 24-hour clock and signal strength indicator. 1MHz and 100kHz steps are provided for quick tuning and the manual tuning function can be locked electronically to prevent accidental tuning changes. A 70cm version is also available - model number IC-4iE.

Icom (UK) Ltd., Sea Street, Herne Bay, Kent CT6 8LD. Tel: 0227 741741 (24hr).

READERS INTERESTED in designing their own PCBs may well be interested in Quickroute Professional for IBM PCs and compatibles.

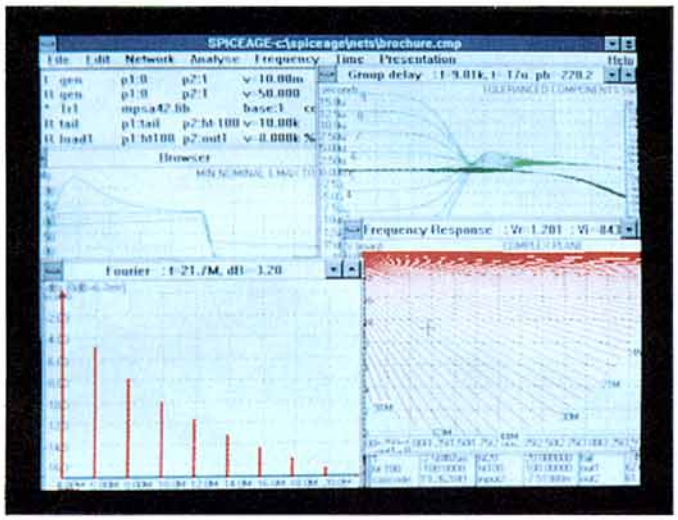
Version 1.5 for MS-DOS and 2.0 for Windows 3.0/3.1 are now available, and the program combines a sophisticated CAD (computer aided design) environment, with a powerful full-featured PCB or circuit design system. Pull-down menus, icons and mouse support are included, together with drivers for most printers and plotters. A shareware version of the DOS version is available, so you can see whether it suits your requirements.

Prices are £39 for the DOS version and £59 for the Windows alternative. These include VAT and P&P.

Contact: Powerware Software Design, 14 Ley Lane, Marple Bridge, Stockport SK6 5DD.

THE LATEST VERSION of the electronic circuit simulation program SpiceAge for Windows is now available, at a special offer price. The software will run on an IBM-PC 286 or higher, running Windows 3.0/3.1 in standard or 386 mode and is used by professional circuit designers. SpiceAge gives quiescent DC voltages, frequency response curves and 'scope like traces of your circuit ideas. SpiceAge has a friendly editor that lets you tell it what components to put in your circuit and how to connect them. Instructions and a comprehensive manual are supplied, and a demo disk together with price details and other information is available from the distributors. Send SAE for more information.

Those Engineers Ltd, 31 Birkbeck Rd., Mill Hill, London NW7 4BP. Tel: 081 906 0155.



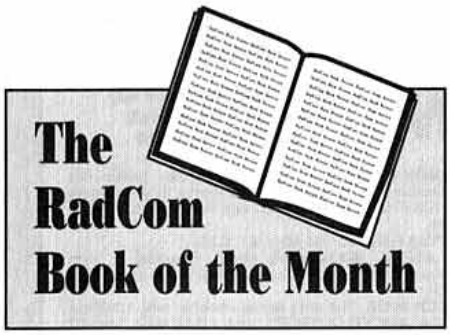
IF YOU HAVE AN IBM PC or compatible, you may have considered using a computer logging system for contacts. One of the best places to start might be Easilog V2.00 which has a host of useful features. These include a capacity of 30,000 QSOs, previous QSO search, DXCC check and new country alert.

A 22-page manual is included on disk, and Easilog is available in either 5.25in or 3.5in format. Price is only £3 (thats right -three pounds!) for the full version.

Contact: Don Ward, G0MDO, 9 Little Lane, East Morton, Keithley, West Yorkshire BD20 5UQ.

INTRODUCING THE VAMPIRE - a new tool from Antex for picking up and placing very small components such as those used for surface mount assembly (SMT). This is a non-electric vacuum pick-up pencil primarily designed for electronic applications. However it can also be used for any small light objects such as stamps or china fragments.

Details from Antex (Electronics) Ltd, 2 Westbridge Industrial Estate, Tavistock, Devon PL19 8DE. Tel: 0822 613565.



Reviewed by Pat Hawker, G3VA

AMATEUR RADIO TECHNICAL ABSTRACTS, VOLUME 1 1991

Edited by Graham Thornton, VK3IY.

124 + xii pages (215 by 160mm) hard covers. Published by Thornton Publishing, Melbourne, Australia.

THIS IS AN EXCELLENTLY compiled and produced book aimed at making it as easy as possible to find and retrieve information on a variety of amateur radio topics.

It contains brief abstracts of the contents of about 750 articles that have appeared during 1991 in a dozen amateur radio and electronics hobby magazines published in Australia, Canada, United States, South Africa and the United Kingdom. Each abstract provides a summary in about 50-100 words of the scope and theme of the article together with details of the author and publication in which it appears.

The book includes an author index and a subject index and the abstracts are grouped in sixteen chapters including: amplifiers, antennas, amateur-television, etc. An appendix provides a glossary of acronyms and abbreviations used in amateur radio.

Details including addresses and some information on subscriptions and whether airmail photocopy service for individual articles is offered although this latter information appears to be incomplete. It will be appreciated that the abstracts in themselves do not include circuit diagrams or detailed information so that ability to access the original article is essential.

The publications covered are: *Amateur Radio* (WIA, Australia); *Electronics Australia*; *Elektor Electronics* (UK); *Everyday Electronics* (UK); *Practical Wireless* (UK); *QEX* (ARRL, USA); *QST* (ARRL, USA); *QST Canada* (Canada); *Radio Communication* (RSGB, UK); *Radio ZS* (SARL, South Africa); *Sprat* (G-QRP Club, UK); and *73 Amateur Radio Today* (USA).

While the titles covered represent a useful cross-section of amateur radio journals, there are some noticeable omissions and no attempt has been made to include articles appearing in professional engineering-type journals although these may contain information of value to radio amateurs; similarly all the periodicals covered are English-language sources.

The Editor points out that "Each original source is fully documented, to assist with its retrieval. If a library does not hold copies of a particular periodical, it may be able to arrange an inter-library loan; it may help if the ISSN number is also quoted. Failing this, your national Amateur Radio Society may be able to offer help. If all else fails, most magazine publishers offer an airmail photocopy service".

● **Denco Coils** wanted, range 3T blue aerial, red oscillator and yellow mixer coils (covering the frequency range 1.6 - 5.3MHz). Also Denco IFTs, No.14/470kHz and IFT 18/465kHz. Information to Stephen Guy, GI0LSB, 5 Beechwood Grove, Newtownbreda, Belfast BT8 4UR, tel: 0232 471629 or after 6.30pm 0232 694120.

● Johny Chervotkin would like to correspond with amateurs in the UK. He is 16 and is also interested in sport, music, stamp and coin collecting. His address is USSR, Ural 624356, Sverdlovok Region, Kachkanar, Block - 8, Home 1, Flat 126.

● Ray Williams, RS6072 is trying to find someone who will explain the **Alinco DJ-X1** handheld scanner handbook. If anyone can tell him how to programme it please contact him on 0476 66047.

● Brian Hayward, G8VXQ, is looking for a **display hanger** for QSL cards, perhaps in the form of multi-plastic pockets five wide x eight high. He also needs a circuit diagram/service manual for **Cambridge Audio amplifier Model P50**. Expenses refunded. Tel: 021 705 3583.

● **Ken Carvill, GW3ENC,** introduced Edwin Hewins, GW3GSJ, to amateur radio and Eddie would like to meet up again. Ken last known address was in Barry, South Wales and if anyone knows of his whereabouts please contact Eddie on Tel: 0352 780334.

● Information and/or circuit diagram for an **MFJ Versa Tuner MkIII 1.5kW ATU, model MFJ 962C**, is required by Mr G Dunn, G3YAA, QTHR, or tel: 0482 866865.

● Phil Stevens, G3SES, needs a circuit diagram/manual for a **Safari Radiotelephone** which is an 11-channel HF SSB transceiver, and would like to talk to anyone who has succeeded in using one of these on the amateur bands. Contact him on: 0244 383954.

● Niall Woods has a **Redifon FM transceiver** (Tx 107MHz, Rx 140MHz) and is eager to obtain details on how to convert it for VHF use. All costs will be reimbursed. Please tel: 051 625 1196.

● Manual or circuit diagram for a **Marconi Guardian 2** Type 2354 is required by Mr I Mant, G4WWX, 28 Welbourne Road, Childwall, Liverpool L16 6AJ.

● Alan Sammon, G0HBC, requires the circuit diagram for the **Ham-Master HM-2010** 2m Tx. It is believed to be the same or similar to the FDK Multi 2000. Expenses will be reimbursed, and he is QTHR, or tel: 021 745 1000.

● Circuit diagram and other information for an **Erskine Laboratories** double beam oscilloscope type 13, RAF ref: 10S/825, is required by Mr M Parson, G8TC. Expenses will be refunded. His address is 3 Bruton Close, St George, Bristol BS5 7QF.

● Does anyone know how to contact **Brian, of Paddock Press.** Ron Rushton, G4YRR, had some QSL cards from him some time ago, but Brian has now moved. If anyone can help please contact Ron at 53 Crossfield Avenue, Blythe Bridge, Stoke on Trent ST11 9PL, or tel: 0782 395017.

● Widdy Girvan, GM2FVV, is looking for plug-in coils for **National FB7/FBX-A** receiver, or blank coil formers for this set. He is also interested in a National HRO type Power Supply with 2.5V heaters. Contact Widdy on Tel: 0786 811 237.

● Information on an **R1475 receiver and PSU**. All expenses refunded by Mr A Besford, G3NHU, 2A Halt Road, Caister, Great Yarmouth NR30 5NZ.

● Graham Du Feu, G0NOU, is trying to trace **Christopher Pollard** (age 43) who was born in Bulawayo but went to school with Graham in Jersey, CI during the early 1960s. Chris was last known to be a manager in the international hotel trade working in South Africa. He married Jill from Kent. Any news, QTHR or tel: 0822 614682. All expenses refunded.

● Mr S Slater, G0PQB, needs instructions/circuit diagram for a **Micronta 3-meter** power output/modulation/SWR accessory. Its a Tandy/Radio Shack Part No.21-522. Copies will be paid for. Please write to him at 24 Lullington Garth, Borehamwood, Herts WD6 2HE.

● Ray Wilson, G3APV, QTHR requires back numbers of ***VHF Communications*** (English version of 'UK W Berichte'), issues 3/1972 and 2/1973. Expenses refunded. Tel: 09467 28449.

Young Amateur of the Year Award 1993

FOR THE SIXTH YEAR running, the RSGB is pleased to announce the Young Amateur of the Year Award. This is again being supported by the Radiocommunications Agency and the communications industry.

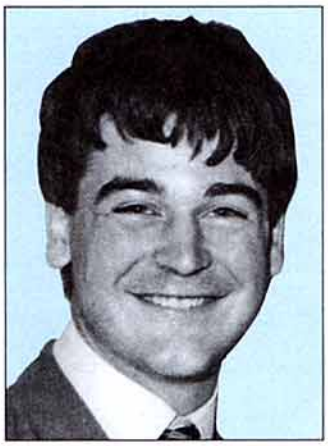
This prestigious award is open to anyone under the age of 18 who has an interest in amateur radio. He or she need not necessarily be a licence holder. Applicants may like to consider the following areas of activity:

- construction
- radio operating
- community service
- encouraging others into amateur radio
- international communication
- school projects

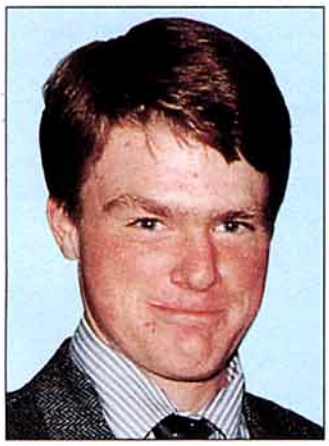
The idea behind the scheme is to generate interest in amateur radio and to encourage people to become involved themselves. If you would like a YAOTY Application Form please contact Project YEAR Coordinator, G4JKS, RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE; tel: 0707 659015.

The closing date for applications is 31 July 1993. The award is open to any resident of the UK, the Channel Islands or the Isle of Man, who has not reached his or her 18th birthday by the closing date.

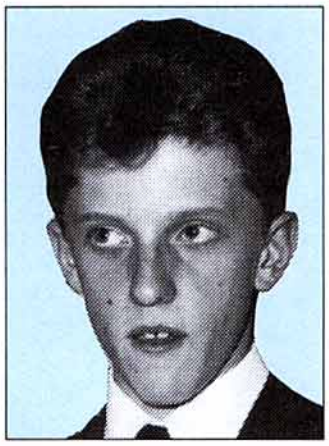
1988: Andrew Keeble, G1XYE.



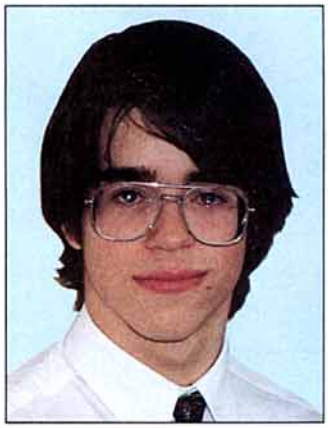
1989: Ted Walker, G0KAQ.



1990: David Martin, GM0NVE.



1991: Gareth Ayre, G0MFR.



1992: Martin Saunders, G7JCJ.

1993: Will it be your applicant . . . .

The Prizes

Along with the prestige of becoming the Young Amateur of the Year, **the winner receives**:

- A cheque for £250 from the Radiocommunications Agency, and an invitation to tour the DTI Monitoring Station at Baldock.
- The RSGB's prize, a Sony general coverage receiver, will be presented by our President, Peter Chadwick, G3RZP.
- The Mobile Radio Users Association will award the winner a week's course at Wray Castle College in the Lake District.
- Siskin Electronics has kindly donated a Mini Pak packet radio modem.

And for the Runner up:

- Icom (UK) will be presenting a hand portable transceiver and probably the usual Icom 'goody bag'!
- A £25 book token from the Mobile Radio Users Association.
- A 5315B multimeter donated by Cirkit Distribution Ltd.

Prizes will be presented at the RSGB HF International Convention at the ICL Beaumont Conference Centre in Old Windsor, on 10 October 1993.

EMC

MEGAN SMITH, G0MEG
EMC Committee Secretary

THIS MONTH I HAVE updates on the EMC Regulations, a clip-on RF ammeter for doing your EMC detective work, and pieces inspired by your letters and the technical press. My thanks go to Fred Robins, G3GVM, and David Lauder, G0SNO, for help with the EMC Regulations. David also contributed the construction details for the RF ammeter.

Make sure that you visit the RSGB EMC Committee stand at RSGB '93 at the NEC Birmingham in May, as there won't be another EMC column until June. Come and meet some of the committee, bring along your EMC queries and problems, or find out what it involves to be a volunteer coordinator! I might even persuade Robin Page-Jones to sign some more copies of the *Radio Amateurs Guide to EMC*. See you there.

EMC REGULATIONS AND AMATEUR TRANSMITTERS

FEBRUARY'S *EMC* COLUMN stated that all amateur radio transmitters will have to be type approved. This only applies to commercially manufactured transmitters or transceivers of broadband design capable of transmitting on commercial frequencies but restricted by link or program option to amateur band coverage. Many current HF and VHF amateur transceivers come within this category.

The requirement for type approval does not apply to transmitters or transceivers (including kits) designed for use exclusively by radio amateurs. Such equipment must, however, still be CE marked; the manufacturer has the option of a self-certification to the appropriate harmonised European Standards or the preparation of a technical construction file and submission to a DTI- appointed competent body for approval. There are two types of standard, product-specific and generic. The European Telecommunication Standards Institute (ETSI) is responsible for them.

A generic standard is expected to be issued later this year, whilst a draft product-specific standard that includes amateur base, mobile and portable equipment has been cited.

CLIP-ON RF AMMETER

A CLIP-ON RF AMMETER such as the 'Pliers-type RF current probe' described by Pat Hawker in *Technical Topics* October 1992 (pp 33-34) is not only useful for antenna experimenters but also as an aid to achieving good EMC in an amateur HF station.

If some of the RF current from a transmitter flows into mains wiring, this can increase the chance of breakthrough problems in nearby TV, video or audio equipment, etc. A clip-on RF ammeter allows this current to be measured so that steps can be taken to minimise it. Instead of splitting a ferrite ring in half, EMC Committee member Dave Lauder, G0SNO, has been experimenting with various types of ferrite core which are already split. The best type he has found is a Maplin Computer Data Line Filter (13mm), stock number BZ34M as shown in **Fig 1**.

This is a large split ferrite bead with a 13mm diameter hole and a hinged plastic carrier which can be clipped around a cable. Although intended to be clipped on and left, with care it can be opened and closed repeatedly. It is intended for suppression of computer interference but can also be used as a wideband current transformer. This type of split bead offers better coupling than a ring core and is usable from below 500kHz to over 50MHz. Alternatively, for a particularly large core aperture (25mm), G0SNO has used 'U' and 'I' shaped ferrite core pieces from a scrap TV line output transformer with all the windings removed although this type of core does not couple particularly well above 10MHz.

CIRCUIT DESCRIPTION

In the circuit in **Fig 2**, a 10 turn secondary is wound on one half of the core and terminated by a 50Ω load formed by R1 and R2 in parallel. When the core is clipped onto a cable, the cable under test forms the single turn primary winding of a transformer and in theory, 10% of the RF primary current flows in the secondary and through the 50Ω load. (Note that more turns on the secondary would give *less* secondary current).

For primary currents up to 1A, the power rating of the 50Ω secondary load should be 1W. In practice, with the Maplin core, the current ratio is less than 10%, being fairly constant at 8% up to 30MHz and falling to 7.5% at 50MHz. At 14MHz for example, 1A RMS in the cable under test causes 80mA RMS to flow through the 50Ω load which drops 4V RMS across 50Ω. Clipping the current transformer onto a cable adds a small series impedance which in theory is 0.5Ω (secondary load divided by turns ratio squared) but in practice is about 2Ω at 14MHz and 4Ω at 28MHz. The voltage across R1/R2 is rectified by a voltage doubler rectifier using two BAT85 Schottky diodes This gives a DC output about 2.8 times the RMS AC input voltage less the forward drop of the diodes. With a 100 microamp moving coil meter, the total resistance of R3 + R4 + meter resistance should be 104kΩ on the 1A range. On the 100mA range, R3 is short-circuited and the resistance of R4 + meter resistance should equal 6.8kΩ. On the 100mA range, the forward voltage drop of the diodes is significant so that the minimum current which can be measured is 30mA and an extra scale should be marked on the meter as in **Fig 3**.

The response of the detector circuit on its own should be fairly flat up to 30MHz but it may be less accurate at 50MHz depending on lead inductances, layout etc.

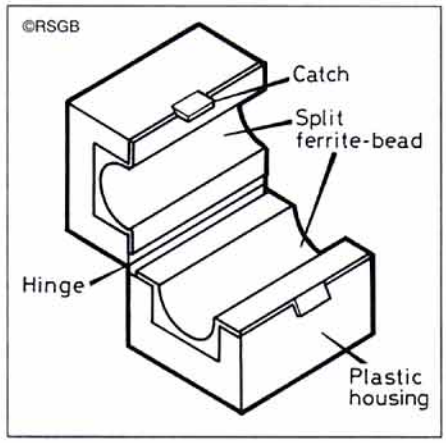


Fig 1: Computer data line filter from Maplin.

CONSTRUCTION

The meter can be mounted in a small plastic box with the current transformer mounted on the lid as shown in **Fig 4**.

The clip-on ferrite choke has two fixing holes in its plastic carrier. Carefully push out one half of the ferrite core then put two M2.5 or 6BA countersunk screws through the holes from the inside. Put a 0.5mm thickness of card (2 thicknesses of QSL card!) under the ferrite core before clipping it back into the carrier. Now put a piece of PVC insulating tape onto the ferrite to protect the enamel insulation on the wire and wind 10 turns of enamelled wire, about 26-28SWG (0.4mm) tightly round the ferrite core half.

This will pull it down into the carrier which is why the card is needed. Check that when the core is clipped shut, there is no gap between the halves and that the plastic spring lugs on the top half are being pushed outwards by the core. Cover the winding with a piece of PVC tape to give it some protection in use.

CALIBRATION AND USE

If required, the accuracy of the clip-on ammeter can be checked against a power meter on various bands, using the test set-up shown in **Fig 5**.

Clip the ferrite core around the coax inner only. With 50W into the load, the ammeter

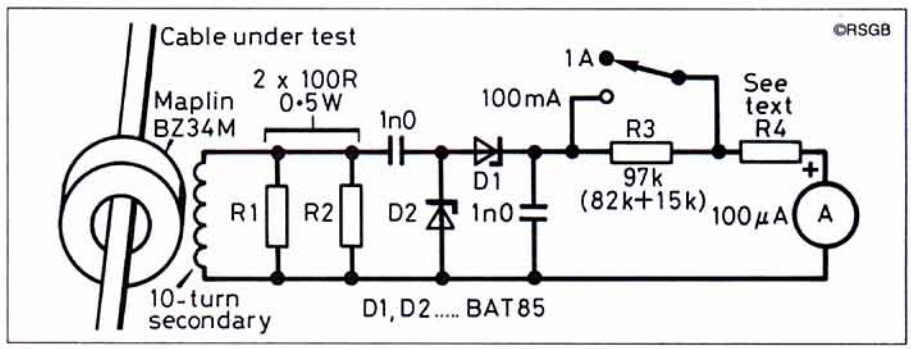


Fig 2: This simple but effective RF ammeter is suitable for HF use.

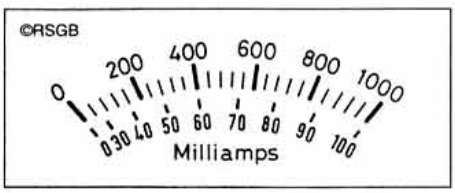


Fig 3: RF Ammeter calibration markings.

should show 1A. With 0.5W into the load, the ammeter should indicate 100mA. The split coax arrangement is only used for testing the meter. In normal use, the meter should of course be clipped around the outside of the braid of unbroken coaxial cable such as an antenna feeder. In this way, it does not respond to the current on the inner but only shows any current on the outside of the braid, which should ideally be zero.

In practice, any current on the outside of the coax braid will form standing waves, causing the reading to vary as the ammeter is moved along the cable. It can also be clipped around a mains cable, particularly a transmitter mains cable to detect any RF current being injected into the mains wiring.

Tests at G0SNO showed that on the 14MHz band, with 100W CW into a half wave wire dipole with a balun and coaxial feed, there was still 90mA of RF on the outside of the coax at the transmitter end. Ideally, this would all go to earth via a good RF earth but a short RF earth connection is not easy to achieve in an upstairs shack with a concrete patio outside!

Unwanted RF current on the outside of the coax was reduced by means of a common mode choke. This was made by winding twenty turns of the coaxial cable round a 200mm long 9.5mm diameter ferrite rod near to where the coaxial cable enters the house. This reduced the RF on the outside of the coax to 30 milliamps which only just registers on the meter.

With an antenna such as an end-fed type which relies on an RF earth as part of the antenna, the RF current on the mains lead to the whole radio station should be checked. Winding the mains cable twenty five turns round a ferrite rod forms an effective common mode choke for 14-28MHz but its efficiency falls off below 14MHz.

The most effective common mode mains choke for 1.8-14MHz is fourteen turns of thin mains cable on a pair of RSGB type ferrite rings.

Note that most commercial mains filters have no inductance in series with the earth wire so they are not effective against common mode signals on all three mains wires together relative to true earth.

EMC CONSULTANT HONOURED

REGULAR *RADCOM* READERS will remember the December 1991 front cover with the picture of the unusual EMC test facility in the salt-mine in Cheshire. The principal consultant involved in that project, Ted Forshaw was awarded an MBE in the New Year's honours list. According to January 1993's *Test* magazine the test facility has one of the lowest RF ambients measured by the National Measurement Accreditation Service.

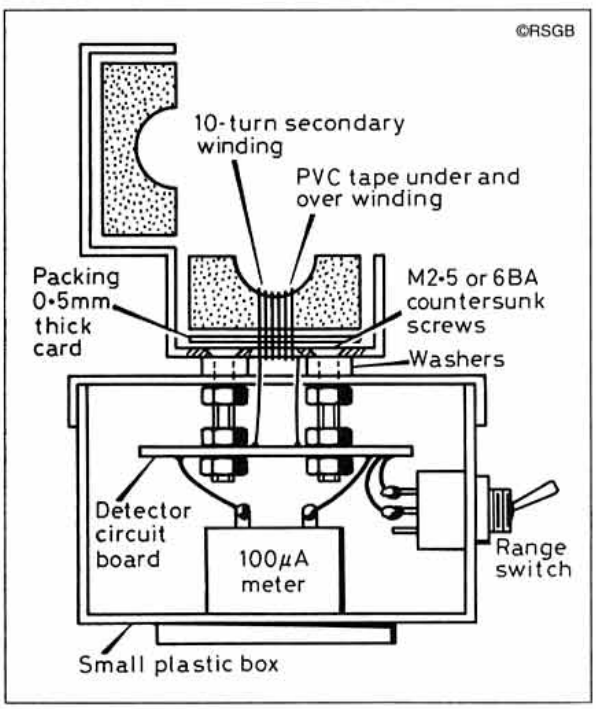


Fig 4: Suitable layout using a plastic box.

DTI INITIATIVE

TRADE AND TECHNOLOGY Minister, Edward Leigh, launched the DTI's EMC awareness campaign at a conference in London in December 1992. The aim is to set up mechanisms for British industry to gain technical knowledge so that manufacturers can compete effectively in Europe.

Test magazine reported that Mr Leigh gave some EMC horror stories to show the need for compliance with EMC Standards. For instance, "on a German autobahn, cars travelling at 70MPH had their antilock brakes suddenly come into operation because of a radio transmitter five miles away. In another case, electric trains caused the malfunction of CAD workstations three miles away".

Radio amateurs are already aware of this kind of problem, and I have included several examples of poor immunity of cars to RF, in previous EMC columns. Mr Wilson, G3DSV, has written to me about advice he was given by Volvo UK. He purchased a new Volvo 440XI automatic and wrote to the manufacturer asking whether there would be any risk of the car's electronics failing if he transmitted in the 2m or 70cm band. The reply from the Customer Service Manager was worrying. "I understand your concern with regard to the operation of radio transmission equipment from the car. Our direct experience in this area is somewhat limited. However, to date, I can advise that difficulties have been experienced by some individuals or organisations. The effects of transmission equipment upon engine management systems are often hard to predict in detail, but our experience has shown that difficulties in the form of control unit cut-out can sometimes be experienced under certain conditions. I can only therefore respectfully suggest that you do not transmit from your car whilst the vehicle is in motion." Mr Wilson is interested to find out if any amateurs have had problems with a similar car.

I think that some Police and rescue services use similar cars, and as Mr Wilson points out, rally drivers use 50W PMR radios, and what about taxis? The facilities for testing cars for RF immunity exist in the UK so maybe here is one of the opportunities which the DTI campaign might encourage.

NEWS FROM THE ARRL

THE DECEMBER 1992 edition of *QST* mentioned that manufacturers of video recorders for sale in the USA have received an extension from the FCC before they must comply with stricter limits on RF radiation from the devices. Originally VCRs were to comply with FCC Part 15 rules for other devices as of June 1994, but this has been extended to June 1996. The Electronics Industries Association of Japan (EIAJ) asked for the extension saying that "the majority of VCR manufacturers were experiencing difficulty in designing receiver portions of VCRs to comply with the revised standards," and that "manufacturers of compliant VCRs recognised that compliance was marginal and may not be sustained due to variations in mass production."

DID YOU READ THIS ONE?

G4DTL HAS SENT A CUTTING from his local paper reporting on the Council's planning approval for a radio ham's masts. One of the Councillors described the masts as 'detestable' although another Councillor assured the Planning Committee that 'If the aerials cause people to suffer from interference, the owner would have to fit resistors'. . . !

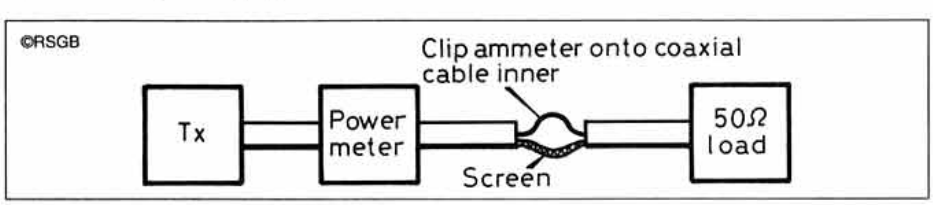


Fig 5: Test set-up for calibration of the RF ammeter.

Q R P

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

INTERNATIONAL QRP

AS THE INTEREST IN QRP operation has increased over the last 20 years, so has the number of QRP clubs and groups increased. From time to time I have mentioned QRP organisations but in response to a recent request, I plan to give details of the main groups over the next few editions of this column. There is nowhere better to begin than with the oldest QRP club of them all: The American QRP Amateur Radio Club International.

The QRP ARCI was founded in 1961 by the late Harry Blomquist, K6JSS, with the aim of reducing QRM on the air, by members voluntarily reducing their power to 100W or less at all times. Due to the increasing interest in true low power operation, and through the leadership of Tom Davis, K8IF, the club voted in the late 1970s to re-define its purpose in that direction, and adopt the generally accepted definition of QRP as 5W output CW and 10W PEP SSB.

The voluntary 100W power limit was later abolished; members may run any legal amount of power necessary at any time, for any purpose, although the 5W limit should be observed when claiming to be operating QRP. The club awards and activities are geared to the 5W limit. The QRP ARCI does not advocate the reduction of legal power limits for amateurs in any country, and serves only to provide a forum for those who enjoy the thrills and challenges of building and operating with low power equipment. The QRP ARCI is a member of the World QRP Federation and maintains ties with other QRP organisations.

The QRP ARCI publishes a journal, *QRP QUARTERLY*, in January, April, July and October, the content of which is written by its members. The projects, features, news items and comments are intended solely for the enjoyment of readers, and is a lively and interesting journal by, and for, the members.

To promote QRP operation on the air, the club promotes the use of designated QRP calling frequencies, regular QRP nets and a programme of QRP operating awards and contests. Details of the awards, some which are open to non-members are available from the club.

Details of the club are available from the Membership Secretary, Mike Kilgore, KG5F, 2046 Ash Hill Road, Carrollton, Texas 75007, USA. Enrolment costs $12 (for USA members) or $14 (non-USA), after which renewal is $10 (US) or $12 (Others). The QRP ARCI has a UK Representative, Dick Pascoe, G0BPS. The fees in Sterling are enrolment £7 and Renewal £6. The UK address is: Dick Pascoe, G0BPS, Seaview House, Crete Road East, Folkestone CT18 7EG.

QRP IS ALIVE AND WELL IN EUROPE

IF THE AMOUNT OF QRP activity in continental Europe can be judged by the number of contests and events, then it is very much alive. Below, I offer three events for the low power operator this summer.

THE EUROPE FOR QRP WEEKEND 1993

THE EUROPE FOR QRP Weekend is a successful annual event jointly sponsored by the G QRP Club and the OK QRP Club under the guidance of Petr Doudera, OK1CZ, and Gus Taylor, G8PG.

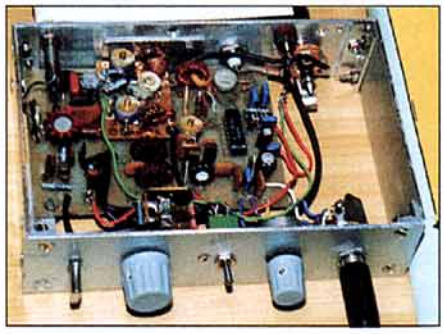
1. **Dates and times**: From 1600UTC on 1 October 1993 until 2359UTC on 3 October 1993.
2. **Mode and frequencies:** CW only on 3560, 7030, 14060, 21060, and 28060kHz, all plus 10kHz.
3. **Power:** Not to exceed 5W RF output. Stations unable to measure output take half their DC input (10W input = 5W output and so on).
4. **Stations eligible:** Any licenced radio amateur.
5. **Contest calls:** Call CQ EU QRP when seeking contacts.
6. **Contest exchanges:** For a contact to be valid, RST, power output, and name of operator must be exchanged and logged.
7. **Scoring:** Contacts with own country do not score. European stations score 1 point for each European contact and 3 points for each contact outside Europe. Stations outside Europe score 5 points for each contact with Europe. The final score is the sum of the points scored on each band used.
8. **Logs:** Separate log sheets must be used for each band, showing for each contact, date, time, call and RST, name, and power received and sent. A summary sheet must be provided showing call, name and address, claimed score for each band, total claimed score and brief details of equipment used.
9. **Submission of logs:** Logs must be submitted to P Doudera, OK1CZ, U1 baterie 1, 16200 Praha 6, Czechoslovakia, by 15 November.
10. **Awards:** Merit certificates will be awarded to the three leading stations from each continent.
11. The judges decision is final in the case of dispute.

The event is organised jointly by G QRP Club and OK QRP Club.

THE U-QRP-CLUB (RUSSIAN) CONTEST

CURRENTLY THERE APPEARS TO BE two QRP Clubs operating in what used to be the USSR. As I understand it, these are the U-QRP-CLUB, which is Russian in origin and membership, and the Soviet QRP Club which embraces the whole of the old USSR. The former has just announced a new QRP contest:

1. **Dates and Times:** An open QRP Contest from 25 July 1200UTC to 26 July 1200UTC.



A neat VXO Controlled transceiver built by Manfred Hempel, DL9CE.

2. **Frequencies:** (all + 5kHz), SSB: 7090, 14285, 21385kHz. CW: 3560, 7030, 14060, 21060kHz.
3. **Power Output:** QRP - 5 watts or less, QRPp - 1 watt or less.
4. **Call:** 'CQ U-QRP-TEST', Exchange: RST + serial Number + name of QRP Club (if a member)
5. **Groups:**
   A: Members of U QRP Club
   B: Members of QRP Clubs
   C: QRP Stations
   D: QRPp Stations
6. **Scoring:** QSO with group A - 5 points
   QSO with group D - 4 points
   QSO with group B - 3 points
   QSO with group C - 1 point

New Region 'P-100-0' - 1 point; New DXCC Country - 2 points; New Continent - 3 points; Multiplier: 1.5 for QRPp stations.

Logs must be submitted to U-QRP-Club (RA4UAP), P O Box 100, Saransk-31, 430031, Russia. Enclose a dollar or two IRCs for a result sheet.

AGCW - DL - QRP/QRP PARTY

THE GERMAN ACTIVITY GROUP TELEGRAPHY (AGCW-DL) runs a comprehensive range of CW contests and events, including a twice yearly QRP contest. The contest below will suit the operator who enjoys a shorter contest.

1. **Date and Times:** Each year on 1 May 1300UTC to 1900UTC open to all licenced amateurs and SWLs.
2. **Frequencies:** 3510 to 3560kHz and 7010 to 7040kHz. Call: 'CQ QRP'.
3. **Classes:** A: max output 5W (input 10W)
   B: max output 10W (input 20W)
   C: SWL
4. **Report:** RST + QSO number/Class (number irrespective of band). Example: 579002/A.
5. **Points:** Every QSO with own country - 1 point; other countries - 2 points. Each QSO with a Class A station counts double. Each station can only be worked once per band; SWL logs - both callsigns plus at least one report. Multipliers - each DXCC Country counts as one multiplier.
6. **Scoring:** The sum of QSO points multiplied by multiplier points' sum.
7. **Results:** If results are required send an SAE and an IRC.
8. **Deadline:** 31 May. Send all logs to: Stefan Scharfenstein, DJ5KX, Himberger Str 19a, D/W-5340, Bad Honnef 6, Germany.

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TRANSVERTERS from 10 metres for 2, 4 or 6 metres. 0.5W output RX gain 15dB, NF <1dB. Large box allows inclusion of 25W linear amplifier, see below. Types TRC2-10, TRC4-10, TRC6-10. **PCB KIT £55.50, PCB BUILT £89.50, BOX KIT £78, BOX BUILT £116.**
TRANSVERTERS for 1mW 10 metre drive, including buffer board, otherwise as above. Types TRC2-10b, TRC4-10b, TRC6-10b. **PCB KIT £64.25, PCB BUILT £100, BOX KIT £85.75, BOX BUILT £132.**
TRANSVERTERS from 2 metres for 4, 6 or 10 metres, 0.5W output. Includes interface to accept 0.5-5W drive. Types TRC4-2i (built only), TRC6-2i, TRC10-2i. New larger box to include linear. **PCB KIT £64.25, PCB BUILT £100, BOX KIT £85.75, BOX BUILT £132.**

LINEAR AMPLIFIERS to suit the transverters above. 0.5W in 25W out. Types TA2S3, TA4S3, TA6S3. **PCB KIT £60, PCB BUILT £80.75.**
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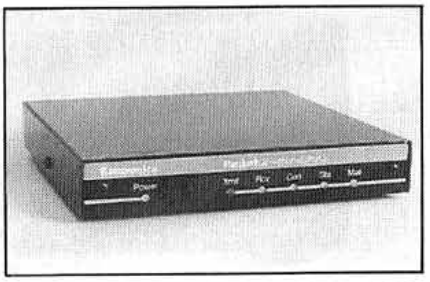

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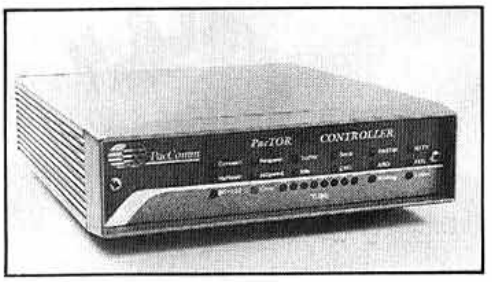

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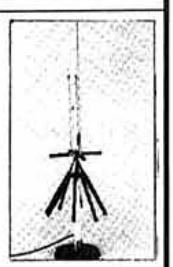

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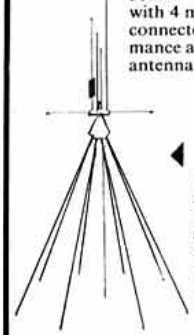

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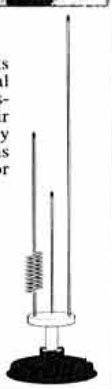

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CONTEST CLASSIFIED

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

HF RULES

21/28MHZ TELEPHONY CONTEST 1993

1. The General Rules for RSGB HF Contests *(RadCom* Jan 93) apply. ***Please note that this year the event is to be held one week earlier than its customary weekend. Attention is also drawn to the removal of the 10-minute QSY rule. Entrants are reminded that stations using packet or other spotting facilities must enter as Multi-operator stations.***

2. Eligible entrants: Overseas (inc EI) - all licensed amateurs. UK - as per General Rules.

3. When: 0700 to 1900GMT, Sunday 3 October 1992.

4. Sections:

(a) UK

(b) Overseas

(c) UK Receiving

(d) Overseas Receiving

Single-op and Multi-op entries accepted in transmitting sections.

5. Frequencies/Mode: 21150-21350kHz and 28450-29000kHz, Telephony only.

6. Contest Exchange: RST and serial number, commencing with 001. UK stations must also send County Code.

7. Scoring:

(a) UK stations work only Overseas stations, 3 points per QSO. Multipliers as per General Rules.

(b) Overseas stations work only UK stations, 3 points per QSO. Multipliers: 1 for each UK County worked on each band.

NOTE: *The same station may be contacted on both bands for QSO points and Multipliers.*

Total Score - The number of QSO points on each band are added together. The total number of multipliers on each band are added together. The final score is the total QSO points multiplied by the total multipliers.

8. Logs: Separate logs are required for each band. Overseas entrants may use the stationery provided by their National Society. UK entrants see General Rules.

9. Address for logs: RSGB HF Contests Committee c/o G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey CR7 7AF, ENGLAND.

10. Closing date for logs: UK entrants, postmarked by 1 November 1993. Overseas entrants, delivered by 1 Dec 1993.

11. Awards:

Section a: The Whitworth Trophy to the UK single-op winner. The Powditch Transmitting Trophy to the leading single-op entry on 28MHz. Certificates of Merit to the 2nd and 3rd placed entrants overall and on each band.

Section b: Certificates of merit to the three leading entrants. Subject to the decision of the RSGB HF Contests Committee, additional certificates may be awarded to the leading entrants from each continent/country.

Multi-operator entries: Certificates of Merit to the leading groups in each section.

RECEIVING SECTION

Rules as for the transmitting sections except where specified below. Holders of transmitting licences for frequencies only above 30MHz may enter the receiving section.

7. Scoring: UK SWLs log only Overseas stations in contact with UK stations participating in the contest. Overseas SWLs log only UK stations in contact with Overseas stations participating in the contest. Scoring and multipliers as for the transmitting sections.

8. Logs: Columns to be headed: time GMT; callsign of station heard; report/serial number sent by that station; County Code sent by that station(if applicable); callsign of station being worked; multiplier(if new); points claimed.

NOTE: In the column headed 'station being worked' the same callsign may only appear once in every three contacts except when the logged station counts as a new multiplier.

11. Awards (At the discretion of HFCC, dependant upon the level of support): The Metcalf Trophy to the leading UK entrant. The Powditch Receiving Trophy to the leading UK entrant on 28MHz. Certificates of Merit to the leading 3 entrants in each section, and the leader from each overseas country.

HF CONTEST CALENDAR

3/4 Apr	*SP-DX SSB*
4 Apr	ROPOCO-1 (Feb 93)
18 Apr	Low Power (Feb 93)
24/25 Apr	*Helvetia (Mixed Mode)*
1/2 May	*ARI DX (Mixed Mode)*
8/9 May	*CQ-M (RSF [Russia] Mixed Mode)*
15 May	County Roundup (SSB) (Feb 93)
16 May	County Roundup (CW) (Feb 93)
29/30 May	*CQ WPX CW*
5/6 Jun	NFD (Feb 93)
19/20 Jun	*All Asia SSB*
26/27 Jun	Summer 1.8MHz CW

HF RESULTS

SLOW CW CUMULATIVE CONTESTS 1992

This event was introduced to try and encourage new entrants to participate in CW contests. From the results it can be seen over a third of the logs were from first-timers to any HFCC CW contest. The new entrants were both newly licensed and the more experienced but not considered entering a contest before. From the results over 150 stations were active during the various contest sessions including a total of nine novice stations.

The contest proved so popular that there will be two series of contests in 1993, the first in April and the second in September. Also in response to suggestions, the frequency range allowed has been widened and the duration of each session extended to 90 minutes. There were comments asking whether the scoring for novices should be reduced, to avoid the pile-ups on them; however none of these requests were from the novices!

For those stations who wonder why their score has changed from their claimed score, this is due to errors found during checking. These include misreading of data and also of incorrect 'guessing' and assumption of names rather than listening fully for the sent name.

One station admitted to finding it rather hard to be sure of what 12WPM was and, on this occasion, no penalty was applied. Thanks to the more experienced stations who either entered or helped by being active during the sessions.

Finally congratulations to Philip Earnshaw, 2E0ABI, for winning and Jenny Cartlidge, 2E0ABC, for coming second. Also to Fraser Robertson, G4BJM, and Keith Dyer, G0KWD, for first and second placed full calls. G0KWD and Michael Jenkins, G0IZU, were also the highest placed first time entrants. Malcolm Harrington, BRS20249, was the only listener entry. Certificates will be on their way to them.

G4HTD

TRANSMITTING SECTION

Posn	Call	Code	7/9	15/9	23/9	1/10	9/10	Score
1	2E0ABI*	1C1-	286	CK	393		400	1079
2	2E0ABC*	1C11	CK	200	180	CK	200	580
3	G4BJM	2C1-	140	143		CK	125	408
4	G0KWD*	2C1-	CK	145	CK	125	125	395
5	G4OFR	2C15		125	111		135	371
6	2E0ACY*	1C1-		80	127	114	CK	321
7 =	G4ARI	2C14	115	100		105	CK	320
7 =	G4DDX	2C1-	CK	105	100	115	CK	320
9	G3MCK	2C1-	90	CK	115	100	CK	305
10 =	G3ZHZ	2C1-	CK		93	105	105	303
10 =	G3HEJ	1Q1-	CK	105		90	108	303
12	G0IZU*	2C1-	CK	83	108	CK	105	296
13	G2HLU	2C12	90	99	105			294
14	G3HAL	2C1-	85	CK	CK	93	109	287
15	G4BLI	2C1-	CK		80	90	110	280
16	G3JSR	2W1-	96	CK	81	CK	83	260
17	G0IBN	2C1-	CK	80	130	35	CK	245
18	G3XKD*	2C1-	CK	68		55	113	236
19	G4XPE	2C11		83	40	110		233
20	G0PAE*	2C1-	CK	60		85	85	230
21	G0KKG	2C1-	108			57	64	229
22	G0IRL*	2C1-	CK	63	75	CK	88	226
23	G3IQF	2C13	60	70		70	CK	200
24	GD0LQE	2C1-	CK	60	56	CK	70	186
25	G4BUO	2C14	130	55				185
26	G0MHC*	2C1-	90		55	30		175
27	G3HYJ	1C1-	CK	40	68	65		173
28	G4EDR*	2G1-	45	60	50			155
29	G0NEB*	2G1-	CK	CK	50	35	65	150
30	G0KJN	2C1-		CK	45	55	48	148
31	G0EZA*	2C1-		23	61	60		144
32	G0PDZ*	2Q11	23		73		45	141
33	G3LQI/M	2G1-		60	80			140
34 =	G0LUZ	2G1-		53	40	45		138
34 =	G0HDB*	2C1-		CK	CK	63	75	138
36	G3PJK*	2C16	30	33		CK	51	114
37	G0IWZ	2---	CK	30	CK	28	35	93
38	G0PUB	2Q1-		25	65			90
39	G6OM*	1C1-	18	CK	CK	35	25	78
40	G0SJC	2G1-		20	15			35

RECEIVING SECTION

1	BRS20249	-W	12	CK	98	84	70	252

Checklogs gratefully received from G0AEV, G0MRH, G3BPM, G5LP

SSB FIELD DAY 1992

This event was marred, for many, by indifferent conditions. Ten metres was largely ignored, although the leaders found some useful multipliers there, and 15m was little better. Even 20m was hard going with a small antenna and a number of restricted stations reported being unable to work out of Europe. Most of the traffic was handled on the LF Bands, where conditions were generally reported as good to EU and there was plenty to work. A few DX stations appear in the leading logs: these were predominantly in North and Central America, with a handful of VK/ZL on Forty.

The weather also conspired to make life difficult for some, with howling gales, torrential rain, fog and frost reported from varying parts of the country.

Many entrants commented adversely on the Asian contest running simultaneously. This is not a new problem, but as yet it has not been possible to find a new date which is agreeable to all the IARU Region 1 Societies involved.

The majority of logs were well-presented (well over half being computer or WP-generated) but a few used programs which fail to conform to the format specified in the rules. One computer-log showed duplicates clearly marked, but still claimed the points! Also, three groups reported total or partial loss/corruption of data due to unexpected failure of on-site computers!

The recent political situation in Europe created confusion as to what counted as a multiplier; also a few entrants seemed still to be unaware of German reunification! It was the adjudicators' decision to rescore **all the logs** to a common standard and many groups will find their scores considerably changed. It was only because this rescoring was being carried out across the board that the two groups who could not be bothered to identify their multipliers or add up their QSO points have had this done for them and have been included in the lists. Do not expect to be so lucky again!

As always, there were many requests for detailed descriptions of equipment/antennas in use. The new 'equipment code' is not of much use here, being too 'broad' in its banding, and lack of space prevents a full listing. However, to see how the other half lives - G3WAS/P: TS940 + TL922, TH7 @ 55', 2-ele 7MHz Quad @ 60', 3.5MHz loop @ 85'. GD3FVA/P TS850 + TL922, 3-ele tribander & dipoles. G3VHB/P: FT1000 + TenTec Titan, TH5 @ 60', 4-ele monobander for 20m @ 95', 2-ele monobander for 40m @ 100', 3.5MHz inverted vee @ 50'.

Back in the real world - G3GRS/P: IC735 + Vertical diamond loop, apex 50'. G3PGU/P: TS850S + 275' centre-fed @ 45'. G3PRC/P: FT1000 + 100' Doublet @ 49'.

Some groups expressed doubts as to what was 'within the spirit of the rules' for restricted antennas. Planar loops *(whether vertical or horizontal)* and V-beams, provided they meet the other criteria, are acceptable and there is no reason why a restricted antenna should not be rotatable. The HFCC will be glad to make a ruling in any individual case.

Congratulations to the award-winners.

G3WRR, G3UFY

OPEN SECTION

Posn		Call	Club/Group	80	40	20	15	10	Mults	Total
1	#	G3WAS/P	LICHFIELD ARS 'A'	894	1429	1434	577	154	171	767448
2	*	G03FVA/P	S MANCHESTER RC	799	1308	1574	280	457	133	587594
3	*	G3VHB/P	LICHFIELD ARS 'B'	728	1246	1635	462	68	135	558765
4		GM5VG/P	WINDY-YETT CG	1037	839	1621	489	4	117	466830
5		G0PNW/P	NORTH WEST AR CG	1182	1249	1075	216		105	390810
6		G4HRS/P	HORSHAM ARS	831	791	1473	106		102	326502
7		GW4CC/P	SWANSEA RS	928	678	1401	95	2	90	279360
8		G4SZD/P	N.E.E.	698	594	1378	270		91	267540
9		GM3ZET/P	LERWICK RC	644	447	1087	475	53	96	259776
10		G3ASR/P	EDGWARE & DRS	836	957	654	156	50	91	241423
11		G4FRS/P	FARNBOROUGH & DRS	783	447	1289	122	15	88	233728
12		GU3HFN/P	GUERNSEY ARC	682	101	1437	187		91	219037
13		G4IRC/P	IPSWICH RC	1104	795	552	34	2	86	213882
14		G4RSE/P	S ESSEX ARS	660	926	767	7		67	158120
15		G4FOX/P	MELTON MOWBRAY ARS	682	536	696	102		72	145152
16		G3GHN/P	CLIFTON ARS	492	561	619	92	16	72	128160
17		G3MDG/P	CHESHAM & DARS	904	891	444	11		52	117000
18		GW3EOP/P	PORT TALBOT	415	182	635	269	2	71	106713
19		G0MEG/P	11TH HOUR CG	517	651	369	24		63	98343
20		G3VGG/P	BROMSGROVE & DARC	423	197	510	40	54	68	83232
21		GW0KRC/P	KIDDERMINSTER & DARS	769	434	145	45		56	78008
22		GM4KNO/P	THE ALSO-RANS	711	187	501			55	76945
23		G0JJN/P	HUCKNALL RR ARC	525	529	150	88		48	62016
24		G6YB/P	BRISTOL CG	1743					32	55776
25		GM3USL/P	CUNNINGHAME & DARC	322	185	462	19		54	53352
26		G3YRC/P	GT YARMOUTH RC	446	349	191	4		39	38610
27		G3XZW/P	TAUNTON & DARC	678	317	207			24	28848

RESTRICTED SECTION

1	*	G3GRS/P	GRAVESEND RS	591	734	544	251	53	97	210781
2	*	G3PGU/P	STRATF'D-U'N-AVON & DRS	773	693	645	167	2	79	180120
3	*	G3PRC/P	PLYMOUTH RC 'A'	633	745	1112	33	5	71	179488
4		G4AYM/P	GLOUCESTER ARS	618	542	559	457		75	163200
5		G6RC/P	CRAWLEY & REIGATE	660	491	479	267	10	83	158281
6		G4FRF/P	FLIGHT REFUELLING ARS	649	610	437	463	20	71	154709
7		GW4EZW/P	NEWPORT ARS	428	714	983	17	2	72	154368
8		G3UES/P	ECHELFORD ARS	939	696	390	57	10	71	148532
9		G3ULT/P	READING & DARC	760	482	554	75		74	138454
10		G4JBR/P	EXMOOR RC	454	506	474	115	21	87	136590
11		G2XP/P	SUTTON & CHEAM RS	1240	387	248	99	16	62	123380
12		G3SFG/P	SOUTHGATE ARC	794	620	676	22		55	116160
13		G6QM/P	QUEEN MARY AR CG	586	587	338	72	15	70	111860
14		G3ZME/P	TELFORD & DARS	732	678	346	61		59	107203
15		G3NJA/P	TORBAY ARS	719	454	364	229		58	102428
16		G0LJQ/P	THATCHAM AR CG	635	456	490	7		60	95280
17		G4HRC/P	HAVERING & DARC	769	706	209	12		56	94976
18		G3SEM/P	INDIVIDUAL ENTRY	579	669	140	113		61	91561
19		G6UO/P	STOCKPORT RS	748	535	368	33		48	80832
20		G0PWE/P	BORDER REIVERS	359	520	458	2		60	80340
21		G3SJJ/P	E NOTTS CG	437	548	440	36		53	77433
22		G4FUR/P	WIMBLEDON/COULSDON	342	497	461	39	14	56	75768
23		G0FDX/P	CENTRAL LANCS ARC	111	820	349	23		56	72968
24		G0NKL/P	SUBMARINE ARC	570	285	350	9		57	69198
25		G3IZD/P	BARROW-IN-FURNESS CG	323	211	663	35		56	68992
26		G4FBS/P	HORNDEAN & DARC	487	226	267	13	5	53	52894
27		G2UG/P	HALIFAX & DARS	345	271	345	122		47	50901
28		G3WQK/P	SOUTHDOWN ARS	421	269	194	61	7	46	43792
29		G0IVZ/P	PLYMOUTH RC 'B'	82	425	399	74	5	44	43340
30		G0JQA/P	HAMBLETON ARS	546	297	70	9	2	40	36960
31		G4ECT/P	CHESHUNT & DARC	108	387	331	9		37	30695
32		G3BPK/P	WIGAN-DOUGLAS V ARS	374	218	257	8		35	29995

Checklogs gratefully acknowledged from: G3PRI, G2HLU*, LZ2HM/P, SP-0189-6D, SP3DIK, SP4AVG, SP6YFU*, SP7FQI, SP9MDY/P, SP9PDK/P,

Northumbria Trophy
* Certificate of Merit

2ND 1.8MHZ CW CONTEST 1992

Conditions for this contest seemed favourable for both local and DX working, with a number of stations working the USA and Canada, and also East into Asia. It is interesting to note the effect of antenna type on the composition of contacts made - even the leading stations missed out on a number of contacts because of the propagation patterns of their aerials.

48 different counties were logged, but 35% were unrepresented. How about activating some of those rare ones next time.

Logs were good with a number of entrants making use of computers, both real-time and post-contest. Sadly, the receiving section was poorly supported with no UK entries at all.

The winner of the Victor Desmond Trophy is Fred Handscombe, G4BWP, whose almost flawless log included 70 bonus contacts. Congratulations also to the runners-up G3SJJ and G3TBK. In the Overseas section things were very close indeed: DL5JQ just outpointed EI6GF and EI5DI for top spot, but only 5 points separated the top three entrants. Thanks also to G0HGA and PA3BTH for their checklogs.

G4DJX

UK TRANSMITTING

Posn	Call	QSOs	Bonus	Score		Equip
1 #	G4BWP	197	70	940	3C	IC781
2 *	G3SJJ	195	61	890	3C6	TS930S
3 *	G3TBK	181	65	868	4C8	FT102
4	G0IVZ	141	61	728	3C6	OMNI VI
5 =	G3VYI	139	59	712	4G4	TS930 + AMP
5 =	G3HEJ	139	59	712	4Q5	FT-ONE + AMP
7	G3RXP	138	57	699	3C6	TS930
8	G3RSD	120	57	645	3C	FT101Z
9	GM4SID	119	55	632	3C	TS850S
10	G3YAJ	115	55	620	3C	TS850S
11	G4FNL	106	52	578	3C3	TS930S
12	G4OFR	102	54	576	3C5	TS430S
13	G4NOK	94	55	557	3C	TS940
14	G0JQN	96	51	543	3W2	OMNI V
15	G4CZB	96	49	533	3W2	CORSAIR II
16	G3KNU	86	49	503	3W	TS690S
17	G3ZGC	95	43	500	3W	IC751
18	G0LZL	83	49	494	3C3	IC740
19	G4OGB	88	45	489	3C5	TS830M
20	GW3JI	79	48	477	3C	TR7
21	GM0RHP	83	41	454	3C3	T/R 4XC
22	G3BGM	70	47	445	3C2	FT101ZD
23	G2HLU	75	43	440	3G2	TS940S
24	G3GMS	64	45	417	3G2	IC735
25	G3BPM	72	38	406	3C	TR7
26 =	G3ZBU	65	42	405	3W	TS430
26 =	G3IQF	65	42	405	3W3	TS140S
28	G3AWR	66	37	383	3Q	CORSAIR
29	G0ADM	59	40	377	2C	FT757GX II
30	G3UFY	61	38	373	4G7	CORSAIR II +AMP
31	GW4HBK	66	33	363	4W4	FT902
32	G3WRR	56	38	358	3W3	FT102
33	G4BVH	60	33	345	4C	TS940
34	G3FVW	54	36	342	2C	FT747GX
35	GW4KVJ	30	25	215	3C	TS830S
36	GM3UM	31	21	198	3W	FT401
37	G3HAL	28	21	189	3G	TS530SP
38	GW3SB	23	19	164	3W	FT101ZD

OVERSEAS TRANSMITTING

1 *	DL5JQ	59	35	352		
2 *	EI6GF	56	36	348	3C3	TS440S
3 *	EI5DI	59	34	347	3C1	TS830
4	SP5ZIM	53	32	319		
5	LA2UA	48	34	314	3W2	TS830S
6	OH1TN	37	25	236	2W	IC765
7	ES5RY	32	24	216	3W	TS820S
8	HB9BNB	32	23	211	3W	T/R4XC
9	YL2TW	31	22	203	2C	
10	LA8WG	25	24	195	3C	FT102
11	ON6TJ	26	23	193	3Q	FT757
12	DL9MWG	25	21	180		FT767GX
13	DF3OL	25	17	160	3C	OMNI V
14	UV3DRU	15	14	115		
15	OK1GR	16	11	103	2W	HB TSCVR
16	DL1DWT	14	10	92	2C	SEG 15D
17	RB4INR	9	9	72	2C3	HB
18	OG7NW	9	8	67	3W	IC765

RECEIVING SECTION

OVERSEAS

1 *	ONL-383	250
2	SP4-208	16

UK - NO ENTRIES.

Victor Desmond trophy

* Certificate of merit

All antennas reported were single-element. The corresponding digit has therefore been omitted from the equipment codes. See General Rules for details of codes.

VHF RULES

70MHZ TROPHY/ SWL

Date: 19 Sept

Time: 0900-1600GMT

General Rules apply. Rule 14 applies (County/Country multipliers). QRA information including county code or county name to be exchanged. eg JO01IN ESSEX OR ESX, Full QTH information is NOT required.

Sections: F Single operator fixed, O All other, L Listeners

Award: The overall winner will receive the VHF Managers Trophy

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

1.3 & 2.3GHZ CUMULATIVES

Date: 5/20 Oct
4/18 Nov
6 Dec

Time: 2030-2300 Local

General Rules apply, including rule 10.

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

Scoring: One summary sheet including all entries, plus a cover sheet. Best three logs of maximum 5 days, please send all logs for checking purposes, as normalisation will select the best three.

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

432MHZ - 24 GHZ RSGB: 1.3GHZ TROPHY AND SWL CONTEST: 2.3GHZ TROPHY AND SWL CONTEST AND IARU 432MHZ-24GHZ CONTEST

Date: 2/3 Oct

Time: 1400-1400GMT

General Rules apply. IARU and RSGB

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

Scoring: RSGB radial ring on 432MHz, 1pt per Kilometre all other bands. IARU 1pt per kilometre (logs will be forwarded)

Separate cover sheets and logs for RSGB and IARU (if you want to enter both contests that means TWO 427's and 4422's).

1296MHZ TROPHY: 2.3GHZ TROPHY:

Time: These will run between 1400 and 2200h on the Saturday.

Stations can enter all contests (IARU or RSGB 24h or 1.3 and/or 2.3Ghz Trophies) but please separate logs and cover sheets for each contest.

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

432MHZ CUM.

Date: 13/28 Oct
12/29 Nov
14 Dec

Time: 2030-2300 Local

General Rules apply, including rule 10.

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

Scoring: One summary sheet including all entries, plus a cover sheet.

Best three logs of maximum five days, please send all logs for checking purposes, as normalisation will select the best three.

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

2ND 23CM AND 13CM FIXED/SWL CONTESTS

Date: 31 Oct

Time: 1600-2000GMT

General Rules apply.

Scoring: Two contests running concurrently, seperate cover sheets and logs. A Summary sheet is NOT required.

Sections: For both contests. S Single operator fixed, M Multi operator fixed, L Listeners

Adjudicator: GW8GSQ, S Thompson, 8 Nant Lais, Corntown, Bridgend CF35 5SA.

144MHZ RSGB CW 6 HOUR

Date: 7 Nov

Time: 0800-1400GMT

General Rules apply

Scoring: 1pt per Kilometre.

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

144MHZ CW MARCONI/RSGB 24 HOUR

Date: 6/7 Nov

Time: 1400-1400GMT

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

Scoring: Logs for Marconi contest will be forwarded. Please send two cover sheets and two copies of the log if you are entering both RSGB 24 hour and Marconi 24 hour contest. You can enter either 6 hour or 24 hour contest, but NOT both.

Adjudicator: For 6 hour and 24 hour contests, G8HHI, J Pilags, 43 Bartons Drive, Dungells Lane, Yateley, Camberley GU17 7DW

144 MHZ AFS & FIXED & SWL

Date: 5 Dec

Time: 0900-1700GMT

General Rules apply.

Sections: A AFS groups (up to 5 stations acting as a team, where total points of each individual are added to make team total). Clubs or groups must be affiliated to the RSGB (individual operators do not have to be RSGB members). Clubs or groups can submit as many teams as they wish, please mark entries team A B C etc: S Single operator: M Multi operator: L Listeners

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

70, 144 AND 432MHZ FIXED STATION

Date: 26/27/28/29 Dec

Time: 1400-1600GMT

General Rules apply. Each band serial starts 001. Each day carry on with sequential serial number (if on first day you worked 20 stations then on day two start with serial 021)

Single band entries will be accepted.

Rule 14 applies (County and Country multiplier)

Scoring: use radial ring for all distances. County and Country multiplier can be be claimed for each band. eg on day one you work five stations on 2m for 30 radial points, and four counties and three countries, and on the same day work eleven stations on 70cm in five counties and two countries, with 50 radial ring points the days total will be (4 + 3) X 30 + (5 + 2) X 50. Totalling up you get 7 X 30 = 210 and 7 X 50 = 350 equals 560 points. It does not matter that on 4m, 2m or 70cm you worked the same counties or countries or even the same stations. On the next day you start again with the counties or countries (you can work the same county or country on each day and on each band, all will count as multipliers).

Please include list of claimed county/ country multipliers for each day, and band.

Once you have totalled each day then just add all the daily totals together to get your final score! And the best of luck.

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

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

10GHZ CUMULATIVES - 1992

Congratulations to Mike Walters, G3JVL, who wins the G3RPE Memorial Trophy and Plate as overall winner and leading fixed station. He wins this for the second successive year. Congratulations to G8KQW, runner-up, and to G8AYY as the leading wideband-only station. Thanks to G4BCH for a check log.

The number of contacts made and scores are up by 50% this year, reflecting the increasing activity on this band. The number of home (fixed) stations is also growing. Most contacts were made using narrowband equipment, but some wideband contacts are also reported, with some stations running wideband only.

The logs were generally of a good standard, except that most entrants sent in logs for only their best three events. The intention was that logs for all active events should be submitted for analysis. There also seems to have been some confusion as to whether cross-band contacts should count as one or a half-contact. The majority counted the contact as one QSO, whereas it should have counted as a half-contact. Where necessary, logs were corrected! *G4KNZ (Adjudicator)*

Pos	Call	Points	QSOs	Locator(s)	Power	Antenna	Best DX	km
1	G3JVL	12612	85	IO90MS	20W	0.9m	G3PHO/P	333
2	G8KQW/P	10769	85	IO91GI	50W	1.4m	F6DKW	390
3	G3FYX/P	10528	71	IO93BA,81PH,91GI	3W	0.9m	G3NWU/P	364
4	G3PHO/P	9571	59	IO93EH	0.2W	0.6m	G6XM/P	338
5	G3ZME/P	8710	69	IO82QL,82NN,82RQ	0.8W	0.8m	G3LQR	292
6	G4BRK/P	7513	65	IO91FN	0.3W	1.2m	G3PHO/P	234
7	G4JNT/P	7113	53	IO80UU	10W	n/a	G3LQR	295
8	G0API/P	6719	50	IO80UU	0.1W	0.5m	G3LQR	295
9	GW4MAP/P	6578	44	IO82JG	0.2W	0.6m	G8KQW/P	295
10	G4FCD	4250	39	IO91JV	6W	0.6m	G3PHO/P	210
11	G3JMY/P	3640	35	IO81PH	0.3W	0.5m	G3PHO/P	211
12	G3JMB/P	2414	29	IO90TV	0.1W	0.6m	GW4MAP/P	245
13	G8DKK	2328	25	IO91VX	12W	0.3m	G3PYB/P	275
14	G3LYP(/P)	1628	21	IO91OO,91MP	20W/0.3W	0.4m	G3ZME/P	164
15	G0API	1167	12	IO80XS	0.1W	0.5m	G4MAP/P	184
16	G8AYY/P	280	5	IO93AD,93AF	0.01W(WB)	0.5m	G3ZME/P	84
17	G4KNZ/P	169	4	IO90MX,83LC,93UK	0.001W	0.5m	G3PHO/P	85

24GHZ CUMULATIVES 1992

Pos	Call	Points	QSOs	Best DX	km	Power	Antenna
1	G4KNZ/P	483	8	GW4JJW/P	90	50mW	18in dish
2	G8AYY/P	211	4	G4KNZ/P	86	7mW	12in dish
3	G3PHO/P	202	5	G4KNZ/P	85	7mW	20in dish

Congratulations to the overall winner, G4KNZ, who had the distinction of being active, and making contacts, in all of the seven activity days! It is encouraging to see an increase in 24GHz activity this year, reflecting the growing interest in this band. From the logs submitted, some 16 stations were active which must be something of a record. Let's hope for even more activity in 1993 - as well as a few more entries, please! *G3WDG (Adjudicator)*

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VHF RESULTS

OCTOBER 1992 UHF CONTEST RESULTS

This year event showed a static field in the Multi-Operator Section, but I am pleased to be able to say that we almost had a doubling in the number of single operator entries. This has to be a positive move, and remember that this is the prime European UHF/microwave contest of the year, so there is real DX to be worked by the increasing number of fixed stations active on the microwaves. Having said that, activity was very much concentrated on the lower three bands, and on that ever rising star, 10GHz. From the UK, there was much to work on 10GHz, with 37 different callsigns appearing in the logs.

Congratulations to the overall winners and runners-up, Nigel Smith, G4EQD, the Hadrabs and Windbreakers Group, John Smith, G8ZQB and the Loadsamoney CG, and also to the individual band winners and runners-up who will all receive certificates. On 1.3GHz, Rob Briggs, G1GHA, also takes a certificate for being the best placed single operator fixed station running 25W or less and 1 antenna and who was otherwise uncertificated. *Andy Cook, G4PIQ*

SINGLE OPERATOR OVERALL RESULTS

Pos	Call	Loc	432	1.3	2.3	3.4	5.7	10	24	Total
1	G4EQD	93QD	0	197	1000	0	0	1000	0	2197
2	G8ZQB	92JN	51	111	958	0	0	0	0	1120
3	G3XDY	02OB	0	1000	0	0	0	0	0	1000
3	G4PIQ	01MU	1000	0	0	0	0	0	0	1000
5	G4LRT	92LJ	19	65	219	0	0	407	0	709
6	G0RRJ	91FE	0	184	361	0	0	0	0	546
7	G6RAF	92QP	453	0	0	0	0	0	0	453
8	G4WKN	92OG	302	91	0	0	0	0	0	393
9	G8FBG	91SG	154	220	0	0	0	0	0	374
10	G3MEH	91QS	0	242	0	0	0	0	0	242
11	G1GHA	92CM	224	24	0	0	0	0	0	248
12	G7AZP	90AS	73	0	0	0	0	0	0	73

MULTI OPERATOR OVERALL RESULTS

Pos	Group	Loc	432	1.3	2.3	3.4	5.7	10	24	Total
1	Hadrabs & Windb'k'rs	02TG	687	1000	1000	1000	1000	569	680	5256
2	Loadsamoney CG	01KJ	1000	435	511	155	0	1000	1000	4102
3	Flight Refuelling ARS	80UU	255	225	87	0	0	588	0	1155
4	Hesperus CG	01QX	164	360	0	0	0	84	0	608
5	South Birmingham RS	92GB	86	164	265	0	0	0	0	514

432MHZ SINGLE OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1	G4PIQ	2066	1000	146	01MU	300	26Y	DL2NBU	740
2	G6RAF	935	453	87	92QP	150	4 x 21Y + 2 x 19Y	DF0GVT	670
3	G4WKN	624	302	72	92OG	100	2 x 21Y + 21Y	DK0BN/P	652
4	G1GHA	462	224	63	92CM	100	21Y	DB8KJ	596
5	G8FBG	319	154	57	91SG	400	4 x 33Y	DK5WO	472
6	G7AZP	151	73	25	90AS	100	2 x 18Y	G4VIX/P	298
7	G8ZQB	105	51	23	92JN	30	19Y	G0EHV	265
8	G4LRT	39	19	12	92LJ	400	2 x 18Y	G7AZP	191

432MHZ MULTI OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1	G0RDI/P	3429	1000	261	01KJ	400	8 x 19Y	DL0KI	790
2	G4VIX/P	2355	687	189	02TG	300	8 x 21Y	DL2ARD/P	755
3	G4RFR/P	875	255	83	80UU	400	2 x 30QLY	DC8VJ	695
4	G0GJV/P	561	164	51	01QX	400	2 x 21Y	DL2NBU	737
5	G8OHM/P	294	86	50	92GB	300	21Y	PA6C	552

1296MHZ SINGLE OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1	G3XDY	18434	1000	68	02OB	300	4 x 23Y	OK1KIR/P	838
2	G3MEH	4466	242	34	91QS	100	1.05m	PA0WMX	425
3	G8FBG	4049	220	33	91SG	45	55Y	PA0PLY	396
4	G4EQD	3634	197	20	93QN	80	27QLY	G0FRR/P	321
5	G0RRJ	3399	184	20	91FE	100	55Y	DF0HS/P	529
6	G8ZQB	2049	111	19	92JN	50	27QLY	G4XUM/P	208
7	G4WKN	1685	91	18	92OG	50	4 x 23Y	G8ESB	225
8	G4LRT	1189	65	14	92LJ	120	27QLY	G4XUM/P	225
9	G1GHA	441	24	5	92CM	10	23Y	G0JBA	215

1296MHZ MULTI OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1	G4JAR/P	21049	1000	78	02TG	250	2.5m	DF0WS/P	814
2	G4IEV/P	9166	435	51	01KJ	400	1.8m + 3.6m PB	PI4GN	465
3	G4DDN/P	7573	360	35	01QX	200	55Y	DC9OD	575
4	G0FRR/P	4745	225	26	80UU	100	4 x 50Y	GD4GNH	399
5	G1OHM/P	3448	164	28	92GB	120	2 x 55Y	ON7WR/A	435

2320 MHZ SINGLE OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1	G4EQD	645	1000	4	93QN	10	49QLY	G4DSF/P	261
2	G8ZQB	618	958	7	92JN	4	27QLY	G0EMG/P	208
3	G0RRJ	233	361	2	91FE	35	25Y	G4DSF/P	169
4	G4LRT	141	219	3	92LJ	6	46QLY	G6SFR/P	192

2320MHZ MULTI OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1	G4JAR/P	5141	1000	22	02TG	50	2.5m	F1FHI	611
2	G4DSF/P	2628	511	14	01KJ	25	1.8m	PA0WMX	323
3	G8GDZ/P	1361	265	9	92GB	30	1.2m	PE0MAR/P	382
4	G6SFR/P	445	87	5	80UU	10	1.5m	G6PHJ	213

3400MHZ MULTI OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1	G4EZP/P	638	1000	4	02TG	7	1.2m	PA0EZ	243
2	G8IFT/P	99	155	1	01KJ	1	1.4m	G3LQR	99

5700MHZ MULTI OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1	G4EZP/P	173	1000	1	02TG	0.3	1.2m	PE0MAR/P	173

10368MHZ SINGLE OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1	G4EQD	231	1000	2	93QN	4	0.6m	G3ZME/P	160
2	G4LRT	94	407	2	92LJ	0.12	0.4m	G4FCD	57

10368MHZ MULTI OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1	G8KQW/P	3532	1000	22	01KJ	100	1.4m	GW8RDX/P	297
2	G0API/P	2078	588	14	80UU	10	1.6m	G3LQR	295
3	G4EZP/P	2009	569	13	02TG	40	0.6m	F6DKW/P	391
4	G4BRK/P	298	84	3	01QX	3	1.5m	PE0MAR/P	188

24000MHZ MULTI OPERATOR

Pos	Callsign	Score	Norm	QSO	Loc	Pwr	Ant	Best DX	km
1	G8KQW/P	25	1000	1	01KJ	0.005	0.5m	G0KZP/P	25
2	G4EZP/P	17	680	1	02TG	0.007	0.3m	G6CMS/P	17

1992 1.3GHZ AND 2.3GHZ CUMULATIVES

On 1.3GHz this year we saw a small increase in the entries for the Single Operator Fixed Station section, however, the entry and activity level on 2.3GHz remained disappointingly low. The results show that, even with a relatively small amount of time spent, it is possible to be successful on this band. I know there are a reasonable number of stations equipped for 13cm, so why not give the band an airing during the 23/13cm fixed station contests in April and October - and of course during the other events during the year which include the band.

Conditions were generally flat; the exception being the 3rd session - this is clearly shown by the results. Congratulations go to John Quarmby, G3XDY, who is showing a very masterful performance on this band this year, the South Birmingham Radio Society, G8OHM, J. Fell, G0API, and the Wirral & District ARS, G4MGR. Unfortunately, no one was eligible for the 25W + 1 antenna award! On 13cms, congratulations the joint winners, S Berry, G4LRT and John Smith, G8ZQB. *G4PIQ*

1296MHZ SINGLE OPERATOR FIXED SECTION

Pos	Callsign	6 Oct	21 Oct	6 Nov	19 Nov	7 Dec	Norm	QSO	Loc	Pwr	Ant	km
1	G3XDY	141	80	241	94	110	3000	88	02OB	300	4 x 23Y	725
2	G0API		57	166	37	97	2283	50	80XS	150	4 x 39Y	501
3	G4WKN	123	56	118	42	12	2062	75	92OG	50	4 x 23Y	331
4	GD4GNH	114	36	109	59		1888	32	74QD	10	4 x 23Y	452
5	G8ZQB	76	38	86	41	29	1450	64	92JN	50	27QLY	286
6	G3MEH	52	18	113	39	55	1384	70	91QS	100	48QLY	350
7	G4LRT			61	27	40	904	39	92LJ	80	27QLY	193
8	G8NEY	44			17	23	702	16	81VK	40	55Y	245
9	G4HRY	20		64		26	644	36	92GK	30	4 x 23Y	283

1296MHZ ALL OTHERS SECTION

Pos	Callsign	6 Oct	21 Oct	6 Nov	19 Nov	7 Dec	Norm	QSO	Loc	Pwr	Ant	km
1	G8OHM	110		102	37	72	3000	69	92AJ	150	4 x 23Y	264
2	G4MGR	124	40	10		21	2292	52	83KH	100	23Y	325

2320MHZ SINGLE OPERATOR FIXED SECTION

Pos	Callsign	6 Oct	21 Oct	6 Nov	19 Nov	7 Dec	Norm	QSO	Loc	Pwr	Ant	km
1	G8ZQB	7		2	1	2	3000	7	92JN	4	1.5m	154
1	G4LRT			2	2	2	3000	6	92LJ	10	46QLY	23

1992 144MHZ CUMULATIVE CW CONTEST

A reasonable entry this year with some spectacular DX to be had.

Once again there seems to be some misunderstanding of normalisation (see footnote with 432MHz Cumulative results).

Congratulations to G4PIQ who wins by a large margin, and to G0ADH as worthy runner-up. Commiserations to G4WKN who closely followed. Congratulations also to G4OUT who gets a certificate for being the highest placed station using a single yagi and 25w or less. Welcome also to DK0TZ who also gets a certificate. Thanks also for checklog from G3MEH.

By the way one station (a certificate winner) lost his best DXbecause the locator was read incorrectly, it just happens that the station in question entered the contest and he was in JN48 not JN42, 59 points lost for this one. *G4DEZ*

Pos	Call	Pts	Ant	Pwr	Sep 1	Sep 16	Oct 1	Oct 16	Nov 11	B/DX	Km
1	G4PIQ	3000	4x15	400	261/919	2031/1000	658/1000	0/0	291/1000	OL7VYT	1256
2	G0ADH	2389	13	50	284/1000	0/0	152/231	93/781	177/608	DJ0VZ	807
3	G4WKN	2382	17	300	226/795	1113/548	335/509	119/1000	171/587	OE3JPC	1312
4	G0RUZ	1790	4X17	20	0/0	618/304	176/267	114/957	154/529	DL7ULM	1001
5	G4ZVS	1665	13	80	75/264	935/460	84/127	87/731	138/474	SP9EWV	1471
6	G4OUT	1284	12	25	111/390	415/204	81/123	68/571	94/323	OK1FZA	1173
7	G4WPS	1138	5	10	81/285	103/50	94/142	75/630	65/223	G0AFH	336
8	G4XPE	605	10	10	0/0	117/57	60/91	42/353	47/161	DJ0VZ	611
9	G0OJA	54	9	25	0/0	0/0	31/47	0/0	2/7	GI4OWA	

OVERSEAS SECTION

1	DK0TZ	1000	11	200	0/0	447/1000	0/0	0/0	0/0	GW3YDX	955

DIRECTION FINDING

MID THAMES TRIPLE NIGHT EVENT

The Eric Mollart Memorial Trophy triple night event took place on 24 October 1992. The start point for the competition was the Three Locks picnic area (NGR 892283) situated approximately 3 miles north west of Leighton Buzzard.

The competition was map reference OS165 (Aylesbury and Leighton Buzzard).

Station A, G4MDF/P, was located nine miles from the start of the Ivinghoe Hills (NGR 961155) at a bearing of 150 degrees.

Station B, G3UJO/P, was located on a disused railway line approximately eight miles from the start (NRG 862158) at a bearing of 193 degrees.

Station C, G4XWP/P, was located south of the river Thame on the North Buckinghamshire Way 11.5 miles from the start (NGR 778135) at a bearing of 217 degrees.

Pos	Name	Club	Time of Arrival at Transmitters A	B	C
1	B Bristow	Mid Thames	20.45	21.58	23.37
2	T Gage	Mid Thames	20.56	21.59	23.38
3	G Whenham	Coventry	20.35	21.58	23.39
4	C Plummer	S Manchester	20.57	22.04	23.40
5	D Holland	S Manchester	20.39	22.04	23.51
6	M Standen	Mid Thames	20.53	22.11	23.52
7	A Collett	Colchester	20.51	22.03	23.52
8	A Simmons	Mid Thames	21.05	22.39	-
9	P Tyler	Mid Thames	23.50	-	22.09
10	B Gray	Mid Thames	23.51	-	22.09
11	B Pechey	Mid Thames	-	22.40	-

RSGB 1993 VHF/UHF Contests Calendar

11 Apr	1st1296/2320MHz Fixed (Feb 93)
1/2 May	432MHz-24GHz
2 May	432MHz Trophy
15/16 May	144MHz
13 Jun	50MHz Trophy
19 Jun	432MHz FM
20 Jun	70MHz CW
3/4 Jul	VHFNFD
24 Jul	144MHz Low Power
25 Jul	432MHz Low Power
22 Aug	2nd432 MHz Fixed
31 Aug	144MHz CW Cumulative
4/5 Sep	144MHz Trophy
15 Sep	144MHz CW Cumulative
19 Sep	70MHz Trophy
30 Sep	144MHz CW Cumulative
2 Oct	1296MHz Trophy
2 Oct	2320MHz Trophy
2/3 Oct	432MHz-24GHz & IARU Contest
5 Oct	1.3/2.3GHz Cumulative
13 Oct	432MHz Cumulative
15 Oct	144MHz CW Cumulative
20 Oct	1.3/2.3GHz Cumulative
28 Oct	432 MHz Cumulative
31 Oct	2nd 1296/2320MHz Fixed
1 Nov	144MHz CW Cumulative
4 Nov	1.3/2.3GHz Cumulative
6/7 Nov	144MHz CW, Marconi/6/24 hr
12 Nov	432MHz Cumulative
18 Nov	1.3/2.3GHz Cumulative
29 Nov	432MHz Cumulative
5 Dec	144 AFS / Fixed
6 Dec	1.3/2.3GHz Cumulative
14 Dec	432MHz Cumulative
26,27,28	
29 Dec	70/144/432MHz Fixed

THE TYPEFACE in Contest News has been reduced at the request of the HF Contests Committee in order to do justice to the large amount of contest information requiring publication, whilst retaining the same page allocation.

GAGE/TYLER CUP 1992

Organised by the Mid Thames ARDF Club on Wednesday evenings.

(Results are based on the best 5 of 7 events)

Pos	Name	Points
1	C Boyce	-21
2	B Bristow	-44
3	T Gage	-52
4	A Simmons	-52
5	G Brightman	-66
6	G Foster	-78
7	B Gray	-95
8	P Tyler	-99
9	C Wells	-116
10	M Standen	-140

SOUTH MANCHESTER 1991/92 WINTER SERIES

(Results are based on the best 3 of 6 events)

Pos	Name	Points
1	C Plummer	18
2	D Holland	13
3	G Blomley	12
4	J Hall	9
=	D Yorke	9
=	J Joyce	9
7	J Heath	8
=	J McNeil	8
9	C Metcalfe	6
=	J Armitage	6
11	S & J Watson	4
12	T Morrison	3

Members' Advertisements

RSGB Members wishing to place an advertisement in this section must use the official form incorporated on the label carrier of Radio Communication. This will prove membership and must be for the current month. No acknowledgment will be sent. Ads not clearly worded, or which do not comply with these conditions will be returned. If an ad is cancelled no refund will be due. An advertisement longer than 60 words will be charged pro rata. Trade or business ads, even from members, will not be accepted. Traders who wish to use this facility must send a signed declaration that the items for sale are part of, or intended for, their own personal amateur station. The RSGB reserves the right to refuse ads, and accepts no responsibility for errors or omissions, or for the quality of goods for sale or exchange. Ads for CB equipment will not be accepted. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain. Please note that because this is a subsidised service to members, no correspondence can be entered into. Licensed members are asked to use their callsign and QTHR, provided their address in the current edition of the RSGB Amateur Callbook is correct. RS members will have to provide their name and address or telephone number. Please include your town and phone number in the free boxes provided to assist readers. Advertisements will be placed in the first available edition of *RadCom*.

Warning: *Members are advised to ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The 'purchase' of goods legally owned by a finance company could result in the 'purchaser' losing both the goods and the cash paid.*

FOR SALE

2MTR FM TR7200G rock bound CW m/mount and manual: £85ono. Comms Rx, TR9R-59DS CW matching spkr and manual, mint: £75ono. Cobra 148 GTL DX m/mode 10m mobile, DTI approved, authority N, CV119/90 for sale to A licensee only: £145ono. Pair free standing Toshiba spkr IMP 800ohm power rateing 40W max handling 80W: £45ono. (Cwmbran) 0633 864446

AC/SG VM Valve(s) or AC/SG. Also Philco Broadcast Rx Model 282 (Empire Five). Wanted for restoration by keen collector. Dick, G0HPM. (Nr Newbury) 0734 713332.

BRAND NEW valves: £1 each. PAF98, DF96, DK91/2/2, EAF42, EB91, EBC81/90, EBF80/89, ECC81/2/4/6, ECL80/82/3, ECL84/5/6, EF42/85, EF89/91/4, EF95, EF183/4, EH90, EL81/85, EY51/81, EY86/7, EZ81, ECH84 and EM87 at: £2.50. Assorted resistors 400+: £1. Assorted capacitors 100+: £1. Assorted transistors, 25: £1. Assorted PCBs, 4: £1. Assorted everything bags, 2KG weight: £10. Postage: £2. Cheques to: K Bailey, 40 Seymour Close, Birmingham, B29 7SD.

COMPUTER clearout:- 80386 SX25MHz motherboard: £65. 80386 DX33MHz motherboard: £125, 80386 DX40MHz motherboard: £140. Centronics PP8 laser printer, needs new drum and toner, can be seen working, bargain: £50. VSWR and power meter, 1.8MHz-144MHz: £35. Wordcraft wordprocessing s/ware, 5.25" unlicensed: £30. Olivetti PCS286 40MB drive, 1MB RAM, VGA colour monitor, inc. s/ware: £350. Laurence G1SWL QTHR. tel eves or mobile. (Fleet) 0252 624028 or mobile 0831 543164.

CUSHCRAFT R5 vertical. 10-20 metres by automatic selection, also 40, 80. If you have a tuner, max 1500 watts, 17ft, varnished, instr/book, as new but moved QTH: £240ono. Collect or carr extra. G0POS QTHR. (Gillingham) 0634 379140.

DRAKE TR7A station incl. RV7 VFO, MS7 l/s, 7077 desk mic, SP75 processor, L7 linear, MN2700 ATU, 1551 dummy load: £1700, No splits. Carriage extra. Stuart, G4MIB, QTHR. (South London) 081674 6452.

FT902DM, just back from main dealer after service, GWO with desk mic, manual, packing etc: £450. Prefer buyer check/collect. KW ant switch: £5. Pair traps: £10. Trio 230 ATU, unused, receipt, manual etc: £150. All plus post. GW3CBA QTHR. (Nr Cardiff) 0446 747223.

HOUSE SALE Wirral, Merseyside. Large 3-Bedroom house, garage and gardens. Handy for shops, countryside, Liverpool, Manchester and North Wales. Excellent VHF/UHF location. Immediate vacant possesion. £55,000 or offers. P Kelly, 20 Fogralea, Lerwick, Shetland, ZE1 0SE. (Lerwick) 0595 5164.

HYGAIN T2X heavy duty rotator, auto brake release/delay and preset direction controls fitted: £235. Commercial solid state 1kW HF linear, 100mW drive for full output, SSB or AM, unused and complete: £500. Yagi 5-el 20M 36ft X3" OD boom, superb performer: £300. Further inf on request. No time wasters please!! G4HSB QTHR. (Cleveland) 0642 816608 after 7pm weekdays only.

ICOM IC-W2E Dual Band FM Tx/Rx unused: £350. WIN108 airband Rx unused: £95. Revox B77/II tape recorder, as new: £1200 ono. (Hastings) 0580 830558.

ICOM IC726 TCVR HF + 6m general coverage receiver, AM/FM fitted, orig pckg, manuals; delivery possible; mint: £650. Ideal first rig. Available April. G3WWI, QTHR. (Maidstone) 0622 758182.

ICOM R7000, TS930S + AATU, TH45E 70cm handheld. All with manuals, etc. Offers Please. (Ipswich) 0473 311665, after 7pm.

KENWOOD TS850SAT, mint, boxed, manuals: £1350. Datong FL3, mint: £80. G4ZPY Paddle/Keyer (VHSCOMBO) Cost £126, accept: £80 (Never used, still in box.). ICOM 3220H 70cm/2m Dual/Band TCVR, 35/45W as new: £400. G3ZFZ, QTHR. (Barrow-in-Furness) 0229 474147.

MAST Clark Scam 40ft pump-up, ex Army, spares/service manual. Buyer inspects and collects: £250. MET 144-7T antenna, as new: £30. G8BTX, QTHR. (Lowestoft) 0502 741064.

POWER SUPPLY 48VDC 32A output, 240 vac input, full circuit provided together with mod for 2.8V DC. 12V and 24V. Also achievable at 32A. Full overvoltage and current limiting at 48V: £85. Sectional 42ft mast CW guys stakes halyard top/bottom fixings, all in canvas bag: £75. Buyers collect. G3SWC evenings. (Horsham) 0403 822444.

QTH 3 Bedroom Semi, Garage, 60ft garden. Full permission 45ft Mast. Phone for further details: £89,000. Freehold. G4AKG, QTHR. (Croydon) 081 651 5147.

RACAL RA1778 Receiver, 15KHz to 30MHz, ISB, SSB, AM, CW. 12Ch Memory. Also MA1105 Bargraph Tuning Indicator, connects to IF output. Both units rack mounted and complete with user/service manuals. Buyer collects. Offers over: £600 Please. (Bracknell) 0344 482394.

SCANNER Fairmate HP200E, boxed, perfect: £190. Serious Coax? about 30M Andrews Heliax LDF-50 with connectors fitted: £40. QRO?, quantity, New EIMAC 4CX250B, Boxed: £14 each. Steve, G0AXS. (Portsmouth) 0705 487202 office hours, 0705 827371 evenings.

SHACK clearout. FM120 base: £10. AR88LF: £25. FM202 mobile: £15. Muirhead WT12 30-100MHz: £10. Hallicrafters S51: £10. Creed 7E: £10. Terminal unit C.F.S.: £10. National HRO inc PSU, offers? Other haggleable bits. Cash. Buyer collects. (Gravesend) 0474 568704.

SHACK Clearout: FM120 Base: £10. AR88LF: £25. FM202 Mobile: £15. Muirhead WT12, 30-100MHz: £10. Hallicrafters S51: £10. Creed 7E : £10. Terminal Unit CFS: £10. National HRO, inc PSU, Offers?. Other 'haggleable' bits. Cash. Buyer Collects. (Gravesend) 0474 568704.

STEERABLE Sat/TV System Gensat Receiver/Positioner IRTE 18 ins Actuator motor unit. IRTE LNB HiTech Video Companion II Decoder with Filmnet. All in good condx: £300ono. G4TDR, QTHR. (Wolverhampton) 0902 763374.

TONO 5000E Communications terminal. Modes; RTTY, AMTOR, ARQ, FEC, CW and ASCII: £650, P&P: £10. Tokyo HL90U 70cm Linear 80 watts out with receive pre-amp: £175, P&P £5. Epsom Printer RX80FT Centronics input: £65, P&P £5. LAR Omni-Match HF 1.8-30MHz 250W PEP: £60, P&P £3. Datong Morse Tutor D70: £45, P&P £3. All above items in as new condx. Phone eve. Peter, G8WYT, QTHR. (Haywards Heath) 0444 450265.

TRIO TS130V: £345. Lowe HF150 Rx with Keypad entry: £239. AR2000 Scanner with charger, all as new: £200. Buyer Collects. G0SHY. (Truro) 0872 40282.

TRIO TS930S, Auto ATU, 500Hz CW filter, SP930 Matching Speaker, Fist Microphone, recent Lowe overhaul, resulting in immac performance, complete with Handbooks, Service Manual, orig packing, only one at this price, first person wins it at: £750. G3FCW, QTHR. (Leeds) 0532 585044.

TS790E 2m Multimode Base station, mint cond, bxd: £1100.13B2 2m Beam ex condx: £60. Mark, GI3YDH. (Belfast) 0232 795783.

TS850S with CW filter: £1100. TL922 Linear: £825. TS790E 2m/70cm M/mode Base station with SP31 spkr: £1100. All mint, bxd. (Belfast) 0232 795783.

YAESU FT ONE All Band, All Mode, HF TCVR solidstate, fitted all options, Shure 444D mike, complete with operating and technical Manuals, one owner: £750. YAESU FL2100Z Linear Amplifier: £400. Morse Tutor Datong: £35. Morse Tutor MMS1: £100. G4OWN. (Carshalton) 081 395 6890.

YAESU FT-70G HF Tx/Rx (Ruggedised Manpack) with matching FC-70M ATU, continuous coverage 2-30MHz. Ideal WAB/DX-pedition: £400. Eddystone 730/4 HF Rx: £125. SPY Radios: Mk 123 set: £200; Mk 328 Rx: £125; Mk 301 Rx (scruffy): £50. Buyers collect/Inspect or carriage extra. (Andover) 0264 353145.

YAESU FT290R, mic, whip, manuals, case. In immac no scratch condx: £200. Paul, G4BKI. (Towcester) 0327 53304.

10m STATION Superstar 360 with DTI approval: £70. Zetagi BV130 9-11m Amp, GWO, clean: £40. Cushman C6E Communications Monitor: £200. (Guilford) 0483 63687.

ACCESSORIES Hansen SWR 50B, SWR Power Meter: £18. Sagan BL-40X 1.1 Balum: £18. AKD HPFS Filter: £5. Call John, G4YDM, QTHR. (Washington) 091 4162606.

AEA PK232MBX multimode decoder with Pakratt II s/ware: £190. ICS fax 1 weather map, Navtex, RTTY, decoder: £180. ERA microreader MK II: £100. ERA RS232 display: £120. ERA BP34 audio filter: £60. Orig packing, manuals. All good wrkng order. (York) 0904 658928.

ALINCO DJF1E 2M h/held, includes Aircraft Marine 108-173MHz with EMS-8 remote control, microphone, orig boxes, instructions: £195. G4RSR. (Poole) 0202 687248.

ALTRON 45 foot wall mounted tower, new thrust bearing, winch and cable, first class condx. G3YJI, QTHR. (Walton on Thames) 0932 223228.

ALTRON CM35 Telescopic Tiltover mast: £100. BBC B Computer, Monitor, datacorder, handbook, RTTY/CW s/ware, interface unit, connecting cables: £50. G4DEV. (Worcester) 0905 51805.

AMSTRAD 1512PC, Twin drives, DOS 3.2, 512k, mouse. Tutorial and service manuals. Programmes for PK232. VG working order: £175. G3MP (Nottingham) 0602 602634.

AMSTRAD PC1512 DD exp 640k, mouse, VGC: £100. Atlas mobile mount: £30. Trio filter, YK885N (1.8kHz): £20. Yaesu FR508: £45. Admiralty handbooks, Vol 1 & 2: £10. G3GGK QTHR. (Cambridge) 0954 210374.

ANTENNA Challenger DX-VI Vertical Antenna covers 80-10metres. Pur April 1992, ex condx: £130. (Farnham) 0252 713851.

AOR AR1500 as new Mains PSU, 12v Lead, spare Bttry pack, bxd: £200 ono. G4EBX, QTHR. (Derbyshire) 0773 812766.

AR88 and Spkr: £45, can deliver. TRIO TR2400 FM Handheld, incl Base and Mobile chargers: £100. Datong Morse Tutor: £40. (Halifax) 0422 365248.

AR88LF with Speaker, S-meter, spare valves and Manual, dated 1944, looks very smart. Buyer Inspects and Collects: £60 ono. G4XPU. (Bolton) 0204 595151.

ARGONAUT 515 Dedicated QRP CW/SSB TRCVR, matching PSU and CW Filter: £250(no offers). G4EHT, QTHR. (Lichfield) 0543 251133.

AT Mother-Boards, IBM compatible, 286, 1MB, includes 2 Serial Ports, Floppy Disk Port. Great for Packet: £45. Jeremy. (Harpenden) 0582 462337.

AVO Douglas Coil Winder incl Wave winding with motor, gears and spinners: £50. Buyer inspects, collects test gear. List available. (Bexleyheath) 081 303 1879.

BBC Master 128, Microvitec colour monitor, twin viglen drives, large amount of s/ware, gone PC hence sale: £325ono. (Leicester) 0533 863969.

BOOKS More than 100; Communications, electronics, control, circuit theory, physics, mathematics. Send large SAE for list. G3BKF, QTHR. (Leics) 0509 412395.

BUTTERNUT HF SB mini beam, 7 feet turning radius, excellent performance over 5 bands, good condx with manual: £130. Neil G4DOJ evenings. (Stockport) 061 437 2682.

BUTTERNUT HF6V Vertical: £60. MFJ Versa Tuner III Model MFJ 962C 1.5Kw: £120. G3TSO Multiband HF TCVR 20w output, Digital Freq Display: £120. BNOS 12 Amp Power Supply: £50. WANTED Bird Thruline with Elements, Kenwood Grid Dip Oscillator. Must be complete GWO. G4RKO. (Newbury) 0635 873414.

CAMBRIDGE uni pivot meters, clean, perfect, tested, accurate 1% A;240 ua, switched X2, X5 B 24 mv. Both 5" scale, offers. G3OOQ QTHR. (Stratford-upon-Avon) 0789 205973.

CLEARANCE: small pwr components Kent BRS14943. (Nr Norwich) 060549 705.

COLLECTORS Items, WWII Reichs Rundfunk WD94 RJ Components, Bakelite case with Eagle Swastika badge: £16. HZ Speaker: £16. Valves with Holders BAL716 OPTA: £8. Tuning Capactor with interrupter contacts: £7. Valves HL2 P2 OSRAM: £5 each. 6146: £8. G3OEG. (Staines) 0784 454757.

COMMODORE 64 latest Model, PSU, 1541 Disk Drive, Datasette, MPS 803 Printer, spare Ribbon, Mouse, HAM S/ware, many games, all leads, handbooks, Joystick, little used: £145. Maplin RTTY Unit TU1000 with Manual: £35. G4FPU, QTHR.

COMMODORE 64, 1541 Disc Drive, 1701 Colour Monitor. MPS801 Printer, ST5 and Tonni Tuner, AMB-TOR Software. Packet Interface plus Digicom 64 Software. Complete AMTOR, RTTY, Packet System. Communication Modem and considerable Software included: £350. (Bristol) 0272 640665.

COPROCESSOR for BBC Master. External unit with own PSU, 512k Board and further Memory expansion to give 614k free RAM for DOS+2.1 Applications. Complete with Mouse, manuals and Software. Excl condx: £100. (Cheltenham) 0242 527651.

CUSHCRAFT-R5 Vertical antenna, nearly new, buyer inspects, collects: £150, ovno. Bill, G0AWG. (Peacehaven) 0273 582345.

DATONG Filter FL3: £100, list price: £149.95. Morse Trainer Microwave Modules MMS2: £60. JP Electronics Quark EPROM Loader for Spectrum Morse Reader, could Modify for other Computer. Suitable for Weather, FAX Additions: £60. Prices above negotiable. Ray, G0HHJ. (Rugeley) 0889 584983.

DRAKE C-Line station incl. R4C Rx, T4XC Tx, MS4 l/s, L4B Linear, MN2000 ATU, 7075 Desk mic: £1500, no splits. TR4C Tcvr with RV4 vfo: £350. Carriage extra. Stuart, G4MIB, QTHR. (South London) 081 674 6452.

EDDYSTONE EC10 Complete with PSU and orig Manual, exc condx: £65 ono. (Rugby) 0788 823043.

FDK 750E 2 metre Multimode 10w: £175. ERA Micro Reader CW and RTTY with CW Tutor: £75. (Manchester) 061 653 8316.

FDK Multi 700AX 2m FM 25w, variable output, in GWO: £55. Buyer collects or Carr extra. G0IRK, QTHR. (Surbiton) 081 390 2650.

FREE Versatower Socket. Must be removed from concrete block and completely cleared away. G3JBU, QTHR. (Northampton) 0604 401800.

FRG7000 Receiver, covering 0-30MHz, excellent condx, including Manual, not Boxed: £175 onco. Buyer inspects/ collects/ pays carriage. Please telephone evenings. (Twyford, Berks) 0734 320453.

FT-ONE Solid State G/C All mode TCVR FM board, etc. YM38 Scanning desk Mic. Separate Professionally built PSU. Operating and Technical Manuals: £625. G3RDG. (NW London) 081 455 8831.

FT101Z Tx Look performs as new, blower, Mic. Must be seen, Ex-Silent key: £320. No offers. G4TLY. (Malmesbury, Wilts) 0666 822935.

FT101ZD no WARC, mic, CW filters, little used: £380. KW1000 Linear plus KW109 Supermatch: £300. SB303 VGC, plus matching Speaker, need little attention, lack of use, suit SWL: £60. Shure MIC444: £15. Buyer collects. (Worcester) 0905 424722.

FT101ZD WARC bands, Mic, manuals, wks well, 901 Ant CPLR: £480. Bob, G3JJU. (Fleet) 0252 615831.

FT101ZD with FM and Mike: £300. 1kw HL1KGK Linear Amplifier:£500. Apple II Computer with B/W Monitor, two Disk Drives, Packet, RTTY, etc, Programme and Printer: £300. WELZ Power Meter and SWR Meter: £30. KW PEPmeter: £15. DAIWA Auto ATU: £40. G3VQY, QTHR. (Wickford) 0268 764317.

FT200 TCVR: £200, H/Book, spare Tubes. Scopex 14D-15 Scope: £50. AR88D (tatty) Works: £40. KW2000 TCVR Slight damage, not working, spare tubes, p/supply, H/book: £55. Sanyo Betamax Videocorder, +75 tapes: £40. Philips N4504 R/Reel Tape: £45. Trio KA200A Stereo Amp: £25. New Boxed Zenite 35mm SLR: £50. Telescope (Astronamy) (powerful): £50. Loads of valves. Loads of components. G4XLA, QTHR. (Rainham, Kent) 0634 378854 evenings.

FT290R With case, Nicads charger, Flexible Antenna, little used, mint, plus FL2010 10w Linear, never used; plus MMB-11 Mounting Bracket; plus SUS285D Colinear boxed: £299. Drake SSR-1 Receiver, mint: £100. Steal8 10w 2m Linear Amp Module, new, suit Handheld: £20. Panasonic WV2600N Colour Video Camera immaculate: £50. Vibroplex Bugkey: £50. McElroy Bugkey: £50. Buyer inspects, collects. G3LUL, QTHR. (Maidstone) 0622 681294.

FT480R 2M m/mode tcvr, GC, new PA, module fitted 10W+ output: £250ovno. Terry G4OXD after 6pm. (Hitchin) 0462 435248.

FT480R: £145. 102E h/held: £85. Altai 5/7A PSU: £30. SWR meter: £15. Multimeter: £20. Antenna switch: £5. magmount: £15. (Buckie) 0542 32208.

FT707 HF tx/Rx + PSU: £450. SB200 HF Linear 1kw: £250. TR7800 VHF FM Mobile: £175. FT227R VHF Mobile: £125. Altron 45ft Telescopic Tower: £425. 3 Ele Tri-Bander: £95. 17 Ele VHF Tonna: £25. KR400RC Rotator: £80. Prissi GC Rx 50KHz-30MHz: £150. MML144/200S VHF Linear: £220. MMT144/28 VHF Transverter: £75. Solid State HF Linear 600w: £220. Misc bits. Phone for details. Contact Alex on (Edinburgh) 031 449 4421.

FT727 Dual-Band Handheld 5w 12v Nicad, case, charder, Ex Condx, quick sale: £165. Sony Personal CD Player + Accessories: £60. G7DDD, QTHR. (Solihull) 021 744 1536.

FT77 100W fitted FM/CWN: £325. FP700 PSU: £125. Pair: £425. Yaesu desk table stand: £15. Datong speech processor, 8 pin: £65. SWR power triple meter unit, 500W: £40. DX Tristar 3 band HF vertical: £45. Postage extra. All items GWO. G3OAZ QTHR. (Basingstoke) 0256 465126.

FT780R 70cms m/mode, bxd, manual, excellent condx: £275ono. Yupituru MVT6000 scanner, PSU, manual, VGC, AM/FM: £150. Wanted: Welz SP-300 SWR/PWR meter. Tel Adrian. (Buxton) 0603 279621.

G3TSO 80m Miniature Tcvr from RadCom June 91. Constructed from kit by Author 15W: £140. Latest PCBs (issues) 80/160m: £12.50. G3TSO. (Cirencester) 0285 750532.

GET AHEAD with QRO LK550 QSK Linear (3 x 3-500Z tubes): £1400. High Mound Paddle Key: £20. 3.5 and 7.0MHz Traps (unused): £35. Current Balun (new): £35. PL259's, SO239's, N-Plugs Elbow, Straight and T-connectors, Desk Scanner with Text Recognition S/ware and ADF: £850. Linet 300/300 1200/75 BPS Modem: £30 plus Commplus s/ware: £30. Apricot Internal 300/300, 1200/1200 1200/75 BPS IBM Card Modem: £30. Print Wheels for Brother Daisy Printers: £5 each.

HALLICRAFTERS S20R Sky Champion, VGC: £70. S18 Sky Champion, tatty: £40. RCA AR77: £60. Telequipmen S32A Scope with Manual: £50. G4HHZ, QTHR. (Hants) 0703 268705.

HEATH HM102 Power/ SWR Meter, 1.8 - 30MHz 2KW: £20. Welz SP225 Power/ SWR Meter, 1.8 - 200MHz 150w, Dual meter: £30. Soar FC845 160MHz Freq Counter: £30. KW E-ZEE Match ATU, with Holdings 1.8MHz Mod: £30. Datong Mk Morse Keyboard: £40. GDO 360KHz - 220MHz: £20. All items ONO. Buyers pay carriage or collect. G3RFI, QTHR. (Potton, Beds) 0767 260800.

HEATHKIT SB301, SB401: £300. Tempo 6N2 1000W output: £900. Microwave modules, 50MHz, 70MHz, 144MHz cnvrtrs: £15 each. Micromax twin 2C39 23cm PA: £125. New and unused Eimac 4CX250B: £35 each. 100W CW/AM HF TX with Eddystone 898 dial: £40. Drake ESR324 satellite receiver: £25. Sharp MZ700 computer: £15. For full details please phone Denis G3UVR. (Wirral) 051 342 7880.

HELIAX Andrew Cable end, Plugs for 5/8 and 7/8 inch: £6 each. Paul, Not QTHR. 0931 713359.

HF SOLID State Tcvr JST135 1.8 - 28MHz inc WARC, with Matching Power Supply NBD520G: £900. TS180 5 Band 1.8 - 28MHz, matching Speaker SP180, Power Supply PS30: £450. YAESU ATU FC902: £130. Cushcraft DW3 18, 24, 10 Dipole: £50. Ex Late G3EQU. G3BUF, QTHR. (Melton Constable) 0263 861434.

HP85 Computer, Manuals, Serial Interface, ROM drawer, memory module, data cartridges: £25. Tektronix 465B 100MHz DB Scope, GWO: £300. Tektronix 7623A Lab Scope, GWO: £500. Several 7000 Series plug-ins. Phone for details, poss p/ex for modern Sig.Gen. Five way electrically operated Coax switches, lovely bit of kit: £25. SAE Data. Jake Adamson, Woodend Victoria Road, Kingsdown, Deal, Kent. CT14 8DY. (Deal) 0304 373788.

HRO Mint Condx C/W 5 Coils, P/S + L/S, P/ Copy H/Book (1945). This set really is VGC: £150 (Could deliver N.East) or SWOP for Kenwood R1000 Rx. Also Candle-stick Telephone, very old: £50. Tel 0287 634397, 9 to 5, Work QTH. (Guisborough).

ICOM 251E 2m M/Mode, plus Aerial Rotator and 30 metres of Co-ax and Control Cable: £425ono. (Oxford) 0865 770959.

ICOM IC2E and IC4E Handhelds C/W Cases and Spkr, Mics: £125 each. ICOM BC-35 Battery Charger:£45 ono. Selection of Batteries for above: £15ono each. Leader LAG27 and LSG17 AF/RF Sig Generators: £100ono each. Hameg HM-605 Oscilloscope, exc condx: £550ono. Commodore 64, plus Datacassette, PSU, Manual: £125ono. Commodore 1901 Colour Monitor, exc condx: £200ono. Thurlby CM-200 Digital Capacitance Meter: £100ono. Sabtronics 8610B Freq Counter: £80ono. Phone Nigel, G4KZZ, QTHR. (Stoke-on-Trent) 0782 394858.

ICOM IC471H all mode 70cm 10-75 watts: £675. Yaesu FT77 HF all mode plus FM, 100W: £365. 10FM tcvr: £30. 10FM amp 35/45 watts: £20. Jaybeam 4 stacked dipoles 70cm, 8.5 DB gain: £25. Commercial grade 70cm colinear: £35. LDF 4-50 cable: £1 per mtr. State your requirements. USA made m/meters RCA: £25. Ex USAF: £20. (Norfolk) 0328 710641.

ICOM IC4E 70cm H/held: £130. IC2E 2 mtr: £110. Both C/W carrying strap, chrgr IC-DC 1, 12v Reg Pack and BP4 spare Batt pack, also IC24G 2mtrs FM Mobile, C/W Mobile mount. Never used mobile: £125. All in pristine condx and unused. (Plymouth) 0752 862751.

ICOM IC701 HF Tcvr, incl PSU: £350. NAG 144MHz 250W Amp: £250. Pair 4CX250B 144MHz 600w: £300. Mike. (Guildford) 0483 223060.

ICOM IC725, mint, AM/FM board, Narrow CW Filter fitted, plus HM2 Mic: £600. 20A Power Supply: £80. All Boxed, buyer Collects. Phone 6-9pm. (Southampton) 0489 577033.

ICOM751 ICPS15 Power Supply, desk mic: £500. HYGAIN TH5: £200. HYGAIN HAMIV Rotator: £150. Morse Tutor: £50ono. Will split. (West Horsley, Surrey) 0483 283930.

ICS FAX-1 weather map decoder. Also decodes RTTY and NAVTEX. All leads and manual: £250 post paid. G3RDG QTHR.

ICS FAX1 Weather Fax Decoder: £150. MWM 30W 2m Amplifier: £50. Datong D70 Morse-Tutor: £35. 2m Trsvtr: £15. LCD Multimeter: £10.(Stroud, Glos) 0453 828011.

IRC's for Sale. QSL Manager has large quantity of IRC's at 35p each. G0GQP, QTHR. (Milton Keynes) 0908 366285.

JAYBEAM Antennas 2m 8el Cross Yagi with Circular Phasing harness: £35. PKW 7cm 2X5/8 Ground Plane: £15. Ian, G0PAU, QTHR. (Watford) 0923 222284.

KENWOOD TH75E, dual band h/held, case, spk mic: £260. Icom IC740HF, FM board, IC3 spkr, mic: £550. Heathkit SB200 linear 1200W o/p: £350. Kenwood MC85 base mic: £60. SP102 spkr: £45. G4MH minibeam: £55. Yaesu FT690 Mk2, linear, vertical ant: £365. Light duty rotator: £30. Most items bxd, mint, with manuals and orig packing. Will consider swapping for GPX600 motorcycle or similar. Contact Patrick. (Dereham) 0362 821125.

KENWOOD TM241E 2m 50W TCVR, rarely used from new, mint condx, exc radio: £225 ovno. (Manchester) 061 7931291.

KENWOOD TM721 2 + 70cm Dual band Tcvr, bxd, accesories, VGC: £400. YAESU FT790R Mk1 with matching 10W 7010 Linear, bxd, VGC: £290. G4SSX, QTHR. (Pinner) 0895 630627.

KENWOOD TS120S 100W Tcvr, VGC: £275. Ray, G0CGQ, QTHR. (Wilmslow) 0625 529713.

KENWOOD TS430: £600. Yaesu 2m FT225RD: £500. MM 4M/144 Transv: £75. MML/100 Linear 2m :£95. G3WBN, QTHR. (Croydon) 081 654 2761.

KENWOOD TS440S with ATU, all bxd and in perfect condx. Offers around: £850. Atari ST 2.5MB with Colour Monitor: £300 ono. (Hull) 0482 43645.

KENWOOD TS450SAT auto ATU, hand mic, 9 months old, pristine condx, non smoker, used for two weeks: £1050 inclusive of delivery. Heathkit linear: £295. Solidstate mobile HF all mode linear, switchable preamp hi/lo power 300W: £150. CTE solidstate mobile, HF all mode linear, 80W: £45. (Norfolk) 0328 710641.

KENWOOD TS520SE HF Tcvr 200W PEP, vgc: £300. Pye W30AM with control box, cable, mounting cradle and manual, working 70.26MHz: £30. Buyer collect above items or may deliver Manchester area. Kenwood MC50 Desk mic: £25. Kenwood HS5 Headphones: £15. Prism Modem for Spectrum, 1200/75 baud: £10. Thanks to all who responded to my wanted ad. Keith Haywood, G8HXE, QTHR. (Manchester) 061 7475099.

KENWOOD TS530S HF tcvr, mint condx, orig packing and manual, buyer collects: £500. KW Dummy load 52ohms: £30. G3YNC QTHR. (Romford) 0708 749175.

KENWOOD TS530SP plus Remote VFO240: £500. KW100C Linear plus Pair New S72B's: £300ono. All as New. G3OCA. (Derby) 0332 662818.

KENWOOD TS660 Quadbander 10W c/w PS20, SP430, VOX4, AT100: £400. Dentron GLA1000B 1kW Amplifier: £250. Dentron 2kW ATU: £200. Cheap shipping to UK. Tim, VE6SH/G4HVA, 107 Strathearn Rise, Calgary, AB T3H 1R5 CANADA. (Canada) (403)246 5263.

KENWOOD TS830S: £599. Sony ICF-SW55: £215. Yupiteru VT-215 II: £115. Shack Electronic Organ, call for details. All as new. G3XLL. (Diss) 0379 652043.

KENWOOD TS850S internal ATU, mint, second rig: £1275. Need OMNI 6 so will P/Ex if poss. Also need Prop pitch motors. (Oswestry) 0691 831111.

KENWOOD TS850S with internal Auto ATU, 500Hz CW Filter, Mic, as New: £1350. PS50 as new, bxd: £180. Trio TS520 with 270Hz CW Filter, Mic: £300. Ten-Tec Corsair II with Mic: £750. ICOM IC210 2m FM 1-10W Homebase + Base Mic: £180. YAESU FC102 1.2kW ATU: £180. Cushcraft A4 Tribander 4 EL Yagi: £200. Butternut HF6V with WARC Coils 80 - 10m, 8 bands: £120. (Falkirk) 0324 32594.

KENWOOD TS940S Voice, Auto Tune, MC42S, SP940, all excellent, Boxed, any trial: £1000. SEM QRM Eliminator: £45. Full Set of Cushcraft A3 Traps with full drawing for 3 Element Beam: £60. G3OUQ. (Nuneaton) 0203 384582.

KW ARGONANT 515 HF TCVR CW/SSB 5w with Kent key, Power Supply, ATU, CW Filter, Mic, Phones, H/book. Silent key Sale: £200 ono. G0MZN, QTHR.

LINEARS 100W: £75; 40W: £35. Standard 828: £65. TRIO 2300: £70. 2 Bttry Packs, 12 volts Nicad Pack and Chrgr D cells: £25. Portable Cassette Tape Recorder: £15. Nombrex Signal Generator: £10. Homebrew DC Voltmeter: £2.50. Electric Vibro Massager: £2.50. Will assist collection. G3VYP. (Nr Ludlow) 056 885 296.

MAMIYA C220 +65mm Lens Medium Format Professional Camera, mint, bxd, manual, Lens Hood: £180. 180mm 'Super' Lens, mint, boxed: £160, or Pair for £300. Colour Video Camera with 17-102mm Auto Aperture Zoom Lens, electronic viewfinder, nicad holder, strong case, bargain at £79. Sony HVS2000P Video Selector/Overlay Generator: £39 or £100 pair. Sky Videocrypt Decoder £50. Andrew, G4JMO. (Blackburn) 0254 661369.

MFJ Multi-Mode TNC, new Oct 1992, Software 1289/1284: £325 ono. Amstrad 1512 Computer, Colour Monitor 720K B-Drive, 360K A-Drive plus S/ware: £300. BARTG Multiterm plus S/ware: £70; Plus Postage, ALL must be Sold. Need cash due to poor health. Phone (Bristol) 0272 828586.

MITAC IBM Compatible 8088 PC, 5.25 FD, 20 MB HD, DOS 4.01, VGA Colour Monitor, mouse, word processor, drawing package, Ex condx: £350 ono. (Bushey) 081 950 0382.

NELSON QUAD. Complete except for some wire. Balun and extra long extension Rods. Buyer to collect or pay carr: £240 ono.(Wiveliscombe) 0984 24212.

OFFERS for WWII equipment: bttry eliminator, type AN 5A, VCR 97 CRT identification unit RDF1 oscillator unit 76 amplifier, type 1134A complete with plugs RF unit types 24, 27 vibratory supply unit No9 power supply tyoe 234A, BC348, R1155. Both poor condx. Buyer collects. (Stockton-on-Tees) 0642 674974.

PHILIPS V6100 Nicam Stereo/Teletext TV with 28in.(66cmV) Monitor. Fully featured remote control system TV with SCARTS for monitor, VCR, satellite etc. Sound output via Hi-Fi. Excellent condx: £285. G4AMP. (Camberley) 0276 33212.

PK-88 Packet Controller with manual, leads etc: £75. (Livingston) 0506 414338 after 5.00pm.

PK232 MBX with latest firmware: £220. Macratt Software for Macintosh, including cable: £25. Microreader Mk2 with 4.1 Firmware: £110. All in good order with cables and manuals. Steve, G6LLD. (Durham) 091 3770593.

PYE PF2UB Pocket phones 460MHz: £15. 4CX350B: £15. Storno 800 UHF Handheld: £10. Bird 8085 1GHz 50w Dummy load: £20. Components, 1Kg mixed pwr devices, FETS, BiPolar, RF, zeners, thyristors, diodes and much more. Bargain at £7.50, all plus Postage.(Horsham) 0403 864222.

R+N trnsvtr 2M input 6M output, only: £140. Kenwood MC55 mobile mic: £30. SR100 2M linear only: £95. AT1000 ATU: £35. Straight brass key, separate oscillator: £25. T100 100W dummy load: £23. FT290 mounting brckt: £10. All equipment in VGC. Call for details. Ask for Simon QTHR. (Maidstone) 0622 890831.

RACAL RA117 HF RX + RA218 ISB Unit, fully Serviced/ Professionally aligned, with manuals: £180ono. S Mode PSU new condx: £10ono. Sivers Lab PM7008 Microwave Generator 8.2-12.4GHz inc, built-in wavemeter: £120ono. TRIO TR7010 2M SSB Tncvr inc Preamp: £65ono. All full working order. G4EIK. (TRURO) 0726 882913.

RACAL RA17 and RA37 in Table-top Cabinet, manuals: £200ono. Kenwood BS5 Bandscope Unit for SM220: £30. Kenwood MC-35S 50K Microphone: £15. Three 6146B Valves, one new, two used, OK: £15. G4PNC. (Blackpool) 0253 395764.

RADCOM Magazines 1982-1991; 103 copies, some years incomplete. Good condx: £12.50, plus Postage. G3BSK. (Birmingham) 021 7444671 evenings.

ROBOT 400 Scan Cnvrtr, manual, Modulator, 625 CCTV Camera, Imaculate; Gantry with Lights and Dimmers: £495 ono. Change circumstances forces sale. (Somerset) 0458 251144.

SHINWA SR001 Scanner 25 to 1000MHz, AM/FM/WFM: £145. Katsumi EK150 Electronic Keyer: £40. EHT Feedthrough Capacitor 1000pF 2Kv: £9.50 each. Brother HR20 Daisywheel Printer: £95. Canon Sheet Feeder for BJ10EX Printer: £25. Phone 6pm to 9pm. John, G4ZTR. (Colchester) 0206 860238.

SILENT KEY sale - G0BVE. FT757GX, matching FP757HD PSU and FC757AT Auto ATU, sell together: £800. YAESU G400RC Rotator: £80. Jaybeam TB2 10-15-20m: £120. 20ft Homebrew Telescopic Mast + winch ? offers. All GWO, immac, not bxd. All prices ono. Contact G0ORD, QTHR. (Stockport) 061 427 1027 evenings.

SILENT KEY Sale - G4MLH. JR599/TR599 Combination Believed Working: £150. ICOM 290E 2m Multimode: £300. Lunar 2m 50watt(?) Amplifier - offers. DARE 12Amp PSU: £50. Kenpro KR250 Rotator, almost new: £50. All prices ono. Carriage extra please or Collect. G3ZOG, QTHR. (Sunderland) 091 5280080 6-9pm or weekends.

SILENT KEY Sale, G3XFI Complete Station, including TRIO JR310 Rx, Yaesu FL200B Tx, KW Z-Match, Trio 2200G, Lowe 2 m Rx, Sharp Stereo Reel to Reel Recorder, 50w Dummy Load, Class D Wavemeter, various PSU and home Brew Rigs, Mags, etc: £250. Further Details G3XFN, QTHR. (West Mids) 021 353 3364.

SILENT KEY Sale: Kenwood TM702E 144/430 FM hardly used, Boxed: £410. Microset 2m Linear with Preamp I/P 5-15w O/P 80/100w, Boxed: £100. Kantronics All Mode KAM fully documented, bxd: £150. Microwave Modules 28 to 144Mhz Tmsvrtr: £80. Alti Mastrotor: £20. Buyer collects. (St Helens) 0744 454270 after 6pm.

SILENT KEY sale: Trio TS530 tcvr: £400. telephone 0604 410822.

SILENT KEY sale: Yaesu FRG8800 Rx incl VHF cnvrtr, FRT7700 ATU, VGC: £400. Trio TS830S incl extra CW/SSB filters, VGC: £650. Trio MC50 table mic: £30. Trio MC35S hand mic: £15. Kenwood HS5 h/phones: £15. Welz SWR bridge, SP200: £40. Yaesu EF-501-DX

low-pass filter: £20. Jaybeam slot fed Yagi 5+5 element 5D/2M 2m 75ohm, unused: £35. MM RX cnvrtr, 144-146/4-6MHz: £25. MFJ 6-way antenna switch: £25. Wine wrap kit: £15. TTL logic probe RS type 423-942: £30. Kanga frequency marker kit: £10. Palomo noise bridge: £45. Cavity wavemeter 100-1000MHz: £10. Buyers to inspect and collect. G4LWF QTHR. (Halesowen) 021 550 5759.

SWAN 100MX HF tcvr, compete with PSU, spkr mic, excellent wrkng order and condx: £300 ono. (Romford) 0708 370654.

TEKTRONIX 465 Oscilloscope 100MHz bandwidth. 2 chann and delayed timebase etc. Good condx, recently calibrated. G3YDY. (Chelmsford) 0245 275841.

TEKTRONIX 475 Oscilloscope 200MHz, Good working order: £350. Marconi Q Meter (TF1245) and VHF Oscillator (TF1247): £100 the pair.(Reigate) 0737 241491.

TEKTRONIX 5403 60MHz DB scope with probes and full handbook: £120. CT71 curve tracer (dynamic semicon tester) with manual: £75. Many other test instruments. Would exchange wanted items, prefer buyer inspects and collects. Please phone for list. G3IJW QTHR. (Bexleyheath) 081 303 1879.

TEKTRONIX T935A 35MHz Dual beam portable mains oscilloscope, good condx: £160. HF 400W Home Brew Amp (*RadCom* Sept 74) needs new relay, hence £80. R1155 Rx, fair cond. not known if working: £40. Racal RA17 Rx in bits, minor fault, hence £60 with manual. Farnell G65M mains input, switch mode, pwr unit 4-6 volts at 5 amps, Ex-equipment, ideal for TTL projects: £10. (Dunstable) 0582 862580.

TELEQUIPMENT D31R Dual Trace Oscilloscope: £50, Buyer collects. OMB type 745 Counter Timer to 100Mhz: £25. Centronics screened lead Male to Male: £5. Centronics switchbox, one in Male, choice of four out female: £20. Postage extra. G3RDG, QTHR. (NW London) 081 455 8831 anytime.

TELEQUIPMENT D31R dual trace oscilloscope: £50. Buyer collects. OMB type 745 counter timer to 100MHz: £25. Two CRTs Cossor type 89J one unused: £20 and £10. Kenwood R2000 comms Rx, fitted YG455C CW filter: £365. G3RDG QTHR. (NW London) 081 455 8831.

TELEQUIPMENT D53 Oscilloscope, Dual Trace with HD Amplifier DC - 25Mhz and CD Amplifier DC - 15Mhz, all Manuals, GWO. Buyer to collect or pay delivery cost: £75. Please after 7pm. G3YWO, QTHR. (Bourne, Lincs) 0778 33642.

TH26E Pristine condx: £200. Lake DTR3 factory built: £60. Yaesu FT7 QRP: £200. All ono. Jon, G4LJW.(Bristol) 0272 634167.

TINY-2 TNC with leads for IC-240: £100. IC-240, VGC, ideal Packet or Mobile Rig: £100. AMT-3 AMTOR/RTTY: £125. *Realistic* PRO-38 10 channel Handheld Scanner, boxed: £60. All in mint condx. GW4WJO. (Holyhead) 0407 762330.

TL922 Linear, ex cond, all leads, connectors, manual, boxed, two new spare valves: £1000 or offers. Prefer Buyer collects. G4KDV. (Otley, Yorks) 0943 463083.

TOKYO HT120 20m SSB/CW Tcvr, 10 watts, N.B, Digital Display/Synth, etc mint: £150 or exchange Heathkit HW9 or PX HW8. Steve, G4MJW. (Witham) 0376 84799.

TOKYO HY-Power HL-120V 70cms 100w+ PA, Pre-amp, metered.(mint): £260. BNOS 25A metered PSU: £130. EME (German) VHF/UHF 2m to 13cms SWR/Power Meter/ Directional coupler, measures to 1kw+ (mint): £250. Kamtronics DUR2 two channel Tx/Rx (Hi Speed Packet): £145. Weltz 3.5-15v variable 4A metered PSU: £35. Panasonic A1 LowLux Video Camera+ PSU (new): £80. EME Interdigital 23cms Filter: £45. Carr extra. Paul, G4XHF. (Crawley) 0293 515201.

TOKYO Hy-Power HX-240 trnsvrtr, VHF to HF, 40W, orig boxes, instructions: £195. G4RSR. (Poole) 0202 687248.

TRIO 9130 2m Multimode, mint, boxed, manual: £345. BO-9A Base Unit: £50. Tonna 9XY 2m Antennae: £30. Altai Rotator and Controller for above: £40. Cable Switchbox: £5. Solartron CD1400 Dual Beam Oscilloscope: £75, (buyer collects). (Kilbarchan) 05057 5582.

TRIO R2000 Gen Cov Rx: £300. WRAASE SC-1 Slow Scan Convertor: £180. IC240 2M FM Mobile Tcvr: £100, Carr extra. (Troon) 0292 317188.

TRIO TR9130 Multi Mode 25W, bxd, Manual, bracket: £225ono. Wanted Uniden 2830/2510, Lincoln, Belcom, Summerkamp any 10 metre Multi Mode. G2LBE. (Staffs) 0922 414796.

TRIO TS700G: £220, Vibroflex Key £5, BC221: £12. Buyer Collects. G2DLJ QTHR (Derby) 0283 701187.

TRIO TS700G: £220, Vibroflex Key £5, BC221: £12.All buyer Collects.G2DLJ QTHR (Derby) 0283 701187.

TRIO TS830S Boxed with Service Manual, Spare set of valves, De-Lux Tuning Knob: £575 ono. (Northampton) 0604 648091.

TRIO TS930S, VGC 500Hz, CW filter, mic, headset, absolute bargain: £700 + carr, no offers. Drake TR7 250Hz CW + 1.8kHz, SSB filters: £600 + carr. AR1500 h/held scanner, all accessories: £150 + carr. Vast quantity components, magazines - SAE enquiries. Ampex broadcast 2" VTR, working, offers. GM3RAO QTHR. (Ayr) 0292 443501.

TS450S plus ATU and CW Filter: £995. TS440S with ATU and CW Filter: £875. TONO 7000 RTTY/CW/ASCII with VDU: £250. All Good Condx. G4BWP, QTHR. (Near Newmarket) 0638 552080.

UNIDEN 28-30 10mtr Mobile, all Boxed, M/Bracket, Mic, etc, mint condx: £200. Phone anytime. G7GHN, QTHR. (Leighton Buzzard) 0296 668753.

VALVES Galore! 170 Boxed/unused including KT88's KT66, 807, QQVO6-40, 120 types. PSU Components HT/LT transformers, chokes, electrolytic capacitors from 15 - 500v to 145000uF. Motors, fans, HT/LT PSU's, AF attenuators, Power Meters. SAE for List. T Price, G4YBU, 4 Purberry Grove, Epsom, Surrey, KT17 1LU. (Epsom) 081 393 9691.

WIRELESS WORLD 1949-1982, some bound years: £45. 19 set Mk II/T with internal mains pwr supply: £30. Valve PSUs 250V and 6.3V trnsfrmrs, crystals, valves etc. Send for list, price. 4 Purberry Grove, Epsom, Surrey. G4YBU not QTHR. (Epsom) 081 393 9691.

WW2 Mobile HF Comms Set Type ZC1 Mk II, mint condx inside. Still works. A real collectors piece: £350. Stan. (Basingstoke) 0256 24969.

YAESU FL2000B HF Linear 80-10m, recent new valves, with manual: £250. G3NDC, QTHR. (Stanmore) 081 954 1309.

YAESU FLDX400 + FRDX400 Tx/Rx pair, GWO, orig bxs, manuals: £200 (no split). Extra Rx: £100. All THREE -10%. Jaybeam 5XY Yagi, little used, VGC: £28ono. SMC polarphasor Mk II, mint thought unused: £29. Jill 061 485 5036 or Keith 061 477 5303.

YAESU FT-ONE Solid State G/C All Mode TCVR, FM board, c/w Mic, seperate professionally built PSU, operating and technical Manuals: £625. Watford electronics Centronics Switch, one in, two out or reverse: £15. G3RDG, QTHR. (NW London) 081 455 8831.

YAESU FT101Z with Digital read out, fan, DC/DC converter, YD148 microphone and Handbook. GWO: £395. G3MVK. (Newport,Shrops) 0952 811529.

YAESU FT101ZD Mk III, FM, electronic keyer, SEM Tranzmatch: £550. Tono Morsereader, CW, ASCII, RTTY: £100. Marine band Westminster: £30. GM4PSF. (Saltcoats) 0294 62955.

YAESU FT107M Solid state HF Tcvr 160 - 10m including WARC, built-in PSU, speech processor, Mic, extension Spkr, full Yaesu service Manual: £525. Heathkit SB200 1200W Linear HF Amplifier, recent overhaul and valves: £300. EIMAC unused 4CX1000 valves: £80 pair. Dave, G0OIL. (Sheffield) 0246 414995.

YAESU FT290R M/Mode, mint condx, Nicads, Softcase, Charger: £220. Would exchange for 2m H/Held, plus cash adjust. G0RKT. (Buxton) 0298 71020.

YAESU FT290R Mk 2, immac, never used mobile with high capacity nicads, technical supplement, orig boxes, instructions: £325. G4RSR. (Poole) 0202 687248.

YAESU FT290R with Nicads, PSU, Chrgr, Bxd: £200. TRIO R1000 MF/HF Comms Rx: £200. Telequipment D83 50Mhz Dual Beam, Dual Timebase Oscilloscope: £150. G3TCU, QTHR(93). (Godalming) 0483 423272.

YAESU FT290R, carrying case, strap, Nicads, chrgr, Bxd, Ex.cond: £200. Peter, GM3NRP, QTHR. (Coatbridge) 0236 426330.

YAESU FT401 DX. Highest bidder will get it! Realistic PRO-57 10 Channel Scanner: £65. Datong AD270 Active Antenna: £35 virtually unused. Selection of Books for RAE: £8. (They worked for me!) FC902 Antenna Tuner: £70. (Chorley) 0257 279798.

YAESU FT501 HF Tcvr with KW107 ATU and Datong FL1 Audio filter: £220. KDK2033 5/25 watt FM Tcvr with ATU: £125. Buyer Inspects and collects. G0IRR, NOT QTHR. (Grimsby) 0472 884877.

YAESU FT650: £875. Navico AMR1000 2M mobile: £140. Kenwood TR751E all mode: £495. Kenwood TS680S: £600. Kenwood MC60 desk mic: £50. Icom IC-R100 Rx plus AD-15E PSU: £400. Microwave modules MML144/100-S 2M linear: £70. Icom IC202E plus Mutek front end: £150. RN Electronics RN6/2/25 trnsvrtr: £175. Buyers to inspect and collect please. Les G6DYU QTHR. (Northants) 0933 652392.

YAESU FT690RII, carrying case, strap, nicads, box, manual, ex cond: £325ono. Also FL6020 matching linear: £85ono. MF-1 boom mic and SB-10 switch: £35ono. Sandpiper 6M/2M whip: £8. Are HF cnvrtr for FRG9600, gives HFRX coverage: £30. Please call G1VBR after 7pm. (Prestbury) 0625 829716.

YAESU FT70G, near mint, as used by Ranny Feinnes: £350. Dentron 2kw HF Linear, recent overhaul: £650. (Teignmouth) 0626 773301.

YAESU FT767GX, bxd and manual, MD1B8 M/phone, good condx: £1400. Commodore 64 1541 D/D, MPS801 Printer, Joystick: £130 ono. (Manchester) 061 682 6003.

YAESU FTV901R Trnsvrtr fitted 2m and 70cm Modules, 10W output both bands: £190. G3NDC, QTHR. (Stanmore) 081 954 1309.

ZX/SPECTRUM two Keybds with interfaces, PSU's, Three Microdrives, Assorted Amstrad s/ware microtapes, cassette tapes, dataspectrum, Alphacom Printer/PSU, Handbooks: £190ovno. Sangean ATS803A Shortwave Rx, new: £80. Eagle valve shortwave comms Rx: £30. 10" Mono TV: £15. P & P extra.

WANTED

AC/SG VM Valve(s) or AC/SG. Also Philco Broadcast Rx Model 282 (Empire Five). Wanted for restoration by keen collector. Dick, G0HPM. (Nr Newbury) 0734 713332.

HALLICRAFTERS S27 in best condx possible, should pref be unmodified. Also HRO-5T PSU, Speaker and Eddystone 888A. Details with price to Judkins, G4DSM, QTHR. May be able to collect. (Wakefield) 0924 361150.

OWNERS Operating Manual Apple Two Europlus. Will pay all costs and postage. Trev, G1SRA, QTHR after 6.30pm Please. (Keighley) 0535 645 645929.

10GHz EQUIPMENT Wide Band or Narrow Band. Klystrons, Magnetrons, Dishes, Horns, Waveguides testing, in fact anything useful after conversion. (Derby) 0332 834228.

40 OR 60 foot lattice tower rotator and bearing. (Worksop) 0909 730332.

70CM, 23CM masthead preamps. 23cm trnsvrtr, preferably SSB Electronics. Moden dual band handportable and mobile, or Triband base. 24cm TV Tx. (Norfolk) 0328 710641.

ANTIQUE Crystal Set. Mahogany Box with drawer for crystals. Ebony Top inside lid. Nostalgia. Bob, G3JJU. (Fleet) 0252 615831.

ATTENTION: FT227R/RB owners. Two mobile brackets needed from packet radio base station. Users and front wire support needed from mobile user. Circuits R and RB appreciated. Jill G0OZJ. (Cheshire) 061 485 5036.

AVO CT160 Valve Tester. Alba SAT300 Satellite RX or Front End Module. Heathkit AW1N Audio Wattmeter. Please Help. G0IMV, QTHR. (Ross-on-Wye) 0989 769209.

BELL Howell 606 Projector and 605 Cine Camera, with Trital or Taytal Lens. Litherland, G4IMT, QTHR. (Chippenham) 0225 891254.

BIRD Elements 25C and 50C 25B for Wattmeter. Other ranges and power considered. G4AJE. (March, Cambs) 0354 741168.

BIRD43 Elements 100C, 100D or any E, J, K, or M elements. Dave, G6UWO, QTHR. (Nottingham) 0602 727047(between 1800 and 2030 hrs).

BUTTERNUT HF2V, must be in good condx. Also Cushcraft 4218 LDF 5-50 with connectors, 70cm K2RIW with PSU, working preferred. G0GMS. (Horsham) 0403 255011.

CIRCUIT - manuals for National 1-10 Superegen Rx and Hewlett Packard GMBH standing wave indicator, model 415B photostat expenses reimbursed. G3WR. (Brighton) 0273 501100.

CRT For Telequipment Scope Model D83 Tube Type T7400-13-2. No 19 Wireless Set in working order. Also KW Victor 120W AM/CW TX. Will collect if possible. Pse phone after 7pm. (Swansea) 0792 390244.

DAIWA SWR/Power Meter CN720, must be in as new condx. Ring Stuart, G4OOK, QTHR. (Middlesborough) 0642 211685.

DRAKE MS-4 in full working order. (Stoke on Trent) 0782 503444.

EIMAC 4CX1000. G3TMA, QTHR. (Spalding) 0775 87464.

ELECTRONIQUES 85kHz IF, specifically any Electroniques Coils, 'Qoilpax', transformers, IF Strips, etc generally. Tony. (Worcester) 0905 641759.

FC902 ATU Must be in good condx and reasonably priced. Jim, G0BGY, QTHR. (New Malden) 081 949 5549.

FT707 FM Board with fitting Instructions. Not QTHR. Phone anytime. (Weston-Super-Mare) 0934 412557.

FV101B VFO for Yaesu FT101E Tcvr. G0DRA. (Lichfield) 0543 252096 Evenings.

HALLICRAFTERS SX28 Super Skyrider, working or restorable. CODAR CR45, CR66, and Q-Multiplier. G4HHZ, QTHR. (Hants) 0703 268705.

HF-5B Butterfly Beam. G3DPX, QTHR. (Sidmouth) 0395 7427.

ICOM H16 VHF PMR H/Held Portable with bttry, etc. Details to G3PMJ. (Gtr. Manchester) 061 790 0650.

KANTRONICS Signal Enforcer (dual CW, SSB, RTTY filter). (Reading) 0734 722085.

KENWOOD TS130V Low Power Tcvr. G4BWP, QTHR. (Near Newmarket) 0638 552080.

MFJ 986 '2 Knob' Differential HF ATU: Buy or PX; Yaesu FC757 Auto HF ATU 150W metered, VGC. GW4RLP, QTHR. (Caernarfon) 0286 675264.

RA17L VFO1 (MC/S) dial, also mter and Racal badge, J-Beam 2M 6ele quad. Info please Redifon 'Safari' manual, p/stat WHY? (Derby) 0332 671536.

RACAL RA180 RF Unit. MA185 Demodulator. Other RTA191 Speedrace Receiver Units considered, also Manuals for same. AR88D required for Spares or Rebuild, non worker, OK if Complete. Will collect reasonable distance. (Mansfield) 0623 641709.

RACAL Rx bits, WHY? For the RA1792. External I/O board, type ST82765. Also seeking any rack mounted Drake receivers. Thanks. (Shrewsbury) 0743 884858.

ROTATOR, complete with control gear, suitable for 2-el triband HF beam. (Nr Dunstable) 0525 221161.

SEEKING really first class Drake R4C Rx, complete for main bands 160/10 plus all the trimmings. Please contact G3CUN. (Birmingham) 021 474 4856.

SPECTRUM Analyser System for my Ham R+D Lab: 50 Ohm: <=!MHz to >=2GHz: Widescan Sweep =>1GHz on Screen: Narrowscan Resolution =<1KHz at =>80dB difference visible on screen. Power attenuation =>100W =>500MHz to safe level and flat to within 3dB. Sensible cash (Similar to top range HF Tx/Rx new) waiting. WHY dealer or private. G3ROZ, QTHR. Strickly Weekends only. (Sandy, Beds) 0767 680828.

TRIO /Kenwood TS430S or Yaesu 757, will pay up to £425 working. Phone or write to Steve, 7 Mayfield Road, Port Isaac, Cornwall, PL29 3RT. (Bodmin) 0208 880603.

WANTED: Yaesu counter digital display Unit to update my FT101Z to FT101ZD standard. G4OSB, QTHR. (Lincoln) 0522 682958.

YAESU 221R. Any condx considered. New Ceramic 2C39. Sivers or similar 18GHz Coaxial Relay (SMA). 20dB 10w Attenuator to 12GHz. (Yelverton, Norwich) 0508 492025.

YAESU Desk Mic MD1B8 or ICOM SM8 Mic. Also buy or borrow Handbook for Yaesu Freq Counter YC3555D. G3DWQ. (Preston) 0772 53810.

YAESU FP757HD Power Supply and FC757AT ATU or FC700 ATU, also MD1 Desk Mike; mint condx only. Colin, G7KIZ. (Redditch) 0527 543598.

YAESU FT736, cash waiting for the right price. Prefer Midlands or North of England. Tony, G0JND. (Buxton) 0298 26800.

YAESU Satellite Unit for FT726R. Must be in GWO. Phone Martin, G7JWR. (Stoke on Trent) 0782 303094.

YAESU YP150 dummy load and pwr meter. Also FT101 series workshop manual, will collect if reasonable distance. G3XZI QTHR. (Sheffield) 0742 551417.

EXCHANGE

EXCHANGE My IBM PS/1 286 computer with 1MB RAM SVGA monitor with mouse and optional audio card and joystick, boxed, mint condx, for dual band Yaesu mobile Tcvr with remote head, or sell for £360. Laurence, G1SWL. Eves/Mobile anytime on 0831 543164. (Fleet) 0252 624028.

FT709R H/H, 70cm and HF mobile linear 80-10M 150W variable output preamp, new PA's. Wanted: BNOS 2M or 70cm linear or TNC to go with BBC master, or HF module for FT726R. Ian G7HXI. (Stalham) 0692 580201 before 9pm.

IBM PC compatible 80386 DX40 mini tower with 160MB hard drive 4MB RAM 1MB video controller, 3.5" and 5.25" floppies, SVGA monitor, loads of s/ware, 1 month old. Swap for best example of a Kenwood TS940S, up to: £150 on top of PC for TS940S fitted with ATU external spkr and optional filters. Laurence G1SWL QTHR. eves or mobile. (Fleet) 0252 624028 or mobile 0831 624028.

YAESU FT290R, carrycase, Nicads and charger, orig Box, excellent condx. Exchange for dual band handheld. Call GM7NFP, Not QTHR. (Crail, Fife) 0333 50503.

CLUB NEWS

DEADLINE - Items for inclusion in the June 1993 issue must be sent to HQ marked "Club News - DIARY", to be received by 20 April 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 - 26, talk 'home winemaking' with free samples! Details 0272 672124.

SOUTH BRISTOL ARC - 7, talk 'Training for a Private Pilot's Licence'; 21, talk on 'Stress Management' by Maralin Nash; 28, talk on 'Simple Computer Programming'. Details 0275 832222 on a Wednesday evening.

BEDFORDSHIRE

DUNSTABLE DOWNS RC - 2, talk 'Radio Controlled Model Boats' by Steve Bond; 30, talk 'Antenna Circus' by Dick, G3WLM. Details 0525 211249.

SHEFFORD & DARS - 8, vintage evening, bring your radio kit, books and other bygones; 15, talk 'Ariane the rocket and launch site' by John Goldfinch; May 6, talk 'Modern 10GHz operation' by Bryan, G8DKK. Details 0462 700618.

BERKSHIRE

BRACKNELL ARC -.14, informal quiz night at Farnborough ARS. Details Steve, G4AUC, QTHR.

BURNHAM BEECHES RC - 5, DF foxhunt-G7HID Fox; 19, talk SSTV by G4XDU; May 1/2/3, Spring DF picnic (Stafford). Details 0628 25720.

MAIDENHEAD & DARC - 1, talk 'FM Systems' by Roger, G3VCT; 20, talk 'PC Computer part II' by Keith, G0CWI; May 6, talk 'Bracknell 70cm Repeater GB3BN' by Tim, G4EMO. Details 0628 25952.

NEWBURY & DARS - 28, Annual General Meeting at Bucklebury Memorial Hall. Details 0635 863310.

READING & DARC - 8, talk 'WW2 Radio Equipment, part 2'; 22, talk 'The Optimised Doublet Antenna', by Vin Robinson, G4JTR; May 13, talk 'HF NFD Planning' by G3WGV and G0PUB. Details 0734 476873.

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 7, talk 'Cellular Telephones' by R Biltcliffe, G2BSJ; 21, Talk 'Members Shacks slide Show' by I Earnus, G3KLT; May 5, talk 'The Bletchley Park Trust'. Details 0296 81097.

CHESHAM & DARS - 14, construction evening, by CW Tutor; 21, CW practice with club Tutor; 28, talk 'Technical topic-Repeater & Beacons'. Details 0494 676391.

CHESHIRE

CHESTER & DARS - 6, Radio ideas and discussion; 13, Surplus equiptment sale; 20, Power supplies, by G8OJO; 27, Special General Meeting , part 2. Details 0244 336639.

MID-CHESHIRE ARS - 7, talk 'Theatre in POW Camp' by Len Moss; 14, talk by John Taylor, G6VJC of Castle Electronics; 21, On-Air Night; 28, talk 'History of Computing' by G4XFD; May 5, Talk 'Theatre make-up' by Len Moss. Details from M Baguley, G7LQD, QTHR.

NORTH CHESHIRE RC - 18, talk 'Radio Servicing' by Castle Electronics of Kingswinford. Details from G0OZJ on 061 485 5036.

STOCKPORT RS - 14, talk by The Fraud Squad; 28, talk 'Solar Activity' by Jim Tottle, G4SSN; May 13, Introduction to Packet Radio by Dave, G4UJD. Details 061 439 4952.

WIDNES & RUNCORN ARC - 13, Construction night; 25, Treasure hunt; 27, Activity night. Details from Dave, G7OBW on 0270 761608.

CLWYD

CONWAY VALLEY ARC - 1, talk 'Receiver Front Ends'. Details 0492 530725.

WREXHAM ARS - 6, talk 'Test Equipment'; 20, Quiz; May 4, talk. Details 0978 845858.

CORNWALL

CORNISH RAC - 1, AGM; 6, Activities night; 12, Computer section night. Details 0209 820836.

CO FERMANAGH

LOUGH ERNE ARC - 18, Annual Mobile Rally at The Killyhevlin Hotel, Enniskillen. Contact Alwyn, GI0BFD, QTHR. Tel 0365 323802.

DERBYSHIRE

BUXTON RA - 7, Junk sale; 13, Quiz night, plus live Morse; 27, Walking Fox hunt. Details G4IHO, on 0298 25506.

DEVON

APPLEDORE & DARC - 6, Construction techniques class; 19, Morse class and talk 'Antennas and Feeders' by G0FCL; 20, Construction techniques class. Details 0237 477301.

EXETER ARS - 19, Annual Inter Club Quiz; May 10, Surplus sale. Details 0392 214204.

EXMOUTH ARC - ***NEW SECRETARY*** Geoff Thornton, G8EKW, 4 Fir Tree Close, Exmouth, Devon EX8 4EU. 14, Refresher for Inter Club Quiz to be held at Exeter Club venue on Monday 19th April. Details G8EKW, QTHR.

DORSET

DORSET POLICE ARS - 1, Annual General Meeting. All members requested to attend. Details 0202 229351.

SOUTH DORSET RS - 6, Annual General Meeting and Presentation of trophies. Details 0305 773860.

EAST SUSSEX

HASTINGS E&RC - 21, Junk sale; May 19, talk & demo 'Police forensic techniques' by G7GHP. Details 0424 830454.

SOUTHDOWN ARS - 12, Talk 'Latest developments in Computing' by Computing Devices Ltd; May 10, Talk 'Mercurey Communications' by John Vamperlow from Mercurey. Details 0323 485704.

ESSEX

BRAINTREE & DARS - 5, Construction contest; 19, Shack talk; May 17, Annual General Meeting. Details 0376 327431.

CHELMSFORD ARS - 6, talk 'The Essex Water Company's system'; May 4, talk 'Aerials for the HF Maritime Service' by Tony Gilbey, G4YTG. Details 0245 260831.

CLACTON RC - 14, talk 'Working Marine Mobile' by Brian Allen, G7BVZ. Details 0255 672606.

LOUGHTON & DARS - 2, Annual General Meeting; 16, Video night - the latest videos from the RSGB & other sources. Details 081 500 2811.

FIFE

DUNFERMLINE RS - 1, talk 'Hardware or Software?' by John, GM4ANB; 8, Committee Meeting(7pm), and HF Operating evening; 15, talk 'VHF portable Operating' by Alan, GM4ZUK; 29, Shack tidy and preparation for Junk Sale.

GRAMPIAN

ABERDEEN ARS - 2, Junk sale. Details 0224 706619.

GREATER LONDON

ACTON, BRENTFORD & CHISWICK RC - 20, talk 'Practical problems in EMC' by G3IGM. Details 081 749 9972.

BROMLEY & DARS - 20, Talk 'Death Valley by Bicycle' by Dave Wellman, G0OBL. Details 081 658 2988.

COULSDON ATS - 12, Visit to the Brooklands Motor/Aircraft Museum. RV at Grovelands Road at 10.00am . ETA at the Mueseum at 10.45am for people who want to make their own way. Details 081 684 0610.

EDGWARE & DARS - 8, talk 'The Enemy is Listening' by George Morley, G0OXH; 22, Spring Morse training evening. Details 081 204 1868.

KINGSTON & DARS - 21, talk 'Secret Listeners' by Brian Cannon, G8DIU. Details 081 398 1128.

SOUTHGATE ARC - 8, Grand surplus equipment Sale; 22, London AR & C Show debrief, photo's, video's etc. Details 081 360 2453.

SURREY RCC - 5, Annual General Meeting; May 3, Construction Contest. Details 081 660 7517.

SUTTON & CHEAM RS - 15, Junk Sale; May 4, Club visit to Didcot Power Station, Oxfordshire. Details 081 644 9945.

WIMBLEDON & DARS - 30, talk 'I followed Rommel' by Joan Nicholls. Details 081 397 0427.

GREATER MANCHESTER

ECCLES & DARS - 6, discussion 'HF NFD Contest'; May 4, talk 'Effective car alarm systems' by G0KLF. Details 061-773 7899.

TRAFFORD ARC - 1, talk 'Astronomy - through space and time'. Details 061 973 0617.

GWYNEDD

DRAGON ARC - 5, talk 'Using a Camcorder' by Trefor, GW0PZS & Dewi, GW0ABL; 19, 'The Grand Debate' when we hope to challenge the Conway Valley Club; May 3, Bank Holiday Surplus sale. Details 0248 600963.

HAMPSHIRE

BASINGSTOKE ARC - 5, Talk 'Magnetic Loop Antennas' by Len, G3MAO; 25, 2m Direction Finding Competition, OS175 - Fox, G1ZSF; May 3, Junk Sale. Details 0256 25517.

HORNDEAN & DARC - 1, Talk 'F-layer propagation' by Dr Geoff Grayer, G3NAQ; May 6, Visit by Peter Chadwick, G3RZP, RSGB President. Details 0705 472846.

ITCHEN VALLEY ARC - 9, open meeting; 23, talk 'BNFL and Nuclear energy' by British Nuclear Fuels plc. Details 0703 736784.

SONY BROADCAST ARTG - 19, Huge junk sale and equipment auction. Details from Stephen Harding, G4JGS, 0256 483454 (office hours).

WINCHESTER ARC - *NEW SECRETARY* Peter Simpkind, G3MCL, 6 Compton Way, Olivers Battery. Details 0962 860807.

HEREFORD AND WORCESTER

BROMSGROVE & DARC - 9, Annual Constructors competition. Details 0562 710010.

BROMSGROVE ARS - 13, Aerial Construction (2m); 27, Birthday Party!!! 10 years; May 11, Annual General Meeting. Details 0527 546075.

HEREFORD ARS - 2, talk 'CES Antennas' by Rick Logan, G4WXF. Details from Errol G Robinson, 29 Folly Lane, Hereford HR1 1LX.

VALE of EVESHAM RAC - 1, talk 'Giant Spark Transmitters' by Tony Hopwood. 8pm at the BBC Club, High Street Evesham. Details 0386 41508.

HERTFORDSHIRE

BISHOP STORTFORD ARS - 19, talk 'Directional Aerials for Radio Fox hunt' by John, G8XLB. Details 0799 550313.

CHESHUNT & DARC - 7, Exhibition of new Amateur Radio equipment by Mike Haydon; 14, Members' Forum; 21, talk 'The Enemy is Listening' by George Morley, G0OXH. Details 0992 464795.

DACORUM AR&TS - 25, A R Boot Sale, held at Heath Park Hotel, Hemel Hempstead at 10am. Details 0442 259620.

HODDESDON RC - 1, talk ' hints and tips' by Don, G3JNJ; 15, talk ' The Post Office Tower' by George Morely; 29, Social night. Details 081-804 5643.

STEVENAGE & DARS - 6, Novice update - progress on 70cm PMR gear by Neil, 2E1ASZ; 13, Practical night; 20, talk 'QRP Operating skills - secrets & techniques' by Ron, G4DDX; 27, Practical night - HF/VHF night on air. Details 0438 724509.

WELWYN-HATFIELD ARC - 5, talk ' Computers and the Radio Amateur; 19, talk ' On Board from the Bottom up'; May 3, Lemsford Village Fete/Bar-B-Q, Hill Farm. TBC. Details 0920 462241.

VERULAM ARC - 27, talk 'Antenna Modelling Software' by Ian, G3SEK. Details 0923 262180.

HUMBERSIDE

BRIDLINGTON & DARS - 1, talk 'Emergency Services' by Mike Norrie; 15, pre Rally Planning meeting; 25, East Yorkshire Rally; 29, Rally Report. Details 0262 673635.

GOOLE R & ES - 9, Repeater Group report; 16, Video evening; 23, ATV Demonstration; 30, Social evening. Details 0405 769130.

GRIMSBY ARS - 1, talk ' White Rose Receiver' by G3TDZ; 15, talk 'Morse etiquette, procedure and the new Morse test' by Judy, G0IGH; 29, visit to Humber Radio (max numbers 15). Details Grimsby 825899.

NORTH FERRIBY ARS - 16, RSGB matters and talk 'My Importing & Exporting Experiences' by Norman, G4NJP (RSGB RLO); 30, Demonstration and talk 'The New Phasing Transceiver' by John, G3TDZ. Details 0482 650410.

ISLE OF MAN

ISLE OF MAN ARS ***NEW VENUE*** The Royal Navy Assn, Regent Street, Douglas. Club meets every Monday 8.30pm. Details from Mrs J Wrigley, GD7DPG.

KENT

DARENTH VALLEY RS - 14, talk 'Introduction to the use of computers in amateur radio'; 28, video evening; May 12, talk 'CTSS' by Neil, G7AKQ. Details 0474 703322.

EAST KENT RS - 1, Talk 'Aerials' by Dr Ken Smith, G3JIX; 15, talk 'The Observatory sited at Canterbury High School' by Kevin, 2E1AJL: held at Icom UK; May 6, talk 'RAYNET' by Ron Glover, G6RMA at Parkside. Details 0227 364606.

HILDERSTONE RS - *NEW SECRETARY* V.B. de Rose, 4 Briars Walk, Broadstairs, Kent CT10 2XR, tel: 0843 869812; 23, talk 'Modern AM 100m TX Pulse width modulation' by G3JIX; May 14, talk & demonstration 'Surface Mount for Amateurs' by Ron, G3TAJ. Details 0843 869812.

MAIDSTONE YMCA ARS - 2, RAE & CW; 16, RAE & CW; 23, Junk Sale; 30, RAE & CW; May 7, Construction competition (open); 8, Morse Test. Details 0622 670936.

SOUTH EAST KENT (YMCA) ARC - 21, Construction contest; 28, Annual General Meeting. Details 0304 372656.

LANCASHIRE

THORNTON CLEVELEYS ARS - 5, talk 'The Scenery of Scotland' by Peter Whittaker; 26, talk 'QRP' by Rev Dobbs, G3RJV. Details from G4BFH, QTHR.

ROCHDALE & DARS - 12, talk 'Five Million Volts'. Details 0706 32502 or 061 653 8316.

LEICESTERSHIRE

CHARNWOOD ARCC - 11, Club Field Day HF. Details 0509 232927.

LEICESTER RS - 5, Constructions Competition - Trophies awarded to winners; 19, Lecture night; 26, May 3, VHF Contest review, VHF NFD preliminary planning. Details Leicester 762241.

LOUGHBOROUGH & DARC - 6, Junk sale; 13, First DF 2 metre; 20, talk 'Meteor Scatter' by G3KWY; 27, Visit to Ratcliff Power Station; May 4, 2m DF. Details Loughborough 218259.

LINCOLNSHIRE

GRANTHAM RC - 6, Visit to the County Emergency Centre, Lincoln; 20, talk ' Oscilloscopes' by G6IPW; May 4, Club Quiz. Details 0476 65743.

NORFOLK

YARMOUTH RC- 1, Informal/Inter Club Quiz at Lowestoft; 8, Propagation & Satellite Update by G3IOR; 15, Informal; 22, Technical Topic, talk by G3OEP; 29, Informal; May 6, Used Equipment Sale. Details Yarmouth 721173.

NORTHAMPTONSHIRE

KETTERING ARS - 20, Annual General Meeting; 27, talk 'Repeaters' by G4AFJ. Details 0536 514544.

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM - 1, Construction evening; 8, Annual General Meeting; 15, Forum; 22, Foxhunt No 1; 29, Junk Sale; May 6, talk 'WAB Awards' by G0FEZ. Details 0602 232604.

MANSFIELD ARS - 1, Junk Sale. Details from G0NZA, 0623 755288.

SOUTH NOTTS ARC - 2, Construction at Fairham College; 16, Open Forum - Members only; 23, Illustrated talk on the SNARC sponsored 1992 trip to Friedrichshafen by G0LXX; 30, Construction at Fairham College. Details 0602 211069.

SOMERSET

TAUNTON & DARC - 2, Talk 'Radar down Under' by Graham, G0GTR; 16, Talk 'Operating from Ascension Island' by John, G0FJT. Details from G3WNI, QTHR.

WEST SOMERSET ARC - 6, Annual General Meeting & Equipment Construction contest with annual prize. Details G4AJU, QTHR.

YEOVIL ARC - 1, Kwiz, Quizmaster G3MYM; 8, Adjudication of Construtors Contest entries; 15, Video 'Melbourne Radio Club 1992'; 22, Annual General Meeting; 29, Committee meeting. Details 0258 73845.

SOUTH YORKSHIRE

BARNSLEY & DARC - 19, talk by G4EJP, RSGB Questions & Answers, with G4JKW-RLO; 26, Talk 'Telescopes' by Bill Taylor, G3GRT. Details 0226 203448 between 6-7pm Mondays, 6-8pm other days.

STRATHCLYDE

KILMARNOCK & LOUDOUN ARC - 6, Constructors night; 20, talk by RSGB Rep GM4AUP; May 4, Talk 'Radio History' by GM3AXX. Details 0563 820052

WEST OF SCOTLAND ARS - 9, Making the best use of Test equipment; Developments in ATV. Details 0698 350926.

SUFFOLK

IPSWICH RC - 14, South Anglia Repeater Group Annual General Meeting; 28, Annual General Meeting. Details 0473 742072.

LOWESTOFT DISTRICT & PYE ARC - 1, Inter-Club Quiz V Gt Yarmouth; 8, Illustrated talk '20 years in Amateur Radio; 29, Video Evening end of Season Social. Details Lowestoft 564325.

SURREY

ECHELFORD ARS - 8, Annual General Meeting; 22, Contest Operating by G4TSH. Details 0344 843472.

TAYSIDE

DUNDEE ARC - 20, Lecture 'QRP - history, equipment & tactics' by Ty, GM0LNQ; 27, Construction Night; May 4, Lecture 'Museum of Communications, BoNess' by Harry Matthews. Details from GM4FSB, QTHR.

WARWICKSHIRE

STRATFORD UPON AVON & DARS - 26, Annual General Meeting; May 10, Preparing for the 2m DF Foxhunt. Details 060 882 495.

WEST MIDLANDS

SOUTH BIRMINGHAM RS - 7, Talk/slide on Australia; May 5, talk 'Badger Boards' by G4YZO. Details 021 458 1603.

WEST SUSSEX

CHICHESTER & DARC - 6, Annual General Meeting. Details Chichester 573541.

WEST YORKSHIRE

DENBY DALE ARS - 7, Surplus sale; 21, talk 'American Adventure' by Tony, G0DBB; May 5, Talk 'Clocks' by David Poole. Details 0484 429238.

HALIFAX & DARS - 20, talk 'Search and Rescue Dogs' by Neville Sharp. Details Halifax 202306.

KEIGHLEY ARS - 8, Junk Sale; Night on the Air, GX0KRS GX7KRC; 29, QRP Construction 'build it yourself' by Rev Dobbs. Details 0274 496222.

NORTHERN HEIGHTS AR&ES - 7, Annual General Meeting. Details 0422 360574.

TODMORDEN & DARS - 5, Video Night; May 3, talk 'Pony Express- the real thing' by Tony, G0DDB. Details Halifax 882038.

WILTSHIRE

CHIPPENHAM & DARC - 27, Annual General Meeting. Details 0225 706265.

TROWBRIDGE & DARC - 7, talk 'CW operating practice and procedures' by Reg, G3BPE; 21 Event planning & social. Details 0225 864698 (evenings).

RALLIES AND EVENTS

This is a list of all rallies, hamfests, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Rally News - DIARY'.

4 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: 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.

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

CENTRAL SCOTLAND FM Group - Annual General Meeting at the Golden Circle Hotel, by Bathgate, West Lothian. Trade Show (open to all) 11.00am to 2.00pm. Business meeting (restricted to member and those joining at the door) 2.15pm to 5.00pm. Talk-in on S22. Full details from GM3AXX, QTHR, tel: 0560 82720.

MARSKE-BY-THE-SEA Radio Rally - Marske Leisure Centre, High Street, Marske-by-the-Seanear Saltburn. 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. S E S callsign GB0IMD on air. Details from Douglas, G3KPO, QTHR 0983 567665.

25 APRIL

BRIDLINGTON & DARS East Yorkshire Rally - The Spa, Bridlington. Doors open 11am (10.30 for disabled visitors). Trade and Club Stands; refreshments; bar; tombola; Bring & Buy etc. Details Norman A Bedford, G4NJP, 0262 673635.

BURY RS Hamfest - Bury Leisure Centre, Bolton Street, Bury. Details from Laurence, G4KLT, 061 762 9308 (eves).

DACORUM AR & TS Car Boot Sale - Heath Park hotel, Hemel Hempstead. Details Dennis, G1AKX 0442 259620.

IRISH RTS Annual General Meeting - Royal Hotel, Bray, Co Wicklow. In conjunction with the AGM a Radio & Electronics Exhibition will be held at the same venue between 11am and 5pm. The Exhibition will comprise all the usual trade stands; Bring & Buy and special displays. Parking available. Admission £1 adults, 50p children. Details Sean Donelan, EI4GK, (01)2821420.

2 MAY

ANGLO-SCOTTISH Rally - Tait Hall, Kelso. Details Bruce, GM4UIB, 0573 224654 (eves).

BATC Rally - Harlaxton Manor, Nr Grantham, just off the A1 (signposted). Usual traders, Bring & Buy, bar and refreshments, lecture programme, demonstrations and flea market. Talk-in. Family venue. Details: Paul G8MJW, 0522 703348.

3 MAY

MID CHESHIRE ARS Rally - Civic Hall, Winsford. Doors open 11am (10.30 for disabled visitors). Full catering and ample car parking. Details: David G4XUV, 0606 77787.

9 MAY

MARS/DRAYTON Mobile Rally - Drayton Manor Park, Tamworth, Staffs, on A4091. Doors open 10.30am. Usual traders, flea market, bring and buy, club stands, a family rally. Details: Peter G6DRN, 021-443 1189. Traders bookings Norman G8BHE, 021-422 9787 (eves).

9th YEOVIL QRP Convention - Preston Centre, Monks Dale, Yeovil. Doors open 9am. Admission £1.50. QRP related lectures; display of home-made QRP equipment; on-air QRP stations using callsign GB2LOW; trade stands orientated to QRP components etc; a chronological display of working vintage radio; refreshments available throughout the day. Details: G3CQR, 0935 813054.

16 MAY

DUNSTABLE DOWNS Radio Club - Annual National Amateur Radio Car Boot Sale at Stockwood Park, Luton. Nr junction 10 M1. 10am until 5pm. Talk-in 2m and 70cms. Attractions include admission to the Environmental Open Day, free entry to Mossman collection of Horse Drawn Vehicles, craft museum, Falconry displays, Rare Breeds exhibition and carriage rides. Plot details on 0582 451057(6-8pm ONLY please)

36th NORTHERN MOBILE Rally - The Flower Show Hall, Great Yorkshire Showground, Harrogate, North Yorkshire. Entry and parking off Wetherby to Harrogate Road. Seperate arrangements for disabled visitors off Hookstone Wood Road. Showground open 10.00am, doors open 10.45am. 100's of stands; bring and buy, bar, cafeteria and free parking. Details from Mike, G0MKK: tel 0423 507653 eve; Fax 0423 500747 or packet G1UXP @ GB7CYM.

RSGB'93 Exhibition - NEC Birmingham. Details from Norman Miller, G3MVV, 0277 225563.

30 MAY

17th EAST SUFFOLK Wireless Revival - Maidenhall Sports Centre, Ipswich. Doors open 10am-4pm. Car boot sale, Bring & Buy; all usual traders and displays. Talk-in on S22 GB4SWR. Organised jointly by Ipswich RC, Martlesham RS and Felixstowe & DARS. Details: Bob Baal G7HZV, 0394 271257.

MAIDSTONE YMCA Radio Rally - Route: M20 jnct 4,5,6 or 7, then A229 Loose Village 2 mi south of Maidstone. Doors open 10.30am (10am for severely disabled visitors). Entry £1 per adult. QSX G8TRF (S22) and G3YSC (10FM & SU22). Exhibition station GX3TRF (on HF). All day video show etc for juniors. Refreshments available. Bring & Buy tables for hire (DIY). YMCA Sports Centre. 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 - Springfield Gardens, Spalding. All trade stands and flea markets will be under cover in the new Exhibition Halls. Details: Mr T Kettlewell, G4TWR, 0775 722940.

13 JUNE

24th ELVASTON CASTLE National Radio Rally - Elvaston Castle Country Park, nr Derby. 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, Hants. Doors open 10.00am to 5.00pm. Details: Cliff G4UJR, 0703 557469.

20 JUNE

DENBY DALE & DARS Annual Mobile Rally - Shelley High School (6 miles SE of Huddersfield on B6116). Doors open 11.00am (10.30am for disabled visitors), traders, car boot sale, refreshments and ample parking. Talk-in S22 and SU22. 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 - Longleat House, near Warminster, Wiltshire. Details from Shaun, G8VPG, QTHR 0225 873 098.

4 JULY

KINGS LYNN ARC Rally -Cattle Market, Kings Lynn. Details 0553 841189.

YORK Radio Rally. Details from Andy Suter, G0GXI 0904 708164.

11 JULY

HORNCASTLE Amateur Radio, Electronics and Computing Fair. Details T Nightingale, G6CZV, 0507 522482.

SUSSEX AR&C Fair. Details & traders' booking: Ron Bray, G8VEH, QTHR 0903 763978 (H) 0273 415654 (W).

25 JULY

COLCHESTER Radio & Computer Rally. Details: Frank, G3FIJ, 0206 851189.

RAIBC Romsey Picnic at Broadlands. Details John, G4COM 0703 693017.

NORFOLK AR Rally. Details Sheila, G0KWP, 0603 618810.

SCARBOROUGH Radio Electronics & Computer Rally - Change of venue to: North Riding College, Filey Road, Scarborough. Doors open 11am. Details from Ross Neilson, G4ZNZ 0723 514767

1 AUGUST

McMICHAEL Rally and Car Boot Sale. Details Neil, G0SVN or Roy, G4XYN, 0628 25952. (This rally was originally scheduled for 18 July).

8 AUGUST

DERBY & DARS Mobile Rally. Details from Martin Shardlow, G3SZJ QTHR 0332 556875 or via packet @ GB7LTN.

FLIGHT REFUELLING ARS Hamfest'93. Details Richard Hogan, G4VCQ 0202 691021.

22 AUGUST

WEST MANCHESTER RC Summer Rally. Details: G1IOO, 0204 24104 (evenings).

29 AUGUST

TORBAY ARS Mobile Rally. Details G3HTX QWTHR, 0803 526762.

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.

MILTON KEYNES & DARS 7th Annual Radio Boot Sale. Details Ray, G1LRU, 0908 660798.

VANGE ARS Annual Rally. Details Mike Musgrave, G4NVT, 0268 543025.

11 SEPTEMBER

SCOTTISH AR Convention - Cardonal Eollege, Glasgow. Details Tom Hughes, GM3EDZ, 041 882 5753.

12 SEPTEMBER

BARTG Rally - Sandown Exhibition Centre. Details Peter Nicol, 38 Mitten Avenue, Rubery, Rednal, Birmingham B45 0JB, 021 453 2676.

LINCOLN SWC Hamfest. Details from Denis, G1XZG, 0522 684214.

19 SEPTEMBER

PETERBOROUGH R&ES East of England Rally. Details from Mike, G0CVZ 0733 222588.

26 SEPTEMBER

THE THREE COUNTIES Rally - Malvern. Details Eddy Cotton, G4PQZ, 0905 773181.

9th NORTH WAKEFIELD RC Rally. Details from John, G4RCG, 0924 362144.

3 OCTOBER

GREAT LUMLEY Radio Rally. Details Barry, G1JDP, 091 388 5936.

8/10 OCTOBER

RSGB International HF Convention - NEW DATE: The Beaumont Conference Centre, Old Windsor, Berks. Talks, latest amateur radio software, ladies' programme; Young Amateur of the Year award; invited traders and Special Groups; overseas visitors' reception. A full convention prospectus will be published by April which will include an advance booking form. Send SAE to: HF Committee, PO Box 599, Hemel Hempstead, Herts HP3 0SR. Details G4BWP, 0638 552080.

10 OCTOBER

KIDDERMINSTER & DARS - NEW DATE, NEW VENUE: Stourport on Severn High School. Details: Malcom, G8JTL 0384 894019 or Jeff, G0RJP 0299 822206.

16/17 OCTOBER

36th JAMBOREE ON THE AIR. Details from Activities Office, The Scout Association, Gilwell Park, Chingford, London E4 7QW, 081 524 5246.

17 OCTOBER

HORNSEA (East Yorkshire) RC Rally. Details Duncan, G3TLI, The Old School, Mappleton, Nr Hornsea, 0964 532588.

17/18 OCTOBER

SCOTTISH TOURIST BOARD RG - Launch of 1993 Airdrie MOD - GB2STB. Airdrie MOD is the 101st Annual Gaelic Festival held in a different town in Scotland each year, to promote the culture and heritage of the Scots nation, through its language, drama, music, dance etc.

29/30 OCTOBER(FRI/SAT)

LEICESTER Amateur Radio Show - Granby Halls. Details G4PDZ 0533 871086.

6/7 NOVEMBER

7th NORTH WALES Radio & Electronics Show. Details B Mee, GW7EXH, 0745 591704.

14 NOVEMBER

BARNSLEY & DARC AR Rally. Details Ernie, G4LUE, 0226 716339 (6pm-8pm please).

MARS/STOCKLAND Radio Rally. Details 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 March. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

1 APRIL

GB0CAT	Cheshire Cat
GB0CDX	Coastal Defence X
GB1CAT	Cheshire Cat
GB2CAT	Cheshire Cat
GB75RAF	75 Years Royal Air Force

2 APRIL

GB0SI	Summer Isles
GB200NLP	200 Anni Newcastle Lit & Phil

4 APRIL

GB0IMD	International Marconi Days

9 APRIL

GB2RCC	Radio Caravan Club

10 APRIL

GB100MR	Manx Railways 100 YEARS
GB2ESF	Edinburgh Science Festival

12 APRIL

GB2GOC	Gardens of Christ

13 APRIL

GB0HLC	Harrogate Ladies College
GB1HLC	Harrogate Ladies College

16 APRIL

GB0TYS	Scottish Activity Weekend

17 APRIL

GB2CDQ	Coastal Defence 'Q'

23 APRIL

GB0MID	Marconi International Day
GB2MDI	Marconi Day International
GB2MID	Marconi International Day
GB2RCC	Radio Caravan Club
GB4IMD	International Marconi Day
GB4MDI	Marconi Day International

24 APRIL

GB0IOW	Isle of Wight
GB2SAF	Seighford Air Field

25 APRIL

GB0KOD	Knottingley Open Day
GB2AMN	Air Museum Newark

SILENT KEYS

WE HAVE BEEN advised of the deaths of the following radio amateurs:

G0GNB	Mr P J Kaye	10.01.93
G0LMP	Mr J K Garlick	26.01.93
G0NVB	Mr E Bringloe	25.01.93
G1LZC	Mr D J Scott	31.01.93
G3AYW	Mr G B L Woodburn	
G3CGZ	Mr D C Evans	
G3EUR	Mr J I G Brown	11.01.93
G3NFO	Mr J H Welsh	21.01.93
G3NRY	Mr R H Killick	12.01.93
G3PD	Mr F Lees	July 92
G3PXS	Mr P E Lewin	
G3TRY	Mr W J North	18.08.92
G3XFI	Mr E J Wright	Dec 92
G3ZW	Mr J W Carter	03.12.92
G4CQK	Mr A G Allnutt	14.02.93
G4GYZ	Mr E Metcalf	Jan 93
G4OHU	Mr R Larkin	10.01.93
G4RDN	Dr A P B Birt	Apr 92
G5YY	Mr W A Mead	14.10.92
G6AVU	Mr J Smith	21.01.93
G6WNC	Mr D P Billingham	27.01.93
GM0SKH	Mr J Moon	26.12.92
GW3AY	Mr W N Follis	09.01.93
GW3TWA	Mr E Humphries	25.01.93
RS3835	Gp Capt J M S Adams	15.01.93
VK4BHJ	Mr N Richardson	06.11.92

William North, G3TRY

BILL NORTH passed away on 18 August 1992, aged 62. He was an active member of the RSGB's ARDF Committee, being its Technical Officer.

In 1946 he built a 'moving' robot and his interest in radio led to him gaining his licence in 1964. Always building his own equipment, he designed and built the first fully transistor D/F Receiver (160m) and later designed and built the now famous and cheap-to-build G3TRY/TAD100 IC Receiver. He was President of the Mid-Thames Radio Direction Finding Club.

Bill was a single man, his main love in life being his hobby amateur radio. He will be sadly missed by all who knew him.

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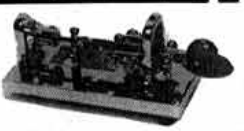

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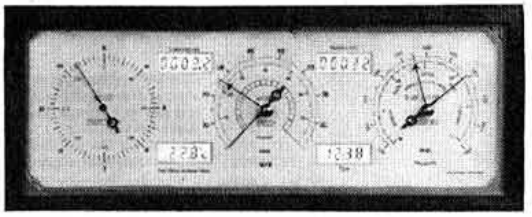

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Council, Committees and Honorary Officers

The Society has a large number of volunteer experts available to help and advise members on a wide variety of subjects. Each month we will be focussing on a different section of the volunteer workforce, whilst still giving brief details of the main office-holders. See also the Information Directory section of the *RSGB Call Book*.

• RSGB Policy Matters (Zonal Council member):-

Zone A (North of England):

Peter Sheppard, G4EJP, 89 St Catherines Drive, Leconfield, Beverley, North Humberside HU17 7NY. Tel: 0964 550397.

Zone B (Midlands):

John Allen, G3DOT, 4 Philip Avenue, Waltham, South Humberside, DN37 0QD. Tel: 0472 825899.

Zone C (SE England and East Anglia):

Neil Lasher, G6HIU, 61A Stile Hall Gardens, London W4 3BT. Tel: 081 747 4045.

Zone D (SW England):

Julian Gannaway, G3YGF, Dean Hill Barn, East Dean, Salisbury, Wiltshire SP5 1HJ. Tel: 0794 40008.

Zone E (Wales):

Clive N Trotman, GW4YKL, 19 Park View, Dolau, Llanharen, Pontyclun, Mid Glamorgan. CF7 9RZ. Tel: 0443 226198.

Zone F (Northern Ireland):

Ian Kyle, GI8AYZ, 1 Portulla Drive, Pond Park Road, Lisburn, Co Antrim BT28 3JS. Tel: 0846 665034.

Zone G (Scotland):

Ian Suart, GM4AUP, 37 Meldrum Mains, Glenmavis, Airdrie, Lanarkshire, ML6 0QG. Tel: 0236 765937.

• For general advice and details on local clubs, or if you don't know who to contact:-

Your RSGB Liaison Officer. See the *RSGB Call Book* or your membership card.

• Antenna Planning:

Need for permission and how to apply – booklet free to members from the Amateur Radio Dept at RSGB HQ.

Planning application refused – RSGB Planning Panel, via RSGB HQ.

Planning Advisory Committee Chairman: Post vacant.

• Awards:

For contest awards, refer to the appropriate contest committee.

For other awards, enquiries and applications go to either:

HF Awards Manager – Bill Ricalton, G4ADD, QTHR.

IOTA (Islands on the Air) Awards Manager – Roger Balister, G3KMA, QTHR.

VHF (and Microwave) Awards Manager – Ian L Cornes, G4OUT, QTHR.

• Band Plans and operating practices:

See the *RSGB Call Book* or March 93 *RadCom* for latest bandplans. For policy, contact the appropriate spectrum manager or committee chairman:

HF Manager – Martin Atherton, G3ZAY, 41 Enniskillen Road, Cambridge CB4 1SQ.

HF Committee Chairman – David Evans, G3OUF, PO Box 599, Hemel Hempstead, Herts HP3 0SR.

VHF Manager – Dave Butler, G4ASR, Yew tree Cottage, Lower Maescoed, Hereford HR2 0HP.

VHF Committee Chairman – Peter Burden, G3UBX, 2 Links Rd, Penn, Wolverhampton, WV4 5RF.

Microwave Manager – Charlie Suckling, G3WDG, 314A Newton Road, Rushden, Northants NN10 0SY. Tel: 0933 411446.

Microwave Committee Chairman – Mike Dixon, G3PFR, Woodstock, Gaze Bank, Norley, Warrington, WA6 8LL.

• RSGB Contests:

First contact the contest adjudicator (see the contest rules). For policy, contact the respective Committee Chairman:

HF Contest Committee – Dave Lawley, G4BUO, QTHR.

VHF Contest Committee – Bryn Llewellyn, G4DEZ, QTHR.

ARDF (direction finding) Committee – Brian Bristow, G4KBB, QTHR.

• EMC:

Advice on solving breakthrough and other electromagnetic compatibility matters:

Committee Chairman: Robin Page Jones, G3JWI, QTHR.

National helpline: 0533 593449.

• Emergency Communications:

Emergency Coordinations Officer – John Irving, G4XJT, 5 The Thicket, Fareham, Hampshire PO16 8PX.

• Exhibition & Rally Committee:

Organises trade shows at NEC, VHF Convention and Woburn Rally.

Chairman: Norman Miller, G3MVV, 'Avon', Gardiners Lane, Crays Hill, Billericay, Essex, CM11 2XA. Tel: 0277 225563.

• Intruder Watch (IARUMS):

Non-amateur service operation in exclusive amateur radio bands.

Co-ordinator – David Owen, G0OES, 9 Cornfield Drive, Boley Park, Lichfield, Staffs WS14 9UG.

• Licensing:

Licensing Advisory Committee Chairman (RSGB Policy) – John Bazley, G3HCT, 'Brooklands', Ullenhall, Nr Henley in Arden, Warwickshire, B95 5NW.

Government policy/licence conditions and interpretations – Amateur Radio Section, Room 613, Radiocommunications Agency, Waterloo Bridge House, Waterloo Road, London, SE1 8UA. Tel: 071 215 2316.

Renewals and payments – Subscription Services Limited, PO Box 884, Bristol BS2 8RH. Tel: 0272 258333.

• Membership Liaison:

Membership Liaison Committee Chairman – Clive Trotman, GW4YKL (see Zone E above).

• Morse Practice Transmissions (GB2CW):

Co-ordinator – Post Vacant.

• Novice Licence/ Project YEAR:

Hilary Claytonsmith, G4JKS, 115 Marshalswick Lane, St Albans, Herts, AL1 4UU. Tel: 0727 859318.

N.B. For details of training courses and examinations, write direct to RSGB HQ, quoting your postcode.

• Packet Radio:

Datacomms Committee Chairman – Ian Suart, GM4AUP. (See Zone G above).

• President:

Peter Chadwick, G3RZP, 'Three Oaks', Braydon, Swindon, Wilts, SN5 0AD.

• Propagation:

Propagation Studies Committee Chairman – Geoff Grayer, G3NAQ, QTHR.

• QSL Bureau:

Outgoing cards – PO Box 1773, Potters Bar, Herts, EN6 3EP

Incoming cards – your QSL submanager (see *RSGB Call Book*).

• Repeaters:

Repeater Management Group Chairman – Geoff Dover, G4AFJ, QTHR.

• Spectrum abuse:

Amateur Radio Observation Service Co-ordinator – Geoff Griffiths, G3STG, QTHR.

• Technical queries:

Technical and Publications Committee Chairman: Dick Biddulph, G8DPS, QTHR.

• Trophies:

Trophies Manager – Bob Harrison, G4UJS, QTHR.

The LAST WORD

THANKS AND . . .

Having just passed the RAE, I feel I must thank Margery Hey of Norfolk whose patience is boundless, Shelagh Chambers without whose tapes I could never have taken the exam, and Walter, G7MBN, whose encouragement knew no end. A very well-earned thank you to all.

John E Dibnah G7OPK

. . . THANKS AND . . .

Please could you give a mention of thanks to all the Packet mailbox (BBS) stations, particularly GB7EVY. Having been licensed for eight months, I use this BBS daily for many of my amateur radio needs.

When I first started to use it I was completely lost on how to go about using the service. Graham *** NAME/CALL***, the System Operator (SysOp) came to my rescue and helped me through my difficulties, both on 70cm phone and in packet messages from him.

I was somewhat amazed to learn that this particular station's equipment was all his own and that he was prepared (no doubt like many others) to provide a service for the benefit of the BBS's users 24 hours per day, year in, year out.

Whenever one requests information about Graham's BBS and its many options, it is freely given and explained in the simplest form for one to understand. I now know that GB7EVY has a large audience of users, and that when a breakdown occurs they work throughout the night to restore the service, which we take for granted.

Had it not been for the BBS SysOps and their dedication, this facility would not exist. Thank You.

Mike Marsden G7NDP

. . . THANKS AND . . .

I have pleasure in enclosing an official receipt for the sum of £4,521.55 and, on behalf of the Royal Society of Mentally Handicapped Children and Adults, I should like to thank you for co-ordinating this appeal for our Albanian project which is progressing extremely well.

We are most grateful to you and your members for assisting our project for people with a learning disability in Albania. Best wishes.

Brian Rix, G2DQU, The Lord Rix, CBE, DL
Chairman MENCAP

. . . THANKS AGAIN

After breaking an item on my Cushcraft Vertical Antenna, I wrote to Cushcraft USA and in the return post had the item replaced, all within ten days. What an excellent response from the company. Thanks again to Cushcraft.

Bob Daw G0MCE

STICK UP

With every month's issue of *RadCom*, appears yet another list of equipment stolen from owners' vehicles. But is the Society, indirectly through the membership, unwittingly contributing to their loss by the sales of car window stickers?

Sad to say, in today's social climate, one is not wise to advertise the contents within one's car, hobby or otherwise, and cars bristling with unusual antennas and stickers not only attract interested fellow members, but identify and provide an outstanding target for would-be thieves.

I am a member of RAFARS and we also have our own sticker, but have been advised to display wisely and not at national meetings.

I received my order of HF Contest Sheets from HQ with the VHF Location Chart and windscreen sticker 'I Love Amateur Radio', issued free with all orders placed during January. Having no mobile equipment and although I love and support the hobby, being licensed and a members of the RSGB since 1950, I will not be displaying the free sticker.

E McFarland G3GMM

MORSE IN CENTRAL SCOTLAND

With ref to the list of RAE and Morse Classes published under 'News and Reports' in September 1992 RadCom, could I be permitted to draw to your readers' attention that a full range of Morse Instruction facilities are available in the above area through MEGS (the Morse Enthusiasts Group Scotland). Anyone interested should contact the undersigned.

Geo M Allan GM4HYF, Chairman MEGS, tel: 041 634 4567.

GB2RS ON AM

In the interesting article 'GB2RS on 50 and 430MHz'(*RadCom*, February), no mention was made of the unique and very important *GB2RS* news transmission on 40m AM. This is made every Sunday morning at 9 o'clock from the station of Jimmy Porter, GI3GGY.

AM has been in use for many years to assist those amateurs and SWLs unfortunate enough to be in hospital or confined to bed at home, and who do not have the luxury of a bedside SSB receiver. A simple AM short-wave radio enables them to keep in touch with the news.

The numerous letters received by Jimmy over the years are testimony to the appreciation with which the AM news service is received. Reports are not confined to the British Isles and Europe; listeners report from all over the world including one from Jim Jackson, ZL2BCG, which is probably a distance record for the 40m news.

Jimmy attributes his many long-distance reports to his rotatable 16-element LPH-9 log periodic antenna system and the vintage broadcast-quality RCA ET4336 high level amplitude modulated transmitter which he has been using continuously since 1949, and which he maintains in pristine condition.

June Dunne GI4MJD, GB2RS 2m
Newsreader for Londonderry

[Sorry I missed this one. The additional benefit of such a service are obvious to those of us who first came across amateur radio by accident whilst tuning around on a broadcast radio - Ed]

SEEK YOU

At rallies I have attended recently I would be lucky to see more than four people wearing their callsign. Gone is the pleasure of a chance meeting with someone for the first time because you recognised the call. Apart from being bad business for the badge engravers, it indicates to me a lack of pride in the hobby and a certain amount of selfishness - "I'm too busy to stop and talk to just anyone / I can't be bothered" etc. Is it the same on the air too? When did you last put out a CQ?

Economic times are hard, but surely a little courtesy would be worth a lot. Lets get positive and show some pride in that well-earned callsign. Put on a happy face and, even if there are no radios going for a bargain, at least spend a while getting to know your fellow hams.

Brian Burke G4HIY

NOTIFICATION OF DESTRUCTION

I have just destroyed 2000 QSL cards, all uncollected over the last two years by the G4 S series. It is such a pity as there were some much sought-after cards amongst them. Please collect your cards or ask your contacts not to QSL.

Alec Bell G4MHQ, Sub-Manager for the G4 S Series.

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.

ENCOURAGE NETS

After just spending a hectic weekend with Thinking Day On The Air I would like to make some comments on the event.

Operating standards were quite good, with the youngsters exchanging names and so on. It was good fun helping to get them their communications badges as they logged twenty stations. However, I feel that we should encourage stations to form nets; this would be for two reasons: 1) to use fewer frequencies and 2) it would stop us from chasing each other up and down the bands when the station you would like to call tells you it's not their frequency.

While talking to various stations I asked them to break between overs but they were very snappy on the mike button! So if anyone was waiting they got cut out, so I gave breaks myself on my overs but only one other station took up the offer to join in. If operators would like to know how to run a net then I can tell of no better place than the WAB net on 7MHz.

Terry Vale G0LUQ

SILLY SOAP HAM

Once again television makes a hash of amateur radio as they introduce it in the Channel 4 programme *Brookside*. Why do they have to introduce the hobby in such a way, with such a silly man, without a thought to the history of amateur radio and its many interesting and sometimes life-saving aspects? Please, for the sake of the hobby, tell them to get it right this time.

Ken Hatton G4IZW

[The Society is in touch with Channel 4 about this - Ed]

CQ, CQ QRP . . . .

My "ham" radio callsign is G0KHB
And I use three-point-five megs, CW, QRP.
I run two watts on "eighty" from some shaky home brew gear.
On three five six oh KiloHertz, or thereabouts, you'll hear,
A shade above the noise, a rock-bound plea for company:
CQ DX CQ DE G0KHB.

No replies are forthcoming. Perhaps nobody is there.
But hark! On this frequency, a strong signal gets on air.
He sends a call and I reply. But there's a catch, I know;
For I'm a tiddler in the mush. And him? He's QRO.
He QSYs. I try again. The frequency is free.
CQ DX CQ DE G0KHB.

A station has responded. He can even read my Morse.
And can I repeat my callsign? (I'm 599, of course . . . .)
I get name and QTH. Yes, I'll QSL. Oh, no!
QRM. Can't QSY so abandon QSO.
We go our separate ways. Maybe there's someone else. Let's see.
CQ DX CQ DE G0KHB.

You may well ask if the answer lies in the other way:
Go QRO, use SSB, give the shops all my pay.
Study, get a licence, then waffle 'til the cows come home?
No, never! There ARE hams out there. They must be lying low.
I will entice them with my home-made HF recipe:
CQ DX CQ DE G0KHB.

I think I hear the silent ghosts of "A" Class licensees.
Rank on rank of unused paddles, bugs and straight Morse keys.
Do they play with black boxes on two meters Funny Mode?
Is this the reason they took time out and learnt Morse's code?
I think not. So, on eighty metres, QRP, I'll be.
CQ DX CQ DE G0KHB.

Mark Davis, G0KHB

Note: Many letter have been received regarding the pros and cons of a code-free licence. These have been passed to the HF Committee which is investigating the subject. A report on the committee's findings will appear in *RadCom* as soon as it is available.

RSGB BOOK CASE

PRICES NO LONGER INCLUDE POST AND PACKING

Antennas

ANTENNA COMPENDIUM VOLUME 1 (ARRL)
G L Hall, K1TD, P Rinaldo, W4RI, M Thompson, KA1DYZ
A collection of antenna articles with something for everyone. 175 pages. **(£10.25) £8.72**

ANTENNA COMPENDIUM VOLUME 2 (ARRL)
Jerry Hall, K1TD
208 pages. **(£10.25) £8.72**

THE ARRL ANTENNA HANDBOOK (ARRL)
16tth Edition **(16.50) £14.03**

BEAM ANTENNA HANDBOOK (RPI)
William Orr, W6SAI/Stuart Cowan, W2LX
Everything you need to know about beam design, construction and operation in this new 2nd edition. 268 pages. **(£7.50) £6.38**

HF ANTENNA COLLECTION (RSGB)
Erwin David, G4LQI
RadCom articles from 1968-89. A wealth of information on antennas, feeders, tuners, baluns, testing, modelling and the mechanics of mounting an antenna safely. 233 pages. **(£9.50) £8.08**

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Les Moxon, G6XN
The completely revised and greatly expanded 2nd edition of this popular book. A wealth of practical information on the choice and construction of antennas. **NEW (£13.50) £11.48**

PRACTICAL WIRE ANTENNAS (RSGB)
John Heys, G3BDQ
Wire antennas offer one of the cheapest ways to put out a good signal on the HF bands and this popular guide has something to interest every amateur on a budget. 96 pages. **(£8.00) £6.80**

W1FB'S ANTENNA NOTEBOOK (ARRL)
Doug DeMaw, W1FB
Explores the many aspects of simple antennas and related matters. 130 pages. **(£7.00) £5.95**

W1FB'S NOVICE ANTENNA NOTEBOOK (ARRL)
Doug DeMaw, W1FB
A plain-language introduction to practical antennas for complete beginners. 130 pages. **(£7.25) £6.17**

Awards

AMATEUR RADIO AWARDS BOOK (RSGB)
Cris Henderson, G4FAM
A compilation of all the world's popular and obscure awards which is suitable for the avid parchment chaser. Fully referenced and with many checklists. 188 pages. **(£9.50) £8.08**

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AMATEUR RADIO FOR BEGINNERS (RSGB)
Victor Brand, G3JNB
Suitable for all ages, this new book explains how to build a crystal set, how to listen to shortwave radio, and how to become a radio amateur. 65 pages. **(£3.50) £3.50**

NOW YOU'RE TALKING (ARRL)
320 pages. **(£13.00) £11.05**

D-I-Y RADIO SUBSCRIPTION (RSGB)
A 16-page all-colour magazine for beginners of all ages. Published six times a year, it includes simple construction projects, kit reviews, posters, ham facts, prize competitions and special offers. Six copies: **(£9.00) £7.65**
Prices include UK postage.

FIRST STEPS IN RADIO (ARRL)
Doug DeMaw, W1FB
(£5.50) £4.68

HOW TO PASS THE RAE (RSGB)
Clive Smith, G4FZH, and George Benbow, G3HB
A companion to the RAE Manual, this book contains some excellent practical advice on how to pass the exam and has nine sets of typical papers (and their answers) on which to practice. 84 pages. **(£6.50) £5.53**

THE NOVICE LICENCE STUDENT'S NOTEBOOK (RSGB)
John Case, GW4HWR
The official textbook for the RSGB Novice Licence Training Course and essential reading for the prospective Novice Licensee. 70 pages. **(£5.29) £4.50**

PRACTICAL ANTENNAS FOR NOVICES (RSGB)
John Heys, G3BDQ
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NORTH AMERICAN CALLBOOK 1993 (RACI)
(£19.50) £16.58

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Over 60,000 UK and Irish callsigns listed plus a wealth of essential information for the radio amateur and short wave listener. Novice callsigns are also featured for the first time. 433 pages. ***NEW!*** **(£9.50) £7.00**

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William Nelson, WA6FQG
How to locate and cure RFI in amateur radio, CB radio and power line problems. 250 pages. **(£8.75) £7.44**

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The official guide for instructors. 101 pages. **(£6.00) £5.10**

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Pat Hawker, G3VA
Reprint of the 7th edition. A very large selection of circuit ideas and devices, information on antennas and related topics plus many constructional hints from *RadCom's* popular Technical Topics feature. 368 pages. **(£7.50) £6.38**

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The largest and most up-to-date guide to every aspect of amateur radio. the new edition has something interesting for everyone, from the beginner to the more experienced amateur. 1215 pages hardback. **(£16.50) £14.25**

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A collection of practical amateur radio ideas gleaned from the pages of QST magazine. 147 pages. **(£5.00) £4.25**

RADIO COMMUNICATION HANDBOOK (RSGB)
A comprehensive guide to the theory and practice of amateur radio which, although published some years ago, still represents excellent value for money. 779 pages. **(£11.00) £9.35**

SOLID STATE DESIGN FOR THE RADIO AMATEUR (ARRL)
W Hayward, W7ZOI / Doug DeMaw, W1FB
An essential guide for the amateur designer and constructor. 256 pp. **(£9.25) £7.87**

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Doug DeMaw, W1FB
Simple, practical projects for the HF bands. 195 pages. **(£5.75) £4.89**

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THE BRIGHT SPARKS OF WIRELESS (RSGB)
George Jessop, G6JP
This is the story of the radio amateurs from Marconi to the 'secret listeners' of WWII, who laid down the foundations of circuits and procedures that we all now take for granted. 90 pages hardback. **(£9.75) £8.29**

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LOCATOR MAP OF EUROPE (RSGB)
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WORLD PREFIX MAP (RSGB)
This is a superb full-colour wall map, measuring approx 1200 by 830mm. It shows amateur radio prefixes, world time zones, IARU locator grid squares, & much more. **(£2.50) £2.13**

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Mike Dixon, G3PFR
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Peter Carron Jr, W3DKV
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Robert Halprin, K1XA
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Edited by P Linsley, G3PDL and T Nicholson, GW0LNQ
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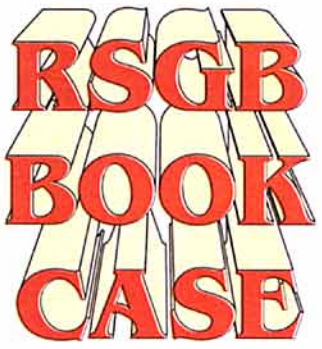

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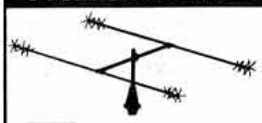

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NEXT COPY DATE

The display advertisement copy date for our June 1993 issue will be **14th April 1993**

DEVASTATING DX

IC-781 We are definitely talking flagships here. The IC-781 is technical excellence without compromise, a master-model HF all-band transceiver that all Amateurs aspire to. Features (short list) include: 5" CRT central information display, spectrum scope, twin passband tuning, dual-watch, auto-antenna tuning, 105dB dynamic range, DDS, 99 memory channels and 150W of output power!

IC-735 The size and weight of ICOM's IC-735 HF transceiver make it ideal for both base-station and mobile operations. The IC-735 has a 105dB dynamic range, passband tuning, noise blanker, 12 memory channels, CW full/semi break-in plus attenuator and preamp. Optional features include an electronic keyer and auto-antenna tuner. See why the IC-735 is as popular today as it ever was.

IC-729 A 50MHz/HF transceiver that allows you to discover the fun that can be had worldwide on the increasingly popular 50MHz band. Features include: 1.8-50MHz, simple all-mode operation, compact size, AF speech compressor, passband tuning, DDS, 105dB dynamic range and band stacking registers. 30kHz-33MHz and 46.2-61.1MHz Rx is possible but not guaranteed.

IC-765 DX enthusiasts will love this HF all-bander. By using the DFM (Direct Feed Mixer) the Rx circuit ensures 105dB dynamic range and a high +23dBm intercept point allowing weak signals to be received even during competition. Other features include: auto-antenna tuning with tuning data memory, Built-in CW narrow filter (500Hz to -6dB, CW pitch control and IF shift.

IC-737 This is ICOM's latest HF transceiver, a compact design using state-of-the-art technology to introduce for the first time; memo pad, DBSR, auto-antenna selector and quick split functions. These new functions will excite HF beginners who want to take the next step up and users keen on portable or mobile operations. The IC-737 is an ideal transceiver for taking on the DX world.

N.B. Photographs not to scale.

ICOM

ICOM manufacture a full range of base-stations, mobiles and handheld transceivers and receivers to cover all popular frequencies and beyond. No matter what your requirement ICOM have the radio for you. For more information and the location of your local Icom dealer contact:

Icom (UK) Ltd. Sea Street Herne Bay Kent CT6 8LD
Telephone: 0227 741741 (24hr). Fax: 0227 741742

YAESU

UK Sole Distributor
South Midlands Communications Ltd, S.M. House,
School Close, Chandlers Ford Industrial Estate,
Eastleigh, Hants S05 3BY.
Tel: (0703) 255111.

Stuck for Space?

Then why not choose the FT-5200 or FT-6200 dual band mobile transceivers. The detachable front panel can be easily mounted in a convenient location on the dash-board, while the transceiver body can be stowed under a seat or in the boot. For extra security, take the front panel with you, the transceiver is useless without it! So for extremely powerful communication capabilities with maximum user convenience and equipment security, face the facts and pick a Yaesu dual band mobile.

FT-5200/FT-6200

Boot-Mountable High Power Dual Band VHF/UHF Transceiver

- ✔ **FT-5200**: 2m and 70cms. **FT-6200**: 70cms and 23cms.
- ✔ **32 Memories:** 16 tunable memory channels for each band.
- ✔ **Channel Steps:** 5, 10, 12.5, 15, 20, 25kHz.
- ✔ **Removable Front Panels For Quick and Easy Installation.**
- ✔ **CTCSS Encode Built-In:** 38 sub-tones selectable from the front panel.
- ✔ **Full Duplex Cross Band Operation:** Independant squelch and mixing balance, for simultaneous listening or transmitting.
- ✔ **Independent TX/RX Frequencies:** Odd splits ok on any memory channel.
- ✔ **Programmable Sub-band Limits:** For band scanning.
- ✔ **Selectable Scan Skip:** For busy channels.
- ✔ **Backlit DTMF Microphone.**
- ✔ **One-Touch Instant Recall:** Recall of CALL channels for each band.
- ✔ **Priority Monitoring.**
- ✔ **Dual External Speaker Jacks:** One for each band.
- ✔ **Built-In Antenna Duplexers:** Standard feature.
- ✔ **Reversed Masked Full Frequency LCD.**
- ✔ **8 Level Automatic Display/ Key Lighting Dimmer.**
- ✔ **Accessories Options:** FTS-22 (CTCSS Dual Decode Unit), FRC-4 (Pager Unit), DVS-3 (Voice Memory and Pager Unit), YSK-1L (6m Separation Kit Cable), SP-7 (External Speaker).

Performance without compromise