

Radio Communication

October 1990



The Journal of the Radio Society of Great Britain

Serving Amateur Radio

Leicester Show Guide

JOTA '90

October 21st & 22nd



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HF National Field Day Report — page 10

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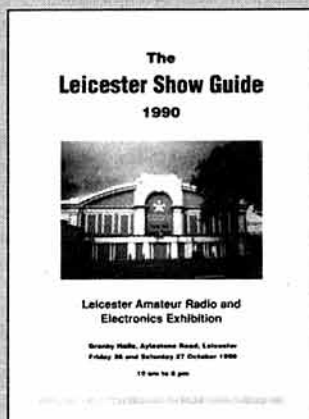
The Journal of the Radio Society of Great Britain



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RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

Founded 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
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Telephone: 0707 49855 — Members' Hotline and book orders
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Secretary and Chief Executive: David Evans, MSAE, CPL, G3OUP

COUNCIL OF THE SOCIETY

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Zone D P E Chadwick, G3RZP

Zone E E J Case, GW4HWR

Zone F J T Barnes, G13USS

Zone G I D Stuart, GM4AUP

HONORARY OFFICERS

Audio visual library co-ordinator: David Simmonds, G3JKB

Observation service co-ordinator: Geoff Griffiths, G3STG

HF Awards manager: S Emlyn-Jones, GW4BKG

VHF Awards manager: Ian L. Cornes, G4OUT

Chief morse test examiner: A N Ianson, G3GDO

HF manager: E J Allaway, G3FKM

Microwave manager: C W Suckling, G3WDG

Trophies manager: Mrs M H Clayton-Smith, G4JKS

VHF manager: D Butler, G4ASR

Society historian: G R Jessop, G6JP

Intruder Watch (IARUMS): Martin Atherton, G3ZAY

Morse practice co-ordinator: Mike Thayne, G3GMS

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

ANNUAL SUBSCRIPTION RATES

Once-off joining fee: £1.50

Corporate members: UK and overseas (Radio Communication by accelerated surface post): £25.00

UK associate member under 18: £8.50. Family member: £9.95

UK students over 18 and under 25: £12.75 (Applications should give applicant's age at last renewal date and include evidence of student status)

Affiliated club or society/registered group (UK): £25.00 (Including Radio Communication): £14.95 (excluding Radio Communication) (Subscriptions include VAT where applicable)

Membership application forms available from RSGB HQ

Council Brief

19 May 1990

● Mike Dennison, G3XDV, was appointed Managing Editor of *Radio Communication*. The RSGB Secretary was appointed publisher on behalf of Council and Marcia Brimson was appointed Assistant Editor. Mr. Dennison's appointment would leave a vacancy in the Secretary's office which would be very difficult to fill.

● Council discussed the Society's plans for its 1991 National Convention and asked the Chairman of the Exhibitions and Rallies Committee, Norman Miller, G3MVB, to provide advice for the next meeting. It was agreed that an annual event was needed at which to show the work being undertaken by the Society. Council also agreed that the Society would attend the London Amateur Radio Show at Picketts Lock in 1991.

● The Secretary was thanked for his generosity in staffing and supplying an RSGB stand at the Dayton, Ohio, Hamvention. Council member John Bazley had also attended the Show at his own cost and considered the RSGB attendance to be first rate and worthwhile.

● A major review of the work of the RSGB Committees and Honorary officers had been undertaken by a special President's Advisory Group. A series of recommendations and thanks would be communicated to all of the Honorary Officers and Committees involved.

● Council discussed the common renewal date and decided to put this matter into abeyance for the time being. This was so that other aspects of the Society's financial work could be given higher priority in the short term.

● Dave Lawley, G4BUO, was appointed Chairman of the HF Contests Committee. Ron Glashier, G6LX, was to be thanked for his dedication as the previous Chairman.

● The fee for the 1989/90 Audit, to be carried out by the new Auditors, was agreed by Council.

● While Council appreciated the difficulties which had been experienced with the 1989/90 budget, the Secretary stressed the need for a proper budget for 1990/91 as a basis for sound financial control by F&S.

● It was reported that the new AS400 computer was running satisfactorily. The new integrated software was not expected to be fully operational for some time.

● Council discussed the fact that many of the services provided by the Society were provided to specific groups of members from the general fund. Council felt that in view of the present economic situation the time was now right to investigate a fairer method whereby those members who used specific services should pay for them. At the same time, Council agreed that the high staff loading needed to be reduced. It was agreed that as much correspondence as possible would now be diverted to Council members, Committee Chairmen and Honorary Officers and RLO's.

● Council appointed a Financial Controller to act as a financial consultant to the Society until the end of 1990. The Secretary was directed to become temporarily involved with day-to-day business matters, and to reduce the priority normally given to amateur radio matters in order to revise administration procedures to complement the work of the Financial Controller.

● Angus McKenzie, G3OSS, said that it had originally taken him nine months to become acquainted with Council matters. After much discussion he agreed to prepare a paper for Council on Council members qualifications.

● In view of continuing abuse of the packet network, it was decided to send draft guidelines for packet users to the Radiocommunications Agency which sought comment.

● On advice from the Morse Test Steering Group, Morse Examiners were re-appointed for a further year as from 1 July 1990.

● It was reported that the new Amateur Radio Observation Service Co-ordinator, Geoff Griffiths, G3STG, had met with the Head of the Radio Investigation Service.

● Other matters discussed included: the RSGB Green Book, Book Production, Raynet matters, RSGB attendance at external events, the retirement of Mr & Mrs Allen and methods of informing members who to contact to get the best out of the Society.

Do You Have a Query?

• General advice and details on local clubs, or don't know who to contact:-

Your RSGB Liaison Officer. See the *Call Book*, May *RadCom* page 59 or your membership card (if recently renewed).

• RSGB Policy Matters (Zonal Council member):-

Zone A (North of England):

Geoff Smith, G4AJJ, "Greenacres", Sawdon, Scarborough, North Yorks, YO13 9DY.

Zone B (Midlands):

John Allen, G3DOT, 4 Philip Avenue, Waltham, S. Humberside, DN37 0QD. Tel: 0472-825899.

Zone C (SE England and East Anglia):

John Greenwell, G3AEZ, "Eastfield", Henfold Lane, Beare Green, Dorking, Surrey, RH5 4RW. Tel: 0306-77236.

Zone D (SW England):

Peter Chadwick, G3RZP, "Three Oaks", Braydon, Swindon, Wilts, SN5 0AD. Home: 0666-860423.

Zone E (Wales):

John Case, GW4HWR, 2 Abbey Close, Tyrrhiw Taffswell, Mid Glam, CF4 7RS. Tel: 0222-810368.

Zone F (Northern Ireland):

Terry Barnes, G13USS, 95 Crawfordsburn Road, Bangor, Co Down BT19 1BJ. Home: 0247-473948.

Zone G (Scotland):

Ian Suart, GM4AUP, 37 Meldrum Mains, Glenmavis, Airdrie, Lanarkshire., ML6 0QG. Home: 0236-65937.

• Awards:

For contest award winners, please refer to the appropriate contest committee.

For other awards, enquiries and applications go to either:

HF Awards Manager - Steve Emlyn-Jones, GW4BKG, P O Box 20, Bridgend, Mid Glamorgan, CF35

IOTA (Islands on the Air) Awards Manager - Roger Balister, G3KMA, La Quinta, Mimbridge, Chobham, Woking, Surrey, GU24 8AR.

VHF and Microwave Awards Manager - Ian Cornes, G4OUT, 6 Haywood Heights, Little Haywood, Stafford, ST18 0UR

Who do you contact for an answer? In most cases there is no need to consult anyone, as 90% of the answers to your questions are to be found in the 130 page Information Directory which forms part of the 1990 *RSGB Call Book*

However, if you feel a letter is the only way to get a definitive answer, are you writing to the best person? To ensure an improved response, we suggest you contact one of the following:-

• Band Plans and operating practices:

See the *Call-book* or Feb 90 *RadCom* for latest bandplans. For policy, contact the appropriate spectrum committee chairman:

HF - Martin Atherton, G3ZAY, 41 Enniskillen Road, Cambridge, CB4 1SQ

VHF - Peter Burden, G3UBX, 18 Langley Road, Merry Hill, Wolverhampton, WV3 7LH.

Microwave - Mike Dixon, G3PFR, Woodstock, Gazebank, Norley, Warrington, WA6 8LL.

• Beacons:

HF - Alan Taylor, G3DME, QTHR.

VHF - John Wilson, G3UUT, QTHR.

Microwave - Graham Murchie, G4FSG, QTHR.

• 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, 110 South Avenue, Southend-on-Sea, Essex, SS2 4HU. Home: 0702-460747.

Direction Finding Committee - Brian Bristow, G4KBB, QTHR.

• EMC:

Advice on solving breakthrough and other electromagnetic compatibility matters:

EMC Coordinator (see Dec 89 and June 90 *RadComs*)

Committee Chairman: Bob Peace, G8SOZ.

National helpline: 0537-593449.

• Exhibition & Rally Committee:

Organises trade shows at NEC, VHF Convention and Woburn Rally.

Chairman: Norman Miller, G3MVB, "Avon", Gardiners Lane, Crays Hill, Billericay, Essex, CM11 2XA.

• Intruder Watch:

Non-amateur service operation in exclusive amateur radio bands.

Acting Co-ordinator - Martin Atherton, G3ZAY, 41 Enniskillen Road, Cambridge, CB4 1SQ

• Licensing:

RSGB Policy - John Bazley, G3HCT, "Brooklands", Ullenhall, Solihull, 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 - Radio Amateur Licensing Unit, Post Office Counters Ltd, Chetwynd House, Chesterfield, Derbyshire, S49 1PF. Tel: 0246 217555/217699.

• Membership Liaison:

Committee Chairman - Geoff Smith, G4AJJ (see above).

• Morse Practice Transmissions (GB2CW):

Co-ordinator - Mike Thayne, G3GMS, 14 Tynedale Avenue, Monkseaton, Whitley Bar, Tyne & Wear, NE26 3BA. Home: 091 252 6138.

• Novice licence:

John Case, GW4HWR (see above).

• Packet Radio:

Mailboxes - Neil Lasher, G6HIU, 40 farm Road, Edgware., Middx, HA8 9LT

Nodes - Dave Hough, G4WRW, 1 Foxe Rd, Frampton, Cotterell, Bristol, BS17 2AE.

General enquiries - Ian Suart, GM4AUP, 37 Meldrum Mains, Glenmavis, Airdrie, Lanarkshire., ML6 0QG. Home: 0236 65937.

• Planning

Need for permission and how to apply - booklet free to members from Membership Services at RSGB HQ.

Planning application refused - RSGB Planning Panel, via RSGB HQ.

• Project YEAR:

Encouraging youngsters into amateur radio.

Co-ordinator - Hilary Clayton-Smith, G4JKS, 115 Marshalswick Lane, St Albans, Herts, AL1 4UU. Tel: 0727 59318.

• Propagation Studies Committee:

Chairman - Geoff Grayer, G3NAQ, "Bagatelle", 3 Southend, Brightwalton, Newbury, Berks, RG16 0BE. Home: 0235-446511

• QSL Bureau:

Outgoing cards - RSGB, PO Box 1773, Potters Bar, Herts, EN6 3EP

Incoming cards - your QSL sub-manager (see p44 June *RadCom*)

• Raynet:

Group Information - Mike Barker, G8CAC.

Zonal Co-ordinator & Talk-through permits - Ian Jackson, G8RWH.

Emergency Planning & Vice Chairman - John Witts, G6BBW.

Press Officer - Ronald Cowan, GM4SRL.

Public Relations - Trevor Emery, G3KWU.

Chairman - Philip Howarth, G3YAC, 1 Clay Close Lane, Impington, Cambridge, CB4 4NE.

• Repeaters:

All repeater enquiries should be referred to the Repeater Zonal Co-ordinator in which the repeater is sited, as follows:-

North of England - Phil Coates, G0COA, Tel: 0924 848803.

Midlands - Alan Marwood, G8SSL, Tel: 0602 202562.

SE England and E Anglia - Mike Hastings, G8ASI, Tel: 0923 265734.

SW England - Fergus McGilp, G8URB.

Wales - Dave Brown, GW4NQJ, Tel: 0686 640814.

N Ireland - Dr David Hutchinson, G14FUM, Tel: 0849 464672.

Scotland - Colin Dalziel, GM8LBC, Tel: 0698 281847.

Special Projects - Dave McQue, G4NJJ, Tel: 0908 378277.

TV Repeaters - Graham Shirville, G3VZV, Tel: 0525 290343.

Chairman - Geoff Dover, G4AFJ, 31 Newbold Rd, Kirkby Mallory, Leics, LE19 7QG. Tel: 0455 823344.

• Spectrum abuse:

Amateur Radio Observation Service Co-ordinator - Geoff Griffiths, G3STG, 11 The Grove, Asfordby, Melton Mowbray, Leics, LE14 3UF.

• Technical queries:

Peter Chadwick, G3RZP, "Three Oaks", Braydon, Swindon, Wilts, SN5 0AD. Home: 0666-860423.

• Trophies:

Mrs Hilary Clayton-Smith, G4JKS, 115 Marshalswick Lane, St Albans, Herts, AL1 4UU. Tel: 0727-59318.

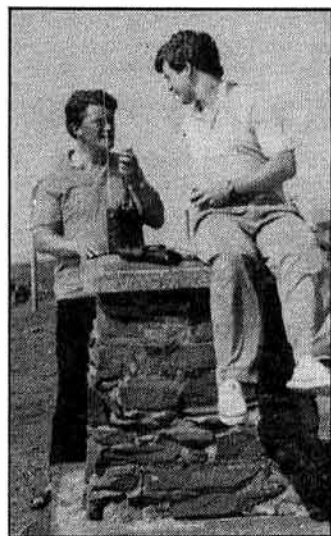
Young Amateur of the Year 1990

Young Man of the Year

1989 YOUNG AMATEUR of the Year, Ted Walker, G0KAQ, mounted an expedition to the Isle of Man during July in conjunction with members of Warwick School Wireless Society. Ted takes up the story:

"Warwick School Wireless Society was first established in 1922. It has had its ups and downs over the years, but is currently going through one of its 'up' phases. After taking part in a number of contests it was decided to mount an expedition during the summer holidays to the Isle of Man.

"Two things immediately gave the proposed expedition a shot in the arm. Firstly, the welcome news of the club callsigns being released allowing non-licensed members to speak over the air, and providing the rarity of the GT prefix. Secondly, the week before we were due to set off, the RAE results came out, the school scoring seven passes from seven candidates.



G0KAQ and G0GNF operating on 2m from the summit of Snaefell.

"We arrived on the camp-site by way of a fully laden minibus in the only rain during the trip. A tractor was needed to get us out of the mud on the site. Things got better as the week progressed. The Manx amateurs made us very welcome. No one complained of the extensive use made of the GB3GD two metre repeater by very newly licensed amateurs. Instead, everyone was very accommodating, inviting us to their club meetings. Through our contacts with locals we made a very enjoyable trip round part of the island on a converted lifeboat,

JUST AS WE WENT to press, the Radiocommunications Agency announced the winners of this year's Young Amateur of the Year competition.

First prize and the title Young Amateur of the Year went to David Martin, GM0NVE, who lives near Glasgow. Runner up was Simon Glanville, G7DCY from Coventry.

The DTI (RA) sponsored competition, which was open to anyone under the age of 18, recognised outstanding achievement in amateur radio between 1 April 1989 and 1 July 1990, and encouraged a substantial number of entries.

Both winners demonstrated their all round contribution to

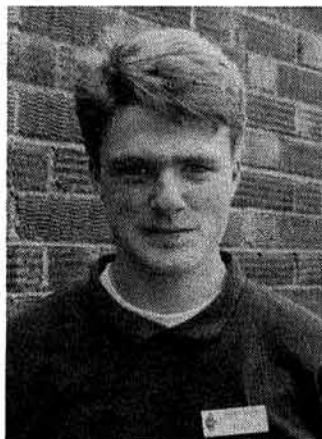
amateur radio, combining an interest in construction and operating with helping others. In particular, they have both worked hard at passing on their interest in radio and electronics to other young people.

David will receive a cash award of £250 and a guided tour of the monitoring station at Baldock from the RA, and a number of other prizes from industry. These include a AMR1000S 2m FM transceiver from Navico, a Tiny 2 packet radio controller from Siskin Electronics, and a digital multimeter from Cirkit. The presentations will be made at the RSGB's HF Convention at Coventry on 30 September.

YAOTY RUNNER UP, Simon Glanville, is G7DCY. A student committee member of the Coventry Amateur Radio Society, he regularly assists a local elderly radio amateur who has problems using his hands. Simon helps with setting up equipment, antenna maintenance, soldering, etc.

At his school, Simon encourages an interest in amateur radio amongst pupils,

teachers and parents by giving demonstrations of the hobby. He founded the school's Remote Imaging Group which obtains data and weather pictures from satellites. He is always keen to encourage the younger pupils to join, and demonstrates club facilities at open days and parents' evenings as well as illustrating operating procedures to students of the local RAE class.



DAVID MARTIN was GM7BPA when nominated for the YAOTY. Now GM0NVE, he runs a young amateur's net in Scotland and has converted ex-PMR rigs onto the amateur bands for both himself and other amateurs as a cheap way of getting on the air. A Venture Scout leader, David has run a JOTA station for the Vale of Leven District Scouts. He is a member of the West of Scotland Amateur Radio Society and has recently joined Raynet.

David's youth work extends to being co-founder and Treasurer of the Young Amateurs in Scotland group, a number of whose members are preparing to take the RAE, while younger members intend to study for the Novice Licence.

creating the biggest pile up of the week by operating G7WKS/MM.

"On another occasion we were operating on 144MHz SSB near the summit of Snaefell when we met up with Harold, G3ACR doing the same thing. His mission was apparently to climb Snaefell and make contact with stations on other peaks in the UK. We went along as well, and braved Snaefell in a howling gale to work stations on Scafell Pike and Ben Nevis.

"The future looks exciting. Seven new class B licensees are eager to take the Morse test, as well as Steve, G1FIP, the school technician, who has had his interest rekindled. More students are keen to take the RAE this year, while G0GNF, master in charge of amateur radio, has applied to become a novice instructor. We're making plans for next year ..."

RA Report

THE 1989-90 Annual Report of the Radiocommunications Agency is now available, free of charge, from The Librarian, Room 605a, Waterloo Bridge House, Waterloo Road, London, SE1 8UA, tel: 071-215 2368.

VHF Convention

A REMINDER that next year's VHF Convention at Sandown Park is 24 March 1991. Details Geoff Stone, G3FZL. Stand bookings, Les Hawkyard, G5HD, The Eyry, Newton St Petrock, Torrington, Devon, EX38 8LU.

RadCom Novice Column

WE INTEND to produce a novice and beginners' column in *RadCom* from January and are looking for someone to write it. Anyone who is interested please write to the Editor at RSGB HQ giving details of experience.

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MKA8 (RSGB) 9/90

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Ages of dependent children _____
Name of 2nd applicant _____
Occupation of 1st applicant _____
Employer's name _____
(Please state if self-employed)
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Time with present employer _____ years _____ months

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(eg mobile home)
Are you? Sole owner ☐ Joint owner ☐ Living with parents ☐
Tenant ☐
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2nd applicant's net monthly income £ _____
Other regular monthly income £ _____
Please give details (eg: child benefit pensions, investments etc.)
Please enclose last 2 payslips as proof of income.

EXPENDITURE

Mortgage/rent/poll tax (per month) £ _____
Finance company/bank loan (per month) £ _____
Insurance payments (per month) £ _____
Other misc. outgoings (per month) £ _____
Please give details (excluding domestic bills) _____
Do you have a car? Yes ☐ No ☐
If yes, is it: Wholly owned ☐ Financed ☐ Supplied by employer ☐

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So the TSB Group may provide a full service to me, I/we understand that
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RSGB Liaison Officers

Nominations for 1991-1993

THE NOMINATION procedure for RLOs was detailed on page 6 of the June edition of *Radio Communication* and valid nominations were received as shown below. As no more than one valid nomination was received for any post there is no requirement for elections to be held.

It should be noted that the Society's Membership Liaison Committee is authorised by Council to fill vacancies on an 'appointment' basis, and the first list of RLOs for 1991-1993 will be announced at the Society's Annual Meeting in December.

Zone A

Cumbria: M.Gibbings, G3FDW
Greater Man: B.Catlow, G4ARP
North Humbs: N.Bedford G4NJP
N.Yorkshire (E of R.ouse and Swale): Bob Wilkinson, G4YKO
N.Yorkshire (W of R.ouse and Swale): Gareth Foster, G1DRG
Tyne and Wear: Ian Batley, G0IID

No nominations were received for Cheshire, Cleveland/Durham, IoM, Lancs, Merseyside, Northumbs, S.Yorks, W.Yorks.

Zone B

Leics: David Harries, G4WYN
Shrops/Staffs: K.Parkes, G3EHM

No nominations were received for Beds/Cambs, Derbys, Hereford and Worcs, Northants/Warwicks, Notts, S Humbs/Lincs, W.Mids.

Zone C

Essex: B.Gibbard, G0AZF
Gtr London (N): R.Charlesworth, G4UNL
Gtr London (S): R.Sykes, G3NFV
Herts: P.Fairhurst, G0KLU
Norfolk/Suffolk: W.Higgins, G3PNR
No nominations were received for E Sussex, Kent, W Sussex.

Zone D

Berks: D.Chislett, G4XDU
Bucks: R.Ray, G3NCL
Guernsey: B.Ayres, GU1HTY
IoWight: D.Byrne, G3KPO
Jersey: S.Smith, GJ0JSY
Somerset (N): K.Watkins, G3AIK
No nominations were received for Avon, Cornwall/IoScilly, Devon (excl.SE), Glos, Dorset (S)/Devon (SE), Hants, Oxon, Somerset (S)/Dorset (N), Wilts.

Zone E

Gwent: P.Dombrowski, GW1NYO
M&S Glam: C.Trotman, GW4YKL
Powys: P.Essery, GW3KFE
No nominations were received for Clwyd, Dyfed/W Glam, Gwynedd.

Zone F

Belfast: G.Curry, GI6ATZ
N Ireland (N): V.Mitchell, GI4ONL
N Ireland (S): D.Campbell, GI4NKD

Zone G

Borders: I.Wilson, GM4UPX
Fife & Tayside: M.Hobson, GM8KPH
Orkney: A.Wright, GM3IBU
No nominations were received for Central, Dumfries & Galloway, Grampian, Highland/W.Isles, Lothian, Shetland, Strathclyde.



N7MYO, G3YDV and G4BUO outside the QTH of KA7MCX in Seattle. G3YDV and G4BUO came world seventh in the World Radiosport Team Championships last July. A full report we will give in a future edition of *RadCom*.

● There is a new QSL sub-manager for the G4PAA to G4PZZ series. This is Mr R Colvin, G0BXQ, 46 Beechwood Avenue, Woodley, Berkshire, RG5 3DG.

● The new curator of the RSGB's Audio Visual Library is David Simmonds, G3JKB, Parsonage Farm, Binbrook, Lincoln, LN3 6BN.

Stolen Equipment

AN ICOM IC-R1 receiver, serial number 890001213, was stolen from the premises of Characteristics, 44 Hilderthorpe Road, Bridlington, North Yorkshire, YO15 3BG on bank holiday Monday, 27 August. Anyone having knowledge of this receiver should contact G4NJP on (0262) 673635, or their nearest Police station.

The Radio Investigation Service Glasgow office have in their possession an HF amateur bands transceiver which is believed to have been stolen in the Central Scotland area. Anyone wishing to make a claim to this equipment should write to: The District Manager, Radio Investigation Service, PO Box 2500, Glasgow, G41 1QY. Please quote the make, serial and chassis numbers of the equipment when you write.

Readers' Survey

AN ESTIMATED 1,000 readers filled in the Readers' Survey form printed in August *RadCom*, and very interesting the replies are. An analysis will appear as soon as we have finished ploughing through the pile. At this year's HF Convention, eight lucky members will have their survey forms drawn out of a drum and each will win one of the super prizes donated by our advertisers.

IEE Conference on HF Radio Systems

THE INSTITUTION of Electrical Engineers has asked RSGB to be associated with this conference which takes place from 22 to 24 July 1991 in Edinburgh. Topics include (but are not limited to) Systems Design, Control and Management, Modulation and Signal Processing, ECCM, Propagation, Noise and Interference, Antennas, Relevant Aspects of Transmitters and Receivers, and HF Radar Techniques.

Any member who is interested in producing a paper on behalf of RSGB should contact the Chairman of the Technical and Publications Advisory Committee, Peter Chadwick, G3RZP, who is QTHR. Please note that no paper can be offered on behalf of RSGB unless it receives prior approval. Similarly, members may not, without prior approval, use RSGB as their organisation or affiliation when registering.

The final date for the submission of synopses to the IEE is 25 October 1990.

● A new amateur radio store has opened in west London. The owner is Martin Lynch, operating from 286 Northfield Avenue, Ealing, London W5 4UB; tel: 081-566 1120, fax: 081-566 1207. The new shop is open from 10am to 6pm, Tuesday to Friday.

PROJECT YEAR

ON 16 AUGUST, UK kit manufacturers and other interested parties attended a meeting at RSGB HQ.

Secretary, David Evans, G3OUF, explained the thinking behind Project YEAR and why it was essential to promote the hobby amongst the young. A report was given on the considerable progress being made on all aspects of the Project; the recruitment video, new books, a new magazine, the Novice Licence, fund raising and, of course, kits.

John Case, GW4HWR, President Elect and Chairman of the Training and Education Advisory Group, detailed the training methods to be used for the Novice Licence. He demonstrated some training aids which emphasised the hands-on approach inherent in the scheme.

In addressing the matter of kit specifications, Technical and

RSGB meets the kit manufacturers

Publications Advisory Committee Chairman, Peter Chadwick, G3RZP, covered areas such as EMC, the limited ability of the potential kit builders, xtal control vs VFO vs synthesiser, harmonics/spurious, the CB Statutory Instrument, safety and PME. Draft 2 of the RSGB document "Novice Licence Equipment Standards" was handed out. He summed up by saying that it was essential that kits were of a high standard, including the instructions.

A lively discussion was inspired by these presentations. A major item of debate concerned how best to identify good kits, perhaps by an RSGB seal of approval.

David Evans wound up the meeting by pointing out that the Novice Licence was only a start and the idea was that Novices would move on to the Class A or B Licences, thus expanding the kit market further.

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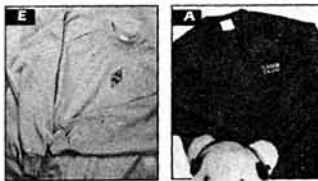
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Colchester, Essex, CO6 5LW.

Tel: **0787 211154**

Further details and new order forms are available from the same address.

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May/June/July 1990

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Complete set of boards	567WIM90	£66.13

G4PMK SIMPLE SPECTRUM ANALYSER

November 1989

BOARD DESCRIPTION	CODE	PRICE
RF Board	118946	£6.11
Video/sweep board	118947a	£4.88
Marker generator/PSU	118947b	£4.49
Complete set of 3 boards	1189SSA	£14.38

G3TXQ TRANSCEIVER

February/March 1989

BOARD DESCRIPTION	CODE	PRICE
Main IF/Audio	028945	£11.50
VFO	028946	£5.46
Driver/Preamp	028947	£6.33
Low pass filter	028948a	£7.48
Band-pass filter	028948b	£4.60
Control board	038942a	£5.18
Regulator board	038942b	£2.30
Complete set of 7 boards	0289TXQ	£27.03

All prices include postage and packing.

Please note 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

HF NFD 1990

Chris Burbanks, G3SJJ, reports on the ever popular National Field Day.

Individual band reports by G4IQM, G3MCX, G3FKM, G3HCT, G3LET, G3KDB and G4JKS.

PHOTOGRAPH: G4BUO

It may appear somewhat idiosyncratic to commence writing a report before the event takes place, but it seems appropriate to record the feelings and happenings around this time.

With just three days to go before Field Day 1990, adrenalin is starting to flow and various rooms around the house become storage areas. Camping gear, tools and aerial equipment are stacked in the garage, a spare bedroom is full of suitable warm clothing and the kitchen is used to store various cooking utensils. The radio room is the hub of activity with the receiver constantly monitoring band propagation. Tuning around 28MHz gives rise for concern; no CW activity is logged at 1500 GMT and just a couple of DL stations on SSB with also a weak ZS QSO just audible. Sporadic E seems more like non-existent E.

It is comforting to realise that, to a greater or lesser extent, similar thoughts and activities are taking place, not only around the British Isles but also throughout Europe since this is now an established IARU region 1 annual contest with the prospect of even more participation in future years.

THE EVENT

One hundred groups of dedicated, and not so dedicated, UK operators with their bands of much appreciated helpers immersed themselves in amateur radio contesting over the first weekend in June. Agreeable weather coupled with generally good propagation over most of

the available frequency spectrum seems to quantify this year's Field Day and leading scores were some 10% up on last year. Most teams experienced rain towards the end of the 24 hour operating period, but it didn't do much to dampen the inherent enthusiasm for this annual trek into the open.

28MHz produced a good opening in the first few hours of the contest but the anticipated second surge on Sunday didn't happen. Instead, on 21MHz, an excellent path to central and mid-west Stateside was available in the last two hours, particularly for the Open section stations with beam antennas. 14MHz was perhaps the surprise this year with plenty of short skip into Europe. 3.5 and 7MHz carried their normal traffic with 1.8MHz being pleasantly static-free.

LEADER BOARD

Intense competition is an integral part of the event and this year was no exception. Winners overall and also in the Restricted section are the Triple A Contest Group, G0AAA/P, who have honed their precision operating over the last twelve months, and submitted the first ever winning entry using real-time computer logging and duping with full CW interface. A true paperless operation. Runners-up in the Restricted section were Marple Contest Club, G3VMW/P, no doubt feeling disappointed at not taking the NFD Shield for a third time.

Several top groups transferred into the Open section this time, making the going even more competitive, but once again Verulam Club, G3VER/P, led the section by quite a margin over Addiscombe ARC, G4ALE/P.

The Scottish trophy was won for the second year running by Kilmarnock and Loudon ARC with a similar score to last year but an overall reduced placing. This being partly attributable to the



G3SXW of the Triple A group (left), and G3VMW of Marple CG (right) celebrate in the time-honoured manner with adjudicator G3SJJ. Photo: G3JHF

defection to the Open section previously mentioned, but also to the increased scores obtained by the leading groups.

The intelligent use of planning and strategy once again put Leicester Polytechnic, G3SDC/P, in the award list with a leading score on 14MHz to win the Frank Hoosen, G2YS, Memorial Trophy.

A record 16 Check Logs from five continents were received: G0JFX/MM2 off Cape Town; Z23JO, who first participated in NFD in 1934 as BRS1431 and then as G2SO in 1936, thanks, Mal; VK5QG; ZL1VV/P, whose operators were ex-G5BK; K3ZO, an excellent computer generated log containing 316 contacts with G and European portable stations, thanks for your valued support, Fred; W1CNU; YB2FEA; YU7SF; YU7LS; OH3GZ; F/G4BLX; G4JSN/P; G3BPM/P; G0CLP/P; G3FAX; G3LIK. Many thanks for all your efforts.

BAND REPORTS

1.8MHz

Conditions were generally reported as very good with low static levels, although scores were not as high as last year and DX was conspicuous by its

absence with only VE1ZZ and the odd UA9 present. (US1A was in Leningrad!).

The leaders in both sections relied on one main run and picked up the loose ends in very short return trips, whilst other front runners made at least three visits. The most favoured start period was between 2030 and 2100, though G3VMW/P did not hit the band until 2130.

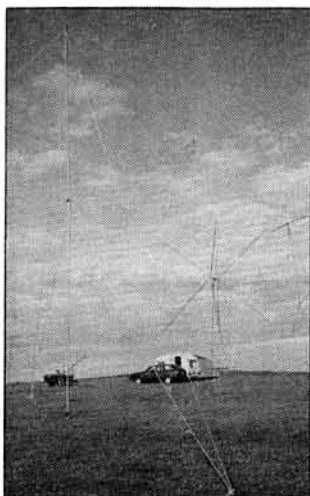
In the Open section, G3TBK/P was the only station to reach the 1000 point mark made with 137 valid contacts, despite having fallen asleep during the session! Restricted section band leader G3VMW/P had a perfect log with 1132 points from 151 contacts. G0AAA/P also had a perfect log but with five contacts less than the Marple group.

Most other groups lost points. Transcription errors and addition or omission of /P accounted for the majority of loss.

3.5MHz

Very few comments were received on this band other than conditions were normal but no DX to speak of. K3ZO appeared in two logs and there were just a few contacts with Asia. The only claim for six points was certainly /P but was in fact Y54 and not YS4 as logged.

PHOTOGRAPH: GM3ZVF

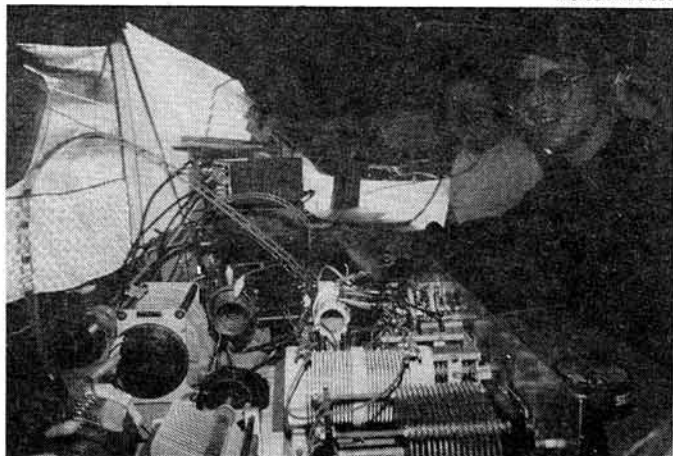


The aerial farm of GM3GRC/P near Auchmuty in Fife.

AWARD WINNERS

NFD Shield:	Three A's	CG	G0AAA/P
Bristol Trophy:	Verulam "A" ARC		G3VER/P
G6ZR Memorial Trophy:	Addiscombe	ARC	G4ALE/P
Gravesend Trophy:	Marple C.C.		G3VMW/P
Scottish Trophy:	Kilmarnock & Loudon		GM0ADX/P
Frank Hoosen Memorial Trophy:	Leicester Poly "A"		G3SDC/P

PHOTOGRAPH: G4BUO



Mind that ATU! Gravesend Radio Society: G3GRS/P.

Restricted section entry, G0BRC/P, were overall band leaders but with a score down about 200 points from last year, although the multiband entries had slightly increased scores.

Leading Open section entrant was G3UES/P despite losing 71 points during adjudication. Runners-up G3GRS/P and G3VER/P both had error free logs.

A comparison of claimed scores to time spent on the band shows G0BRC/P at 868 points for 24 hours, G3UES/P 744:9.5, G3GRS/P 634:3.5 and G3VER/P 606:3.2. Most traffic was carried from 2030 to 0430 with the peak at 0000-0200 and, provided that only short visits were made, a high scoring rate could be achieved.

7MHz

Band conditions appear to have improved this year judging by comments received. One station commented that K3ZO's signal was stronger than most Europeans at times so it was disappointing that other US stations didn't join in the fray.

Open section leader was G3RIR/P with a single band entry gaining 1561 points from 484 contacts. They had obviously put some thought into their strategy and had a good selection of antennas at their disposal. These included a Bobtail curtain, a W8JK, and two half waves in phase. Top Restricted section entry came from G3GXI/P making 351 QSOs for 1143 points.

With isolated exceptions, the standard of log keeping was excellent, certainly the computer is proving to be a great help in the preparation of entries.

14MHz

This band appears to be taking over from 7MHz as the basis for building up a good foundation score and was once again open throughout the contest. Even

modestly equipped stations were rewarded with some DX and several Open section entrants were seduced by their beam antennas into spending more time on the band than perhaps they should.

The top stations avoided peak DX hours to concentrate on European portables with G0AAA/P securing just the right mix, with 166 points per hour from 11 carefully timed visits to the band. Several multiband stations topped 850 points with G4ALE/P, G3NJA/P and G5LO/P all breaking the 1000 barrier. Triple A commented that this year's score was their highest for seven years.

G3SDC/P are clear winners of the Frank Hoosen, G2YF, Memorial trophy with a single band entry and the help of 280 WVE contacts using a 5 element Yagi and a vertical antenna.

21MHz

Conditions seemed down if results are compared with last year's winning score of 763 points from 250 contacts. Closer examination of the logs, however, reveals that in the Restricted section scores were well up on last year.

Overall band leader was



A useful check-log was supplied by ZL1VV/P

G3VMW/P with 543 points from 162 contacts, followed closely by G3RAC/P - 530/163. The only other group to exceed 500 points was a single band entry from G3GHN/P with 508 points from 166 contacts.

G3VMW/P made 5 visits to the band with their most productive time between 1700-1900 which netted 110 QSOs, of which only 25 were outside of Europe and 67 were portable.

G3RAC/P visited the band ten times with a peak between 1651 and 1742 when they made 51 contacts; 8 were outside Europe and 36 portable. Both groups made almost the same number of contacts, 162/163, and portables, 89/91, though the Restricted section entrant worked more stations outside Europe, 36/25.

Logs were generally good with the exception of one of the front runners on this band losing some 40 points after claiming 3 points for every Russian QSO they had!

28MHz

Propagation was patchy with the western advantage apparent but not so great as in previous years. Band conditions taken overall were better than last year with G5BK/P and G0AAA/P more than doubling their scores. Most

groups started off on the band, but not many made an early morning check, with the exception of G3ZRS/P hooking a station at 0514 and G3WKX/P catching a VK7 at 0554.

In the Restricted section, overall band leaders G5BK/P scored 806 points from 120 QSOs although this was less than half of their chart topping 1988 score. This was followed by G0AAA/P with 766/112 and G3VMW/P 752/111. Leading Open section entrants were G3VER/P using a four-element quad and a dipole to make 774 from 110 contacts, G3ULT/P 724/110 and G3UES/P 680/103.

DX worked over the 24 hours ranged from RW9 and JA through EUs to VK and ZS, but very little Stateside traffic.

FACTOR X

One entrant, commenting on the consistent success of the Triple A Contest group, attributed their achievements to what was described as Factor X. It was this comment, and a recent discussion with AI, G3FXB, which provided the words motivation, dedication and experience, that prompted a more in-depth look at the top operators.

G3SXW, G3TXF and G3VWG of Triple A, together with G3VMW and G3WPF of Marple, were all licensed in the mid 1960s. Like many of us who came into the hobby around that time, they had no Armed Services background, but were interested in the self-training and spirit of adventure that was offered by the hobby. Now in their early forties, and after some 25 years of dedicated DXing and contesting, these operators are probably at their peak of operating skill.

PHOTOGRAPH: G3OUF



The sophisticated station of G3UJV/P.

Turn to page 62 for the conclusion of this report plus the full tabulated results.

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TH26E 2m transceiver	£249.00
TH46E 2m transceiver	£269.00
SMC33 remote control speaker/mike	£28.50
DTP1 DTMF keypad	£14.50
DTU1 DTMF unit	£14.50

Random Ramblings

Leicester is here, and we are all looking forward to meeting you all if you can get to the show — acknowledged to be one of the best, if not THE best, in England. I don't need to tell you the stand number 'cos you will fall over us when you enter the hall.

New goodies from Kenwood will centre on the exciting range of handheld rigs for VHF and UHF. The range is now completed by the TH-27E and TH-47E mini size maxi performance handies for 2 and 70, the TH-26E and TH-46E for those who want high power and rugged use, and the really new TH-77E dual band 2/70 handheld which can have extended frequency range receive, and will operate cross band duplex or repeater mode.

All your favourite people will be on the stand:— Beryl and Julie, of course, Richard from Matlock and the new Richard (but you will all recognise him as Richard McLachlan, G3OQT) appearing for the first time as the commercial director, and if they let me out of the cage you may even see G3PCY (who is he?). See you all on the day.

John Wilson G3PCY



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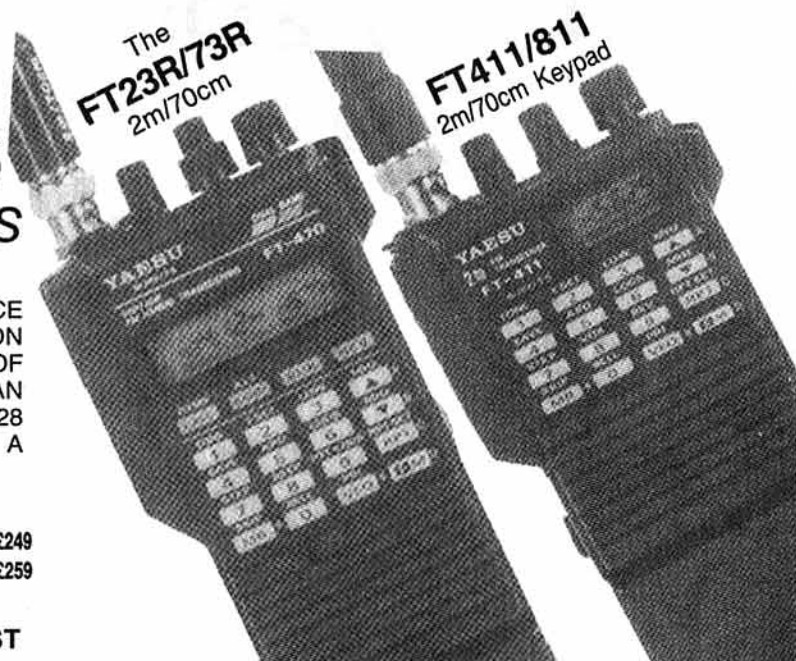
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FT980	shack	HF 100W Gen. RX	S/S	from	£1095.00
FT757GX	shack	HF 100W Gen. RX	S/S	from	£1275.00
FT757GX-II	mobile	HF 100W Gen. RX	S/S		£775.00
FT747GX	mobile	HF 100W Gen. 12v DC Gen. RX	S/S		£625.00
HT120	mobile	HF 10W 20mtr 12v DC	S/S		£249.00
OSCAR II	mobile	CB 40CH. 11mtr 12v DC	S/S		£39.00
FL7000	mobile	HF 500W L/amplifier	S/S		£1391.00

VHF/UHF TRANSCEIVERS

FT736	shack	VHF/UHF	S/S		£1190.00
FT711RH	mobile	VHF 70cm 45W	S/S		£295.00
FT227R	mobile	VHF2mtr 10W	S/H		£139.00
FT703R	handy	VHF 70cm 2.5W	S/H	from	£139.00
FT73R	handy	VHF 70cm 3.5W (no batt)	S/H	from	£179.00
KOK-FM2030	mobile	VHF 2mtr 25W	S/H		£169.00
IC-1271E	shack	1200MHz 10W FM, SSB, CW	S/H		£775.00
FT727R	handy	VHF/UHF 3.5W dual band	S/S		£319.00
SAGRA-600	handy	VHF Lin/amplifier 600W	S/S		£659.00
HL160V25	handy	VHF Lin/amplifier 160W	S/S		£199.00

RECEIVERS

FRG8800	shack	HF/SW Gen. RX m/mod	S/H	from	£545.00
FRG9600M	scanner	VHF/UHF 60-950MHz RX	S/S	from	£459.00
AR2002	scanner	VHF/UHF 25-1300MHz RX	N/O		£487.00
MX7000	scanner	VHF/UHF 25-1300MHz RX	N/O		£349.00
AIRBAND-RX	handy	VHF/UHF 118-136MHz RX	S/H		£39.00
ICF20010	portable	HF/VHF receiver	S/H	from	£219.00

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FI232C	Yaesu	RS232C/radio interface	S/S		£59.00
TONO-5000E	T/Unit	Amtr, Rtty, Ascii, CW etc	N/O		£659.00
TONO-777	modem	Amtr, Rtty, Ascii, CW	S/H		£149.00
AMT-2	modem	Amtr, Rtty, Ascii, CW	S/H	from	£139.00
MMT4001	T/Unit	Rtty, CW c/w keyboard	S/S		£159.00
MULTICOM	modem	Rtty G3.1V data unit	S/S		£39.50
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KP100	keyer	CMOS keyer c/w paddle	S/S		£79.00
RM1	modem	RS232-TTL interface	S/S		£59.00

MISCELLANEOUS/ACCESSORIES

FC757AT	Yaesu	Auto ATU 300W	S/H	inc. VAT
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FEX144/767	module	2mtr plug in (FT767)	S/H	£159.00
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LPM144-1-100	Bnos	VHF Lin/amplifier 100W	S/S	£199.00
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MMA28	M/mod	10mtr RX pre amp	S/H	£19.00
MMD050	M/mod	Preq. Pre scale	S/S	£69.00
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FS711V	Datong	SWR/POWER 50 to 150MHz	S/H	£39.00
OC144/28	Datong	2mtr to 10mtr converter	S/H	£25.00
SRB2	Datong	Auto woodpecker blanker	S/S	£69.00
TP30	Tel	HF-Multiband wire ant.	A/S	£15.00
202	Shure	High imp. fist MIC	S/S	£19.95
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MP-100	Trio	Kenwood mounting brk	S/H	£20.00

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S/H

N/O

A/S

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GC038	LOWER MAST CLAMP G-400, 600 etc	£16.95
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CK46	ROTARY BEARING 1.5-2.5 MAST	£34.95
MC1	LOWER MAST CLAMP RCS SERIES	£25.00

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RC5W	5 WAY G-400RC, 800, 1000SDX PER MTR	£0.48
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RC8W	8 WAY HAMIV, T2X 2000RC RC SERIES PER MTR	£0.72

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13M20BP25	25FT BASE PLATE MOUNT	£541.65
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MORSE EQUIPMENT

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SPECTRUM ANALYSIS

HF

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham
B17 8QB

I'm sorry to have to report the death of Marjorie, wife of Geoff Watts on 29 July. During the 60s and 70s when Geoff produced *DX News Sheet* it was Marjorie who folded all the copies and took them to be mailed around midnight (or later) every Tuesday, as well as answering the telephone and opening the mail. Unfortunately she had been suffering from multiple sclerosis and had been unable to use her limbs for the past eight years. It is largely due to her that *DXNS* is now one of the world's leading newsletters. Thank you Marjorie.

Robin Scadden, G3TFM, reports that someone else is using his call on CW on 21 and 28MHz, and on SSB on 28MHz. In the past three years he has only been active for very short spells on 144MHz and packet.

ALBANIA

In a message dated 31 July, Jacques Pecourt, F2YS/W2, said "Peter, HA5WE, has returned to Budapest from Tirana and the ZA operation has been delayed towards the end of the summer at the explicit request of the Prime Minister of Albania. Peter's licence has been approved by the appropriate ministries and by the Council of Ministers, but in view of the delicate political situation in Albania, the Prime Minister feels that it will be beneficial to postpone the expedition for at least one month. Peter has stressed that ZA1AA and ZA1CZ are not licensed Albanian stations. Peter and the sponsors urge that the above statement be taken at face value and that any further elaboration of the facts by anyone else should be treated as rumour. Further information, including start-up date and frequencies will follow". I have heard nothing since...

AWARDS

KIRYAT ONO AWARD

Issued by the Israel Amateur Radio Club to those who have worked four stations in Kiryat Ono since 1 March 1990. It consists of a 30 x 21cm coloured drawing of specific landmarks of the city and is signed by the Mayor. QSOs

must have been on the HF bands only but there is no restriction on mode or band. Send certified list with US\$3.00 or seven IRCs to Joseph Obstfeld, 4X6KJ, P.O.Box 873, Kiryat-Ono 55000, Israel.

OLIMPIADA CULTURAL BARCELONA-92

Gained by working EA3-EC3 stations between 1 September 1990 and 9 August 1992 (the last day of the Olympic Games). Only one QSO on each mode on each band may be counted and there must be at least 20m between contacts which each count one point. Europeans need 50 points. Send certified list of contacts to Radio Club Baix Penedes, Box 250, 43700 El Vendrell (Tarragona), Spain.

CONTESTS

CQ WW DX SSB CONTEST

0000 27 October - 2400 28 October

All bands 1.8 to 30MHz (excluding WARC). Single-operator, single and multi-band, multi-operator single and multi-transmitter and QRP classes (this allows up to 5W output. Exchanges are RS plus CQ zone (we are in Zone 14). QSOs with own continent count one point and with others three. The multipliers are the CQ zones, WAE countries and DXCC countries from each band added together. Own country may only be worked for country/zone credit. Use separate log forms for each band and give date, UTC, station worked, numbers out and in, and points claimed. Mark new multipliers clearly. Check for duplicate QSOs - the presence of these can cause disqualification. Those working more than 200 stations on any band must enclose a 'dupe sheet' for that band. QRP entrants must clearly note the fact on their cover sheet



Harry, DL8CM (left) and Martin, G3ZAY (HF Committee Chairman) discussing Penguin Island at Friedrichshafen.

1990 28MHz COUNTRIES TABLE

G0JZU	198	G4NXG/M	90
G4MUW	178	G0MXU	86
G4VVP	176	G0CKP	79
G4DXW	160	G2AKK	79 (CW)
G4O8K	131	G4M2L	63
G4ZYQ	112	G4SJJ	60

and state the actual output power used. All entries must be postmarked no later than 1 December 1990 and sent to *CQ Magazine*, 76 North Broadway, Hicksville, NY, 11801, USA. Sample log and summary sheets are available from *CQ* in exchange for a large SAE and some IRCs - please note that I do not have any of either of these documents.

1990 CQ WW RTTY DX CONTEST

0000 29 September - 2400 30 September

Sponsored by *CQ* and *The RTTY Journal*. I can provide photocopies of the rules.

ON CONTEST

7 October - 3.5MHz SSB
14 October - 3.5MHz CW
21 October - 144MHz phone and CW.

In each case the contest runs from 0700 to 1100. Only QSOs with Belgium and with DA stations are allowed. Exchange RS/T plus serial number (from 001). ON/DA stations will give their club code, and Belgian old-timers will give the year they were licensed. Each ordinary contact counts three points, with an old-timer five. Each club worked is a multiplier. Listeners may enter and should log time, station heard, code given, and callsign of other station. Points as for transmitting section. Logs should be sent within three weeks of the contest to Welters Leon, ON5WL, Borgstraat 80, B 2880 Beerzel, Belgium.

In the 1989 WW South

PHOTOGRAPH: DJENK

America CW Contest the only UK entrant seems to have been **GM3CFS** who scored 32,494 points in the multiband section.

In the 1989 **VK/ZL Oceania DX Contest** (CW and Phone sections) **G5MY** should be congratulated, as he appears to have been the only UK entrant. He scored 598 points in the CW event and 850 in the phone. A pretty dismal turn-out from the UK!

MISCELLANEOUS

A letter has been sent out from Mustafa, TA3B, Umit, TA3C, Yasar, TA3D, and Levent, TA3F. They are in Izmir and point out the great difficulties they are facing in receiving incoming QSLs. They are receiving many complaints from those who have not received cards from them and they want everyone to know the problem lies with the local Post Office. In future please mail cards by registered mail or otherwise send them via Thomas Vorkamp, DL5YCC, who will pass them on.

Another letter of apology. This one from VU2AID who has written to G0EGE about the VU40 Award. Originally VU2AID was used as the address for applications, and he collected them before forwarding to VU2TN. For a number of reasons they have not all been sent out. VU2AID is attempting to meet VU2TN and take over the records to remedy the situation as soon as possible. VU2AID is usually on 14.150MHz at 1400 in the 'AIR Net' and says that he will collect information about applicants over the air.

One of the founders of amateur radio in the Falkland Is, Alan Betts, VP8AI, who was first licensed in 1937, died recently aged 75 years. By the time he had built his equipment WWII had broken out so he didn't get on the air until 1945 and was the only active VP8 during the 1950s. Most of his contacts were made on CW using 30W. Don Betts, VP8ON, asks for QSLs to the address in *QTH Corner*. He answers all cards received direct by air-mail. Cards for any VP8 station may be sent c/o Postmaster, GPO, Stanley - but only if their direct QTH is not known. It is important to use airmail as many are only on the islands for a short time.

Mike, RA3YG, has written to say that during the period 15 June to 15 July, working from Kolguyev Is, (IOTA EU-85) 4K3PA,

SPECTRUM ANALYSIS

4K3PWB, 4K3/UA3YCA, and 4K3/RA3YG made more than 25,000 QSOs, many of which were with the UK. QSLs should be sent only via RA3YG, who is organiser of the 'Kolguev DX Group' for planning international expeditions. Mike invites suggestions for places to visit next year. His address is in *QTH Corner*.

DX NEWS

David Ditton, G6QQ, will be V2/G6QQ from Antigua from 14 October to 7 November and will be on the air mostly on 21MHz CW. He hopes to take part in the RSGB 21MHz CW and CQ WW SSB DX contests. He will keep regular skeds with G3FJV on Mondays and Thursdays at 0800 on 21.403MHz commencing 25 October, and will work callers after this. KA3DBN will be in Anguilla between 1 and 8 October and has the callsign VP2EBN.

The group which is visiting S.Georgia and S.Sandwich next month is in need of urgent contributions. Their immediate target is US \$12,500 as this amount has to be paid as a deposit to the owners of the ship *Imdioama* for the thirty days it will be needed for the expedition (the

total charter fee is \$90,000). Early in August they had collected \$2,000 and pledges for a further \$11,000. Contributions go to Gerry Branson, 93787 Dorsey Lane, Junction City, OR 97448, USA. The proposed expedition to **Malpelo Is** which was earlier believed to have been postponed until next year may now happen at the end of this month. Y90ANT is located at George Foster Base, **Antarctica** and will be there until the end of the year. He invites CW skeds five or ten kHz above the low ends of the bands and uses 3.790, 14.290, 21.290, and 28.490MHz on SSB. HF0POL, in the **S.Shetlands** is very active between 1500 and 1800 near 21.260MHz, and on 7.060 or 7.084MHz after 2200. FD1MRP will be in **French Guyana** for three years and has the callsign FY4FP. He is on CW only on 14.017, 21.017, and 28.017MHz according to *DX-NL*, but also 15 to 30kHz above the low ends of the CW bands on 14, 21, and 18MHz according to the *Long Island DX Bulletin*.

DL2GBT will be in **Malta** as 9H1XX until 21 October mainly using SSB on 14, 18, 21, 24, and 28MHz and possibly 7 and 3.5MHz. The numeral in the callsigns of **Estonian** stations

QTH CORNER	
C6A/G4RWD	Bureau or K.J.Cheetham, Callington Hall, Tatenhill, Burton on Trent, Staffs, DE13 9SH.
J49G	SV9ADH, Polymirics 34, GR-54000 Chania, Greece.
RA3YG	Mike E.Sochinski, PO Box 5, Bryansk, USSR.
S70MX	HB9MX, Strahleggweg 28, CH-8400 Winterthur, Switzerland.
VP6ON	Donald Betts, 7 Jeremy Moore Av, Stanley, Falkland Is, S. Atlantic.
7J1AB	United States Embassy, PO Box 9041, Riyadh 11413, Saudi Arabia.
708AA	F6EXV, 4 Impasse du Doyen Henri Vislo, F-33400 Talence, France.
9M6PV	via WA4WTG, 718 SE 3rd Lane, Dania, Fla, 33004, USA.
9X3HG	PO Box 420, Kigali, Rwanda.

now indicates their location - ES1 is Tallin and the Northern Islands; ES2 Harju Rajon; ES3 Haapsala and Paide; ES4 Kohtla-Jarve, Sillamae, Rakvere, and Narva; ES5 Turtu, Jogeve, and Polva; ES6 Valga and Voru; ES7 Viljandi; ES8 Farnu; ES9 special event stations, and ES0 Western Islands.

DX News Sheet reports that H44AP in the **Solomon Is** has been found near 18.130MHz between 1130 and 1230, and is also often near 14.200MHz between 0800 and 1100. T30AC is now in **Fiji** and has the callsign 3D2WM. He will be there for three years and prefers CW.

DX News Sheet reports that the call 7Z1AB has been issued to a station in the US Embassy in Riyadh, and that there are four

licensed amateurs there who are likely to use it. There has been no further news of the large group of Indians who were hoping to visit **Bhutan** this autumn. In view of VK9NS's experience this seems rather unlikely to happen anyway.

JARL News reports the coming into service of a second Japanese 29MHz FM repeater - this time located on Hokkaido. Its callsign is JP8YCV, and frequencies 29.550MHz (input) and 29.650MHz (output). The first, JP1YEE, came on the air in 1985 from Ogasawa and has been found to be very useful.

F6FYD will be in **Sudan** and **Southern Sudan** for several months. It is not known if he will be able to get permission to operate. 5V7HL is believed to have been a pirate but 5V7DP, in

HF F-LAYER PROPAGATION PREDICTIONS FOR OCTOBER 1990

The time is represented vertically at two-hour intervals 00(00)GMT for each band, ie 00=0000, 02=0200, 04=0400 etc. The probability of signals being heard is given on a 0 (indicated by a dot) to a 9 scale; the higher the number the greater the probability with 1 meaning 10 to 19 per cent of days, and so on. Additionally 50MHz F-layer and 1.8MHz openings are indicated by a plus (+) sign in the 28 and 3.5MHz columns.

Time / GMT	28MHz	24MHz	21MHz	18MHz	14MHz	10MHz	7MHz	3.5MHz
	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802
** EUROPE								
MOSCOW	...1899872...	...3999994...	...69999982...	1...888889942	533776668996	987544346899	875211113688	+42.....4++
MALTA	...887773...	...29888861...	...599999841	11...888889973	753876678998	998744446899	998421124788	+5.....4++
GIBRALTAR	...576453...	...7887751...	...9998983...	...298889971	441687778996	997864446899	998632223689	+++3.....3++
ICELAND	...46541...	...168774...	...4899971...	...6889994...	22...187778984	884665556899	888632224678	+++3.....35+
** ASIA								
OSAKA	...1861...	...3972...	...58741...	...475432212	...152135655	...2...4773	...1551	...22.
HONGKONG	...49+862...	...5888741...	...27767751...	1...55568742	2...22236886	1...4786	...1574	...24.
BANGKOK	...6++82...	...5788895...	...147679831	1...25468953	4...2136897	3...4788	1...1576	...243
SINGAPORE	...6888883...	...5788895...	...246879831	2...15468964	4...2136898	2...4787	...1575	...242
NEW DELHI	...6++83...	...668885...	...1336878321	212...14468544	73...1136888	73...4789	51...1577	...244
TEHRAN	...8++83...	...67788951...	1...2634679842	411...3458975	8651...126899	973...4789	74...1577	...244
COLOMBO	...8++83...	...56888951...	1...1225679842	411...3458975	73...126899	973...4789	74...1577	...244
BAHRAIN	...8++83...	...76788951...	2...353679853	525311458986	975...126899	972...3789	74...1577	...245
CYPRUS	...7++99961...	...899999831	212988889963	634876789897	987643557999	996311235899	8841...2688	+5.....3++
ADEN	...8++899621	1...766889842	423522579986	7453...358998	985...26999	973...3789	75...1567	52.....235
** OCEANIA								
SUVA/S	...257721...	...478843...	...7767761...	...27656872...	...16532366...	...52...34...	...2...11...	...
SUVA/L	21.2432...374	32.46531.675	232776433852	1.387434583	...2751.156...	...42...33...	...2...11...	...
WELLINGTON/S	...687521...	...1788643...	...38767761...	...57556872...	...65223672...	...32...34...	...1...11...	...
WELLINGTON/L	21.1...12	33.121...33	232452...353	1236631.1552	...2651.1462...	...32...34...	...1...11...	...
SYDNEY/S	...5988851...	...7188873...	...68767872...	...475468841...	...1521368861	...2...473...	...151...	...
SYDNEY/L	...21...32	11.421...54	12117421.275	11.1274321473	...252114761	...3...23...	...152...	...
PERTH	...7898651...	...68888741...	1.1366678742	2...1124458975	...2...1126897	...4785...	...1572	...
HONOLULU	...8...3...	...1...251...	...311.572...	...1.532.772...	...233531164...	...563...31...	...23...1...	...
** AFRICA								
SEYCHELLES	...777874521	1...666886742	422323678986	7431...458998	972...126999	95...3789	82...1567	5.....234
MAURITIUS	...78+899731	2...66688653	522433679987	843111458999	962...126899	84...3789	61...1577	4.....244
NAIROBI	1...787898852	31.76688975	632632379998	8653...158999	9961...26899	983...3788	761...1577	53.....244
HARARE	2...677789864	41.76688986	752633379999	9744...158999	9961...26899	984...3788	761...1477	53.....244
CAPETOWN	21.477889975	53.676679997	862743358999	984621138999	9973...5899	985...3789	773...477	54.....444
LAGOS	31.3++8985	53.586679997	872863238999	99584...16999	99971...4899	8994...1689	6771...477	444.....444
ASCENSION Is	21...98777765	431296557887	875583224899	996771...2899	99984...699	89861...389	6773...67	454.....34
DAKAR	11...9+8+984	331197667996	774385325899	9966831.3699	99985...699	88862...389	7673...157	444.....24
LAS PALMAS	...8+898851	11...99999972	331398889996	664688778999	998875446899	999742113699	88852...378	+552.....4+
** S. AMERICA								
Sth SHETLAND	11...37888874	331158887886	774477665888	886675443478	89985211.146	67862...13	3563...1	.23.....
FALKLAND Is	11...58+8+874	331.7887788	664386643588	887575421368	9998521...37	89862...14	6873...2	354.....
R DE JANEIRO	11...3786762	221.58655785	664277322588	8875751...389	999752...69	99862...37	7773...5	544.....2
BUENOS AIRES	1...48+77873	221.68866785	564287523278	8875753...168	999752...37	89862...5	7773...2	444.....
LIMA	...+8+872	11...2865674	343.24632257	76264441...27	8996521...6	79862...3	5773...244	244.....
BOGOTA	...1+87772	1...3865574	332...5632157	66521541...38	9996321...6	89863...4	6763...1	444.....
** N. AMERICA								
BARBADOS	...8+8+872	11...8865684	343.27621387	6662454...168	9996521...38	98862...16	7763...4	543.....
JAMAICA	...1+87761	...3875573	332...5642256	56412542...37	9985421...6	89863...3	6763...1	344.....
BERMUDA	...6+88861	...7876783	332.17643586	564135411278	9985421...48	88863...16	7773...3	444.....
NEW YORK	...1888851	...3887772	221...5664575	553.25442367	88734311...37	88863...15	5773...2	244.....
MEXICO	...298751	...487552	221.2...574234	553.41451.157	88735212...37	59863...25	6773...2	344.....
MONTREAL	...288851	...3888872	221...5665685	542.25453477	88734212...157	88863...25	6773...2	344.....
DENVER	...5773	...68751	221...166543	442.1...255334	686241122...3	48863...3	2573...24	244.....
LOS ANGELES	...1862	...38741	11...57532	341.1...56222	576241.23...1	27853...2	473...4	444.....
VANCOUVER	...351	...573	11...17742	331.1...37543	575231.25212	36853...2	1363...3	344.....
FAIRBANKS	...1	...231	1...11124631	22...32236753	554452126655	34653...3322	243...11	444.....

The provisional mean sunspot number for August 1990 issued by the Sunspot Index Data Centre, Brussels was 199.9. The maximum daily sunspot number was 295 on 20 August and the minimum was 120 on the 7 August. The predicted smoothed sunspot numbers for October, November and December were respectively: (classical method) 136, 134 and 132; (SIDC adjusted values 120, 119 and 116).

Togo is often in Snooky's Net on 21.335MHz at 1800. 5V7RC has been heard on 21.295MHz around 1200. J5CVF is a new station in Guinea-Bissau - he will stay until mid-December and may visit the Bigajos is sometime this month or in November. FT4XG told G4DXW that FT4WB on Crozet Is has a faulty transmitter and is waiting for spares - hopefully these will arrive when the ship arrives this month.

PROPAGATION

Smithy, G8KG, has been moving house and therefore rather limited in his activity this month but he says: "The shift in the pattern of solar activity reported last month has persisted and the average level was again rising by the last week in August. Provisional daily solar flux values were above 300 sfu on 22 and 23 August and the 27-day average rose above 200 for the first time since January. Signs of a moderate recovery in levels although it is too early to

say how long this might last. There was a major geomagnetic storm in the last week of July but indices were otherwise low until mid-August." David, G3ZPF, has taken me to task for my comment last month asking if the bands were really that bad. I was being provocative - but the DX has certainly been there for those who have been winking it out. However, it is very clear that 28MHz has just not been as good as some of us remember it being during some previous sunspot maximum periods. At those times it was possible to work very easily with the proverbial "piece of wet string" but not this time...

Thanks to DX'press (PA3CXC), DXNL (DL3RK), the Long Island Dx Bulletin (W2IYX), RSGB DX News Sheet (G4DYO), the Ex-G Radio Club Bulletin (WA8GTA), and the Lynx DX Group Bulletin (EA2JGO). Closing date for December issue is 25 October, and for January it will be 13 November - which is ridiculously early but not the fault of the Editor!

VHF/UHF

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

August offered a good selection of modes to exploit including several auroras, some good tropo, a few Sporadic E openings on 144MHz and frequent events on 50MHz, and the Perseids meteor stream. The latter seems to have been quite good this year, several contributors reporting good reflections.

DXPEDITION RESULTS

John Hotchkin, G4ATA (YSW), has sent the complete results of his August operation from The Lizard (CNL/IN79JX). On VHF, he operated between 10 and 16 August. For a single handed operation, he certainly put on a good show from this rather rare square. The equipment used was described in the August column.

On 50MHz he made 60 contacts with 14 countries in 36 squares. On the 14th, 1916-2042, he worked into Scandinavia via Es, best DX being OH5NQ (KP30). On the 16th, 1931-2205, there was a good opening to DL, OE and the Mediterranean; best DX was SV1OE (KM17), and 9Hs 5AA, 5EX and 1PA (JM75).

185 QSOs were made on 144MHz with 17 countries in 42 squares. On the 10th and 11th there was tropo propagation to northern Spain and Biscay, with EA2AWD/MM (IN85) worked in a wet square. DL, ON and PA stations were contacted on tropo on 10-12th. SSB MS skeds were completed with SP9EWU (JO90), HG3DXC (JN96), YU2CV (JN95) in a 30 second burst, IW1AZJ (JN35) and Y22IC (JO63) on the 12/13th. On 430MHz he made 24 contacts with four countries and 14 squares. He operated in the contest on the 11th making 16 QSOs. Best DX was ON5NY (JO10) on the 10th.

John mentions all those who helped his solo effort by loaning various items. These were the North Wakefield Radio Club, G0CVC, G0EVT, G4IAU, G7CCL and G8GXP. Although a little 'mike shy', G7IDR assisted, and Mr D Slicker transported the equipment to and from the site and helped assemble and dismantle the stations. He thanks all the sponsors who helped raise over £800 up to 22 August for the BBC's Children in Need appeal, and particularly his understanding and supportive wife for letting him go.

TABLES AND AWARDS

As those who have an entry in the Annual Table will know, Sicily, IT9, may be counted as a country for points although it is not a recognized DXCC one. VHF Awards Manager Ian Cornes, G4OUT, has confirmed that IT9 is a valid country for RSGB awards, as noted in the current *RSGB Call Book*. Perhaps he can persuade the ARRL to fall in line with the rest of Europe and accept it as a country. The ARRL has accepted 5N QSLs for 50MHz DXCC purposes; there was some doubt about the licensing situation originally.

METEOR SCATTER

The major meteor stream in October is the Orionids whose parent body is comet Halley. It actually consists of four streams with periods ranging from 7.54 to 89.44 years and very retrograde inclination orbits averaging about 163°. At atmospheric encounter, the velocity is one of the highest, 68km/s. The British Meteor Society's *Radiant Catalogue* gives the B stream a ZHR of 35, Right Ascension 94.5° and Declination +15.5°.

The radiant of the Orionids is above a mid-UK horizon from about 2100, through midnight to 1200UTC. Reflection efficiencies exceed 50% as follows: NE/SW 2300-0500; E/W 0130-0730; NW/SE 0400-0930 and N/S 2300-0100 and 0600-1030. The period 19-24 October should provide useful reflections, the peak probably occurring on the 21st, although not necessarily very pronounced due to the combined effects of the several streams and their 'shallow' inclinations to the ecliptic plane.

Another stream worth considering is the Taurids S which peaks on 3 November, available 1730-0800. The RA/DEC are 50.5 and +13.6° respectively, inclination 5.5° and period 3.00 years. Best times are: NE/SW 2000-0100; E/W 2130-0330; NW/SE 0000-0530 and N/S 1900-2300 and 0200-0600. Next month I will give data for the Leonids.

PHANTOM QSOs

Responding to last month's item about the UB5KY/GW4FRX phantom auroral QSO on 13 March 1989, Jim Smith, G1DWQ (DOR) says he also received a QSL from him for a non-QSO at 2017 the same day. The only USSR station he worked was UC2LAI. Colin Mister, G0DAZ (HWR), is yet another who has UB5KY's card for an imaginary QSO in this event.

BAND REPORTS

This month's contributors included G2HKU, GM3s GSM and GDX, G3s GVV, KSH, LPS, YRM, G4s DXW, EHQ, FRV, GW4KGR, G4s MUW, NXG/M, PDQ, VVP, ZYQ, and G0JZU. Stations who were using CW are shown in italics:-

7MHz	
2100	C58/ON7EH, 5V7RC
2200	SU1CF
2300	FJ14IND
14MHz	
0500	HC8/HC1LT
0600	FK8FS, KH3/KB7HM, KH0AC, T32Z, TI9US, 3D2KW
0700	AH3C, FO5JV, H44AP, VK9NB, ZK1s DD, KY
0800	FO5BI, K8CRM/KH3
0900	ZK2EA
1600	JT18G
1800	V63IK, 7Q7LA
1900	KL7NA/KH2, S79MX, ZS9A, 7O8AA
2300	A61AC, J5CVF
18MHz	
0400	V31TU
0500	TA7/KUQJ
1500	9V1YD
1600	S79MX
1800	FH5EJ
1900	D44BC, FY5FA, ZD8Z
2000	PA0GAM/S72, TA2AO, 4S7WP, 6W1QJ
2100	A92BE, HL1IUA, PJ2AM, VP5/W2AH, VY2QST
2200	N7ET/DU7, V2/AA6QG, ZD8LII, 7Q7CW
2300	V44KJ, 8R1/W1CDC
21MHz	
0600	T5RR, 7O8AA
0700	H44RW, JI2KLU/JD1 (M.Torishima), V63IN, ZK1KY
0800	H44AP, KA3HMS/KH3, T20AA, ZK1BY, 3D2/OZ1KLA, 9M8PV
0900	A35QC/AH3C, BZ4UBC, XU8DX, 3D2YA
1000	BZ4DDL, J28DN, ZK1KY
1100	BV5SY, SU1CF, T30BC
1200	VP2EY, YB8RB, UB4JWO/3W3RR, 9X5HG
1300	FT5XH, XX9KA
1400	BV2FA, ED9ICM, FR4FR, YC9VGB, ZS9A
1500	D68KB, ZS8MI
1600	A61AD, BZ7AA, XW8KPL, 9M8ST, 9V1RH
1700	HS0ILY, 9M2CS 9V1YC
1800	HF0POL, V73AZ, 3X1SG
1900	BV2DA, HS1BV, J5CVF, S0IA, V63IN
2000	S92LB, VP2EY, 3V8/C31WW, 6W8JX
24MHz	
0700	9M2FS
1200	S79MX, TR8BY
1300	FT4XG, 5H3TW
1400	FS5EJ, V51BG, VU2EMY
1900	7Q7RM, 7Q7CW, 9M2AX

28MHz has not produced any exceptional dx this time so is being left out to make room for 18 and 24MHz.

PROPAGATION STUDIES

In Ray Cracknell's, G2AHU (HWR), July 50MHz propagation and activity report there were contributions from Cyprus, Zimbabwe, Greece and Japan, providing a comprehensive account of events at this end of the VHF spectrum. There was Es propagation from Britain throughout the month, the poorest days being the 8th, 20th and 29-30th.

Ray commented: "The increase in the number of European stations permitted to operate on 50MHz tends to give a distorted impression and must be set off against the incidence of transatlantic openings which this year have been, in the main, of short duration and very localized in extent. This year's results on transatlantic circuits can only be described as disappointing.

"Other longer distance circuits from Africa and South America opened on several days, mainly to the extreme south and west which could be reached direct by F-layer propagation - by TEP or otherwise - and to the rest of the British Isles with a final hop of Es. From the Midlands it was apparent that these occurred when stations in the south of France were also being received very strongly."

The phenomenon of noctilucent clouds has been mentioned in VHF columns from time to time, it being queried if they can sustain any form of VHF radio propagation. Ray's report included details of a QSO at 2047 on 1 July 1989 during VHF NFD. Chris Tran, GM3WOJ/P (IO74NP) worked G4BVY/P (JO01KK) on SSB with RS55 reports each way while beaming north at a prominent noctilucent cloud.

No conventional aurora was apparent although there was an auroral tone on the signals and on the GB3SIX beacon. Ray commented: "NLC propagation seems improbable but anyone with similar experience or who can give details of any auroral QSO on the night of 1/7/89 is asked to comment, please."

50MHZ INFORMATION

Now some items from the August 6m Information Pages supplied by Ted Collins, G4UPS (DVN). The new Canadian beacon VO1MUN (GN37) on 50.0375MHz is located at St Johns, Newfoundland and runs 10W from a home built TX to a vertical antenna, 46m AGL. The 20WPM FSK message is "VVV de VO1MUN 47.6N 52.7W AR." It has been heard all over Europe and reception reports should be sent

to the Memorial University ARC, PO Box 51, St Johns, Newfoundland, Canada A1C 5H3.

Trevor Day, G3ZYY (CNL), was active from Gibraltar from 22 June to 12 July using his ZB2HN call. He worked 135 British stations, 33 Ws and a VE, and his country tally was 24. He repaired the ZB2VHF beacon and got it running again.

FC1MKY informed Ted on 9 August that his request for a permit to operate in Monaco had been turned down. The club station in the principality has also been refused a permit. C31RM wrote to G4XNS to say that no 50MHz permits have been issued to Andorran residents nor are any being issued to visiting DXpeditionaries. By contrast Nick Waite, G3KOX (HFD), who operated from the Azores earlier this year with G3SDL, has received a 50MHz permit to operate in Turkey. Mid-November is suggested as a likely time.

Since about 9 July, someone has been using a variety of exotic call signs on the band, such as KG6HA, KJ6HM, 9K2AM and KH6GBZ. On 8 August he allocated himself 4Z4IF and JY0A. Some may have been fooled into thinking they have worked a genuine station. The obvious advice is to not waste money sending QSLs and IRCs.

John Ridd, G8BQX (SXE), is one of many who has worked EB5EIB (IM99UE). He sent a copy of a QSL from him but as far as we are aware, no Spanish amateurs have any permit yet to use 50MHz. Many are understandably incensed when foreigners, who have 50MHz licences at home, operate from Spanish territories, including EA6 and EA8, when on holiday.

Membership of the UK Six Metre Group has almost doubled since May and there are now members in 38 countries. New recruits include EI9BG, FC1MKY, I1AMU, OE5KE, OH2BC, OZ7DX, SM7AED, YO2IS, YU3ES, ZB2EO, ZS6XJ, 7Q7RM and six Ws. The Secretary is G4UPS, 27 Parklands, Hemyock, Devon, EX15 3RY; contact him for details.

John Livesey, G0JLL (LNH), is the editor of the group's newsletter called *Six News* and a copy of issue number 26 arrived via Neil Carr, G0JHC. It includes a 'Beginner's Guide to MS Operating', well illustrated details of a 2-el. 50MHz beam, QSL information, a resumé of Solar Cycle 22 so far and details on extending the coverage of the FT-690R Mk 2 by SV1DH.

50MHZ ACTIVITY

The usual method of individual reporting tends to be rather

repetitive, so this month I have compiled a chronological report of activity based on input from the following contributors: Darrell Moody, G0HVQ (GLR); Neil Carr, G0JHC (LNH); Jim Smith, G1DWQ (DOR); Gerry Schoof, G1SWH (MCH); Terry Chaplin, G1UGH (SFK); John Heys, G3BDQ (SXE); John Hunter, G3IMV (BKS); Bryn Llewellyn, G4DEZ (ESX); G4UPS; Ela Martyr, G6HKM (ESX); John Fitzgerald, G8XTJ (BKS); Gerard Elliott, G14OWA (LDR); Geoff Brown, GJ4ICD; John Hilton, G1MZVJ (LTH) and Paul Baker, GW6VZW (GWT).

Starting in July, on the 25th there was Es propagation from 1640-1830 to F, I, 9H, ZB2EO (IM76), SV1AB and SV1EN

(KM18). QSOs were made with Z23JO (KH52), 7Q7RM (KH74), ZS6LN and ZS6WB. There was strong TEP in Jersey. On the 26th, CT1LN was copied at 1145 and SV1AB and YO2IS (KN05) were worked in the morning. From 1800 ZB0T (IM76), CT1BH (IN51). GJ4ICD worked 7Q7RM at 1650 and Z23JO was the strongest signal Geoff has ever heard from Africa from 1700 for half an hour. The LU1DMA beacon was S5 in Jersey.

The 28th provided Es and auroral opportunities. The Es, 1140-1300 brought OEs in JN67, 68, 76, 77 and 78, IK5FTQ (JN52), IOFDH (JN61), IK7GXR (JN81) and DLs in JN58. YO2IS was also QRV. Beacon GB3RMC (IO77) was auroral from 1500 to

LOCATOR SQUARES TABLE

Starting date: 1-1-1979

Call sign	50MHz	144MHz	430MHz	1.3GHz	Total
G3IMV	305	438	125	51	919
GJ4ICD	425	263	119	59	866
G4IJE	366	338	5	2	711
G6HKM	263	224	112	48	647
G4RGK	121	311	145	52	629
G0DAZ	137	316	122	39	614
G1KDF	266	183	104	37	590
G6HCV	309	233	-	-	542
G4KUX	-	384	120	-	504
G4TIF	172	204	111	-	487
G4XEN	66	300	114	6	486
G4DEZ	110	249	60	50	469
G1SWH	196	165	60	6	427
G8DER	43	183	114	82	422
G0CUZ	-	348	73	-	421
G1DWQ	284	152	-	-	416
G0EVT	142	213	57	-	412
G8LHT	113	185	93	14	405
G4MUT	122	153	94	34	403
G1LSB	73	176	144	-	393
GW6VZW	236	143	6	-	385
G4PIQ	-	278	105	-	383
G0JHC	328	48	-	-	376
G8ATK	74	144	94	52	364
G4RRA	-	280	80	-	360
G4SSO	-	261	98	-	359
G4VXE	147	162	42	4	355
G4SWX	-	347	-	-	347
GM4YXI	-	340	-	-	340
G4DHF	-	331	-	-	331
G8PYP	183	112	34	-	329
GJ6TMM	109	151	52	-	312
G0GMB	-	187	99	-	286
G1GEY	-	170	92	22	284
G4YTL	-	249	-	-	249
G6STI	-	152	69	24	245
G0HVQ	173	71	-	-	244
G3FPK	-	244	-	-	244
GW4VEQ	-	241	-	-	241
G0LFF	83	153	-	-	236
GW4FRX	-	232	-	-	232
GM4CXP	-	198	31	-	229
G1SMD	115	106	-	-	221
G0NFH	113	78	18	9	218
G4DOL	-	218	-	-	218
G6MXL	52	97	48	20	217
G8XTJ	101	121	-	-	222
G1TCH	99	95	6	-	200
GM0GEI	193	-	-	-	193
G1UGH	101	89	-	-	190
G4XBF	-	172	-	-	172
G1WPF	20	114	37	-	171
G6MEN	67	54	27	3	151
GM1XOG	145	-	-	-	145
G4TGK	-	137	-	-	137
GW4VX	-	115	-	-	115
GM0GDL	-	88	23	-	111
GM1BVT	88	23	-	-	111
G1CEI	11	77	18	-	106
G8UWO	-	41	44	18	103
G7CLY	-	100	2	-	102
GM1ZVJ	35	48	-	-	83
G6ODT	-	29	47	-	76
G0HDZ	-	64	-	-	64
GW7EVG	-	21	-	-	21

No satellite, repeater or packet radio QSOs.

0600 next morning and nine countries were available by aurora. The second phase, 2300-0020 in Dorset produced a visual event, too. There was Es to Iberia on the 30th and Z23JO was S7 for 20min from 1710. More Es on the 31st around 1200 brought OE6s DGG and WHG (JN87) and from about 1800 some 9Hs. SV1AB was worked at 1855. IO, YO2IS, SV1DH were QRV and CU1EZ (HM76) was worked at 1812. 7Q7RM and Z23JO were also available.

Coming to August, on the 1st 9H5AB was QRV at 0940, followed by Es to F, I, OE and 9H from 1110-1240. 1540-1900, more Es to I, OE, OZ and SM. 1A0KM worked 105 stations in about an hour; OY7FRA (IP62), OY7ML, OH0BNP (KP00), YO2IS, Fs and DLs were worked. Around 1700, 7Q7, Z23 and ZS6 came through.

On the 2nd at 0715, there was Es to 9H and from 0840-1240 to I, LA, OE, OH and SM. SM3BIU (JP73) at 1412 and SV1DH at 1545 were worked. From 1650 there was three hours of Es to DL, OE, OH and OH, OZ and SM, also YO2IS. At 1750, the MUF exceeded 100MHz. 5B4CY was S7 for 90min from 1905 and the CTOWW beacon was copied from 2005.

The latter was S9 at 0920 on the 3rd and GM, DL and SM were worked 0948-1050. CU1EZ was available 1215-1400 then there was a complete fadeout. On the 4th there was Es to I, 9H, OH and SM from 0845-0900. CU1EZ was there from 1248 till fadeout at 1700. From 2115 there was Es to I and OE and 4U1ITU at 2210 was a choice DX station. During the afternoon, GJ4ICD reported propagation to Z23, ZS6, 7Q7, SV and 9H.

The 5th brought morning Es to F, I and 9H. G3BDQ worked Z23JO at 0828, a most unusual time for this path. G4ODA/TF was worked from about 2030. ZC4MK was copied at 0818 on the 6th, then OE and YO2IS. The V51E keyer was there at 1700 as was Z23JO. 1845-1915 brought a short Es opening to OE, DL, SV and YO.

ZC4MK was heard again at 0835 on the 8th and from 1020 there were Fs. From 1629, the V51E keyer was copied via TEP/Es for 30min. DL, OE and F stations were worked from 1545 on the 9th and the V51E keyer was on again at 1745. From 1920 there was three hours of Es to DL and OE. On the 10th, 1015-1315, there was Es to I, DL, OE and SM and IS0AGY was worked. There was a major solar flare at 1820.

There was an extensive Es opening on the 11th, 1330-1930 to CT, DL, HB9, I, IS0, OE and OH. HB0/HB9QQ (JN47) was

worked by many and LX1JX was QRV. G4DEZ worked LU8YYO, the ZD8VHF beacon was S6 from 2127 for 35min and G4ODA/TF was contacted.

Many MS QSOs were reported on the 12th at the peak of the Perseids, countries worked including DL, HB9, HB0, I, OE, OZ, PA and SM. Es propagation was available, 0730-1300 to I, LA, ON, OZ, PA and SM and 2105-2230 brought further Es to DL, OE, OZ and SM. I2ADN/8 was on from JM79.

MS QSOs with DL and SM stations were reported in the morning of the 13th. 0739-1050 brought more Es to I2ADN/8, IT9CHU, IK5NTE, 9H5AA and YO2IS. OH3MF was worked at 1840. 0735-1100 on the 14th produced Es to DL, OZ, TF, T77C and YO2IS; 1750-1801 to OH and OZ and 2055-2143 to DL, OZ and SM.

On the 16th there was Es to I, T77C and SM7 from 1830 and I2ADN/8 was worked in JM88 at 2123. 9H5AA was worked at 0845 next morning, while on the 18th, FC1MKY (JN33) featured in readers' lists. From 1224 there was Es to OZ and SM and at 1940 9H1BT was heard. On the 20th Z23JO was QRV at 1707 and OH2SX (KP20) was worked at 1932.

There was a tropo opening to Scotland from the Midlands from 1300 on the 21st and G6HKM worked OY/G4ODA (IP62). The 23rd was a rewarding day. Beacons ZB2VHF at 1115 and CTOWW at 1230 were copied, then from 1440 there was a good aurora to G, GD, GI and GM. At 1614, auroral-E QSOs were reported to SM7 and from 1720 there was an Es opening to DL, F and I. The V51E keyer was S8 at 2100 on the 25th and IT9CHU was worked at 0754 on the 27th.

70MHZ

Roger Banks, G4WND (SFD), sent the August edition of his *QSB The Newsletter for Four Metres*, the front page of which carries comments on the proposed new band plan. Feedback from his readers suggests opinions vary between, "A waste of time" and "About time." The main technical article is devoted to the Pye A200 series of amplifiers which can be tweaked to give 50W of linear amplification on 70MHz.

Only two reports this month, the first from G1SWH who worked EI2VPX/P (IO61) in Waterford on 4 August and EI9FK/P (IO53) in County Mayo on the 11th. The other report was from Ian Cornes, G4OUT (SFD), who operated from home in VHF NFD on 7 July to collect some counties in G, GI, GM and GW.

144MHZ

Colin Morris, G0CUZ (WMD), has received a tape recording from HG5PT of the excellent Es opening to eastern Europe on 10 July 1988 in which Tamas worked about 100 Gs. If anyone would like a copy, send Colin a cassette with return postage and he will oblige; he is QTHR.

Colin worked IT9WGZ/9 (JM68) at 1750 in the Es opening on 25 July. On 1 August, from 1645 he contacted EA6PS (JM19), EA3CSV (JN01), EA7s in IM86/87 and ZB0T at 1800; the Es faded by 1825. He operated in the long aurora on 28 July, best DX being SM1BSA (JO97) and LA5JEA (JO18). Gotaways were UA2FL (KO04) and ES2XM (KO29).

He reckons this year's Perseids shower was the best since 1984 and he completed 25 QSOs. The best were G4DHF/TF (IP03) on random SSB, TF3EJ (HP94) on CW, IN3TWX (JN56), OH5LK (KP30) and SM2CKR (KP03) on the 12th and SM7EAN (JO86) on Oland Island on SSB on the 13th. He reckons the shower peaked at 1000-1200 on the 12th.

G1DWQ heard EA6PZ and several EA7s via Es on 1 August but Jim failed to make any contacts. On the 4th he worked EA1WZ (IN53) at 2349 by tropo in the EA/F contest. FF6KSL (JN28) and EI2VPX/P were new squares on the 5th. In the aurora on the 23rd he worked GM4BYF and GM0LIR (IO85) on CW around 1720 and heard GM0GTU/MM (JO07).

G1SWH made his first MS QSOs in the Perseids. Gerry completed on SSB with G4DHF/TF, SK3LH (JP93), SM5FRH (JO88) and LA1K (JP53). EA3KU (JN00) was a new square for G1UGH in the Es event on 1 August, as was EI2VPX/P on the 5th. On the 26th, Terry worked OZ1BEF (JO46), SM6KJX (JO67), OZ7JR (JO57), G0JDL/MM (JO14) on the oil rig supply ship *Vulcan Service*, OZ5TG (JO45) and OZ2BB (JO46) by tropo.

G3IMV's first QSO in the 28 July aurora was at 1616 with SP4MPB (KN03), followed by SP9AMH/P (KO02) and SP7DCS (JO91). By MS, John completed with LA0BY in JP67 and 68 in the Lofoten Islands, which are a good distance from Bletchley.

Peter Atkins, G4DOL (DOR), caught the 1 August Es to Spain and from 1707 worked EA3ADW (JN11) and six EA7s in IM76, 78, 86 and 87, the last contact being at 1802. He operated in their contest on 5 August when tropo was good to the south. Pick of the bunch were EA2BWA/P (IN93),

EB1DMI/P, EA1CJF/P and EA1CJT/P (IN63), EA4SJ/1 (IN83), EA2AWD/MM (IN74), EA2BFM/1 and EA1DVY/P (IN81). In a fleeting Es opening on 23 August, quite late in the season, he worked IW1AZJ/1 (JN35) and IT9IPQ/9 (JM78) between 1912 and 1957. Peter heard IW5BUX. During the Perseids, he got part of a call ?X4?? and wondered what that could be. Any suggestions?

Andy Silence, G4MYS (HPH), reckons you don't necessarily need QRO and big beams to work DX. He sent a copy of a QSL from I6JLO (JN62) worked via Es on 14 July at 1947, confirming an FM QSO made with 45W to a colinear antenna at 42ft AGL; QRB is 1522km.

G4OUT operated on CW in the aurora on 28/29 July. Ian worked several GMs, G4OWA (LDR), EI4CL (IO63), G4KIS (ATM) and SM5FRH between 1525 and 0141. Stations heard included SM1BSA, LA, SP3 and LY. The QTEs for the GMs were 12-24°, the EI/GI QSOs were at 348-354°. The SM5 was best at 340° and quite inaudible east of north.

In an aurora on 21 August, Andy Cook, G4PIQ (ESX), worked LA3NGA (JO49), GB2XS (IO78) and SM4KYN (JO79). In the good event on the 23rd he worked GMs, including GM0GTU/MM and on the 26th OH2TI (KP20) and SM5ERR (JO89). Gotaways were ES2XM and LY2BJB. There was some good N/S tropo on the 26th and Andy contacted OZs and LA3NGA again.

John Palfrey, G4XEN (NHM), wrote that 1990 is the first year since he was licensed that he didn't have any Es QSOs in June. On 5 July, 1638-1710, he worked EA7s AH and PZ (IM67), EA1MO (IN71), EA1CAI (IN72) EA4CM (IN80) and EA4DLQ (IN79). The next Es was on the 14th, 1930-2010 to Italy.

The aurora on the 28th was in full swing when he came on at 1617. He worked SM1, OZ, SP2, 5 and 7, DL, EI, GI, GM and GW and heard an LY2. The event was spectacularly visual at 2315 for 15min when the rays were fading, leaving a greenish glow. On MS, G4YTL/TF was John's 300th square and 48th country. It was a 'tail end' CW QSO including a 21s, S9 burst and ranks as "QSO of 1990." He thought the Perseids better this year with excellent reflections all day on 12 August and into the early hours of the 13th.

G6HKM got an unexpected new square on 26 July when she worked Andy, GW0KZG/MM on the *RRS Challenger* in IO60. Ela had a couple of QSOs in the 28 July aurora with GM1YZW (IO68) and G4KIS (IO64). In the Es on 1

August she worked six EA7s in IM76, 77 and 87 and ZB0T for a new country. 5 August brought EI2VPX/P and on the 26th she worked several OZs.

John Hill, G7CLY (HBS), contacted GB2XS at 0650 on 14 August, also EI2VPX/P. He worked GM0LVI (TYS) and heard G4PIQ/TF on 12 August. Greetings to Andy Smith, G7FWE (CHS) whose contribution got squeezed out last month. He runs 10W from an FT-480R to a 10-el. Yagi at 45ft AGL.

Graham Daubney, G8MBI (HFD), worked a couple of YUs via Es at 1206 on 29 July. About an hour later he heard YUs calling CQ for 3-4min. G8XTJ has been working more WAB squares but had no luck with the folk in OV00. John did get through to EI2VPX/P who always put an excellent signal into G3FPK's Rx.

Darrell Mawhinney, G1KSO (DWN) worked ES2XM, QRB 1916km, in the 29 July aurora for a new country. On 5 August he completed on MS with G4DHF/TF and thinks it a first GI/TF QSO on the band. Any prior claims? Other Perseids QSOs included SM2CEW (KP15), SM2ILF (KP04), SK3LH, plus DL, EA, F, HB9, OE, OZ and Y. G14OWA found this year's Es very poor with only weak signals ever reaching the province. However, it was compensated by several good auroras.

John Lincoln, GM0JOL (HLD), is in IO78 and regularly QRV. Recent CW MS completions include DL1GBF (JN48) on 27 July, DL3RBH (JN68) on 3 August and SM2CEW on the 6th. In the 28 July aurora his best DX were OK1IBL (JO60) and GW0KZG/MM (JO12). There was a 'local' aurora on the 15th but he was too busy to stay on.

Doug Millie, GM4DJS (SCD) keeps magnetometer records and found things very unsettled on the morning of 28 July with a series of storm pulses between 0530 and 0700. The radio aurora commenced at 1422 and continued till 1800. On CW he worked into DL, F, G, GI, GW and PA. The second phase was from 2020 to 0500 on the 29th. Both the GB3LER and OY6VHF beacons were very strong; DL0PR and GB3VHF were also copied and he contacted stations in DL, EI, F, G, GI and GM.

The event on 23 August started at 1405 till 1700, with a small second phase at 1858. Doug's CW reached OY/G4DHF (IP62), SP7DCS, GM0GTU/MM and HB9DFG (JN37) plus Gs and near continentals. GM0LVI could be heard on tropo as well so he was able to determine the Doppler shift which was 1kHz low. This indicated the reflecting zone was receding at about 2km/s.

ANNUAL VHF/UHF TABLE January to December 1990											
Call sign	50MHz		70MHz		144MHz		430MHz		1.3GHz		Total Points
	Cty	Ctr	Cty	Ctr	Cty	Ctr	Cty	Ctr	Cty	Ctr	
G1SWH	51	33	32	6	85	18	41	8	12	5	289
G6HMK	59	34	-	-	67	22	34	13	27	10	266
G0IMG	44	29	40	4	49	12	32	4	-	-	214
G0NFH	40	20	21	3	48	9	11	2	2	2	158
G0CUZ	-	-	-	-	88	31	30	6	-	-	155
G1WYC	16	18	-	-	53	14	25	8	-	-	134
G4XEN	-	-	-	-	64	25	32	7	3	2	133
G8PYP	22	23	1	1	42	13	21	6	-	-	129
G8ESB	8	4	15	2	42	6	30	4	9	4	124
GW6VZW	77	43	-	-	-	-	-	-	-	-	120
G8XTJ	13	24	-	-	57	13	-	-	-	-	107
G0EVT	21	23	-	-	36	14	5	1	-	-	100
G3FPK	-	-	-	-	78	18	-	-	-	-	96
G4OUT	-	-	26	5	55	9	-	-	-	-	95
G14OWA	29	7	-	-	43	14	-	-	-	-	93
G7CLY	-	-	-	-	60	9	-	-	-	-	69
GM0JOL	-	-	-	-	47	17	-	-	-	-	64
G6MXL	3	12	1	1	25	5	7	2	2	2	60
G6ODT	-	-	-	-	35	6	15	4	-	-	60
GM0GEI	29	22	-	-	-	-	-	-	-	-	51
GW7EVG	-	-	-	-	31	6	-	-	-	-	37
GM1ZVJ	1	9	-	-	2	1	-	-	-	-	13

British counties are those listed in the January 1990 *RadCom*, but excluding IOS; 77 in all. Up to three different stations allowed in all 12 GM regions. Do not include EI counties. Countries are the usual DXCC ones plus IT9.

John Nelson, GW4FRX (PWS), was QRV in the 23 August aurora from 1526 to 1933 and his QTEs varied from 0-30°. Best DX were LA4YGA (JO48) and GM0GTU/MM. He heard OH1CF and passed over G4DHF, not realizing till later that David was in OY on his way back from the Five Bells Group's Icelandic trip! Using 3W of SSB, Gary Nicholas, GW7EVG (CWD), worked G7IAC/P (NLD) on 19 August, GM1NUS/M and GM0LAK/M (BDS) on the 26th. He missed out on the auroras but did QSO EI2VPX/P on the 7th.

From Anglesey Tony Jones, GW4VEQ, heard OY6VHF for the first time via aurora on 27 July. In the Es on 1 August he worked EA7s in IM76, 77 and 86 and on the 4th, EA1WZ (IN53) by tropo. The tropo lift on the 5th brought EA1DKV, F6BQX/P (IN86) and EI2VPX/P and on the 9th and 10th more EA1s in IN53, 63 and 73.

Using SSB in the Perseids, he completed with Y27BL (JO61) and EA3KU (JN00) on the 11th, and on the 12th with G4PIQ/TF, TF3EJ, IN3DOV (JN56), LA1K, SM2ILF, HB9STI (JN46), IK1LGV and IK1JXY (JN44), HG7BT (KN17), and with FC1CCC (JN26) on random.

In an aurora on the 21st SM0ERR (JO89) and LA8SJ (JO59) were contacted. Pick of the crop in the 23 August aurora were GM0GTU/MM, OY/G4DHF and SK6QW (JO68) with DLs and PAs. The aurora on the 26th brought QSOs with DL, LA, OZ and SM, the best DX being SM0HAX (JO99), SM1NVW (JO97), LY2BJB and LA5JEA.

430MHZ

Paul Brockett, G1LSB (LCN), contacted OK5A/P (JO70) on 21 July. In the lift on 2 August he did well across the North Sea to

LA1YCA and LA8AK (JO38), LA9RAA and LA3EQ (JO28), OZ1KLU (JO46), LA3VW and LA3DV (JO48), DL3LAB (JO44), OZ2OE and OZ6HY (JO45), OZ1JPT (JO64), SM6CEN/M and SK6AB (JO57), SM4JHK/4 (JO69), SM4KYN and SM4KRK (JO79), SM6JEH (JO68), SM4DHN/4 (JP70), SM6OEQ (JO58), SM7LAD and OZ7IS (JO65) and LA9DI (JO59).

G4ATA/P (IN79) was a new square for G1SWH on 11 August. G4MYS had a 20min QSO with F2LQ on FM on 18 July; not bad just using a colinear antenna and at 270km, his best DX on the band in 10 years. Sheldon Hands, GW8ELR (DFD), took advantage of sea ducting at 1056 on 11 July to work EA8/DJ3OS (IL18). The German was S3 and Sheldon got S8. The path was open for two hours on 430 and 144MHz.

Dave Dibley, G4RGK (BKS), heard SP3RBF (JO71) for quite a while on the morning of 13 July but couldn't raise him. In the aurora on 21 August he worked GM0HKB (IO77) for a new square and on the 26th, in another event, he replied to Dave's CQ call. He wishes those equipped for 430MHz would take a look on the band during auroras instead of working the same stations time and again on 144MHz. He is usually on 432.050MHz calling CQ and not just in the stronger auroras.

Peter Burden, G4UBX (WMD), is again QRV on the band with 30W to an 88-el. Multibeam at 3m AGL. He transverts to the band using an ageing SOTA product and has worked 14 squares and seven countries, including GU3EJL (ALD), G4ATA/P (CNL) and EI2VPB/P (IO61).

G6HKM found conditions very good for the Scandinavian Activity Contest on 2 August. Ela's DX included LAs 8AK, 9RAA, 1YCA, 3VW, 3DV, 9DI and 9JFA; OZs

1KLU and 2OE and SMs 6OEQ and 4KYN. She also worked some PAs.

1.3GHZ

G1SWH made his debut on the band on 3 August, his first QSO being with G1GEY (IO94). On the 8th Gerry worked GW3CCF (IO83) and on the 12th, GD4XUM/P and G10GDP (IO74), and GM4LBV (IO75). G4XEN has sold all his 1.3GHz gear but John hopes to be QRV again soon with better equipment and 10W.

Colin Roberts, G4ZFI (ESX), uses 10W to a 55-el. Yagi at 10m AGL. In just over a year he has worked 31 squares in 11 countries. August DX included DC8CE (JO44) at 2059 on the 1st; DJ5JQ (JO31) at 1954 and SM6ESG (JO67) at 2030 on the 2nd. SM6ESG again on the 4th at 0558, also copied on 2.32GHz; DB1BX (JO32) at 2038 on the 12th and then worked on 2.32GHz and DF7JS (JO31) at 2056, plus the usual PAs. Beacons LA1UHG and LA3UHG were heard almost continuously from 1 to 4 August but no Norwegian activity.

G6HKM worked her best ever 1.3GHz DX on 2 August, SM4KYN at 1193km, having worked Anders near the end of the 430MHz contest. Ela has yet to work LA. She took part in the contest on 12 August when best DX was GD4XUM/P.

DEADLINES

The 144MHz Trophy Contest was in full swing while this was being written but I believe conditions were not outstanding. Please get your letters in by **25 October** for the **December** and **22 November** for the **January** issues.

See page 65 for SWL News

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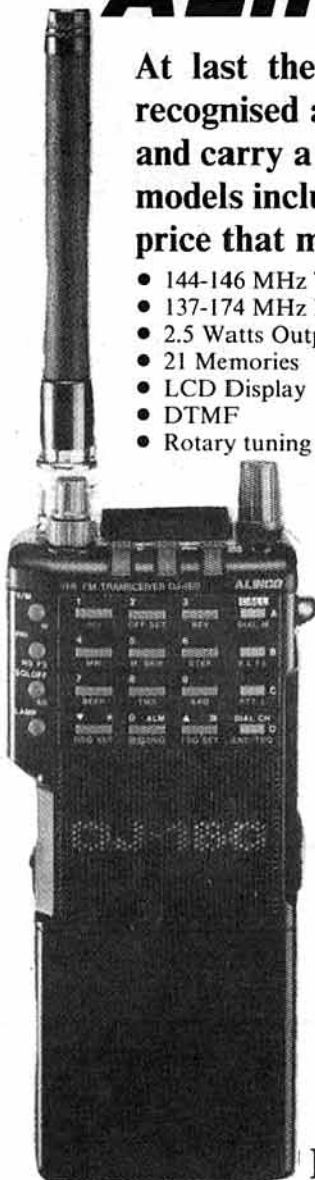
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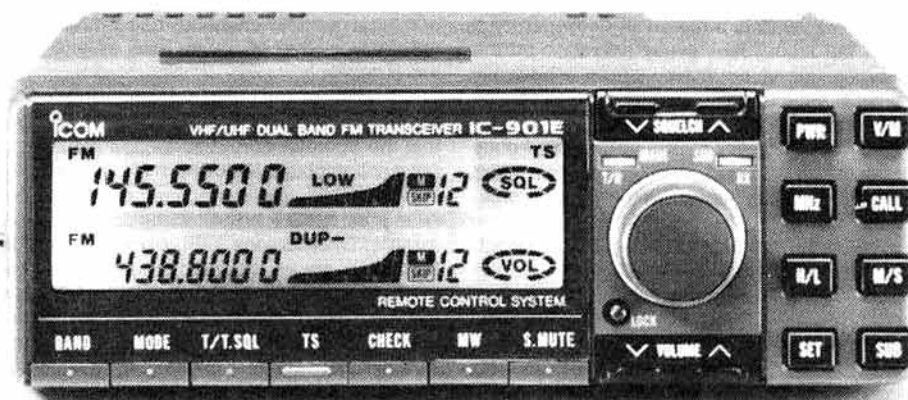
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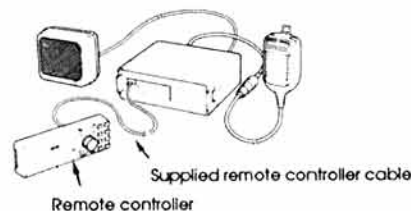
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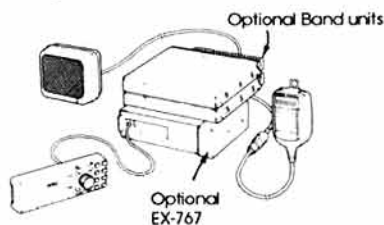
• Basic 1-body style



• Basic separate style

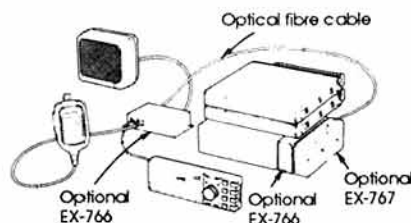


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TOPICS

PAT HAWKER G3VA

OPERATORS YES - BUT
BASICALLY A TECHNICAL
HOBBY?

WHEN *HAM RADIO* BEGAN publication in 1968 under the editorship of Jim Fisk, W1DTY, it rapidly showed itself to be a near-ideal source of useful technical information and ideas for all experimentally-minded amateurs. It introduced many ways of improving receivers, transmitters, antennas and simple test equipment for HF, VHF and microwaves; not only constructional articles but also useful guidance on applied theory, propagation etc.

It established itself as the only amateur radio periodical of standing that concentrated entirely on the technical and scientific side of the hobby, devoting no space to contests, awards, band reports, social events etc. During its 22 years of publication, *HAM RADIO* articles have been the source of innumerable items in *Technical Topics* - with Jim Fisk (until his death in 1981) and then Rich Rosen always happy to see digests of *HAM RADIO* articles appearing on this side of the Atlantic.

Thus the closure of *HAM RADIO* following the June 1990 issue is a matter of deep personal regret but also, I feel, a sad reflection on the changing role of our hobby - from a basically technical and scientific hobby recognized as such in influential, regulatory circles moving increasingly in the direction of a purely fun hobby for appliance operators, with little interest in the technology unless this arises from their professional work.

Dick Ross, K2MGA, publisher of *CQ* (which has taken over unexpired subscriptions and which will in future feature articles by some of the regular *HAM RADIO* contributors without adopting its technical-only approach) puts it thus: "The true ham technician - the person who

actually dug into the innards of a radio and made it work, the person who experimented with novel antenna designs and new modes of communications in amateur radio, was becoming a smaller and smaller minority... The technicians among us no longer provide the numbers needed to support a monthly magazine of the calibre of *HAM RADIO*. Those who question that statement need only examine the contents of *QST* over the past few years as it relentlessly moves further away from its traditional role as a technical journal, in response to the changing needs of its readers... Let's get on with the world as it is, not as we'd like it to be." Similarly *CQ*'s editor, Alan Dorhoffer, K2EEK writes: "Today's amateurs are operator orientated and somewhat less technically geared... in a shrinking technological society. Amateurs like things to remain the same forever. Things change, people change and most certainly the hobby has changed... It may not be what everyone likes or wants, but this is reality."

Personally I find these opinions, while realistic, deeply depressing. I have always believed that the operator of a radio station (whether or not it is composed entirely out of commercially-manufactured equipment) can be - should be - keenly interested in the technology. Contests, awards, DX-peditions, QSL cards etc were intended to act as spurs to developing better, more reliable, more portable/transportable low-cost equipment and enabling us to understand better the capabilities of the radio spectrum. Yes, Amateur Radio is an interesting fun hobby

- but it is (or was) also basically a technical and scientific hobby held in high regard in professional and regulatory circles, serving as a valuable form of self-training and contributing to the art of radio communication.

[Reassuring news is that preliminary results of the RadCom Readers Survey indicate that more technical articles (but simpler ones) are what is wanted by RSGB members - Ed]

In this connection, I have been dismayed this year to find the Science Reference and Information Service Library off Chancery Lane, part of the British Library, and formerly the Patents Office Library, on which I have always depended in the preparation of *TT*, has closed its files on virtually all the overseas and some UK Amateur Radio and hobby-radio periodicals. For many years it has provided open-access to *QST*, *HAM RADIO*, *73 Magazine*, *Amateur Radio (Australia)*, *Short-Wave Magazine*, *Radio-REF* and at various periods *CQ*, *Electron* (VERON), *VHF Communications*, *QRV* (Germany) all of which have now been discontinued at the Library - possibly also *Radio-ZS* although some 1990 issues are still appearing.

Earlier this year, when this change of policy was becoming evident, I wrote to the Head of Technical Services at this famous library, stressing that many of these journals were of interest to professional communications engineers as well as to hobbyists. In reply, EJ Copley wrote:

"The Library is in a difficult position in that it is seriously under funded and simply does not have enough money to maintain the subscriptions to all its periodicals. Cancellations have been, and continue to be, inevitable; we very much regret that it is impossible to effect them without depriving one or other group of users of the titles they have grown used to finding here. I am impressed by your arguments in favour of the amateur radio periodicals and would like to reinstate them, but cannot - we cancelled them last year as an economy, and since then our financial position has deteriorated still further. The best I can say, and I am sorry it does not sound very promising, is that if things do improve we will be glad to think again."

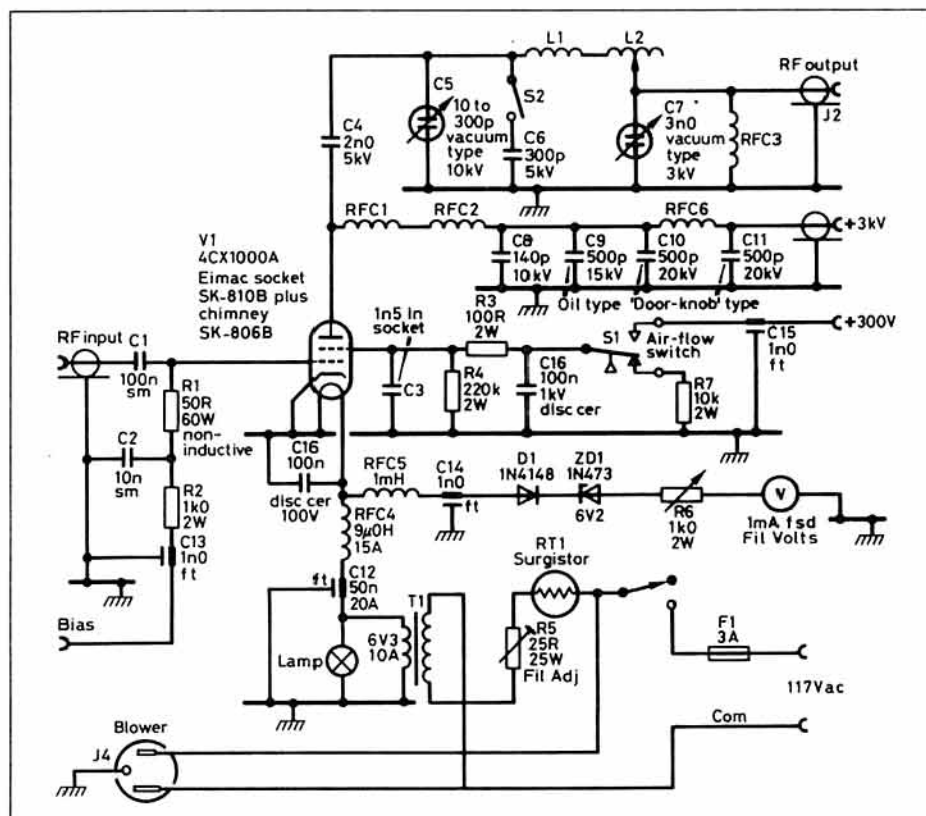
So it would seem that Government parsimony will have to be blamed if *Technical Topics* ranges less widely in future! A few years ago the idea of the British Library not taking such world-famous technical periodicals as *QST* would have been unthinkable! Sic transit gloria...

KN5S'S LOW-DRIVE, HIGH
POWER LINEAR

IT HAS BEEN STRESSED before that the design and construction of a really high-power linear amplifier calls for considerable technical expertise and care in view of the high-voltage involved, coupled with the high-cost and vulnerability of modern valves and transistors capable of delivering large amounts of RF power. There is still much to be said for adopting the valve rather than an all-solid-state approach.

In *CQ* (July 1990), Mark Mandelkern, KN5S (a number of whose *QST* articles have previously been noted in *TT*) describes a powerful 4CX1000A tetrode amplifier (Fig 1). It is capable of delivering 1.5kW output throughout the range 1.8 to 50MHz with only 30W drive, almost all of which is absorbed in the 50 ohm grid resistor eliminating the need to match the input circuit or provide neutralization. In Class AB1, drive is only required to overcome circuit losses, usually under a watt.

Clearly this American amplifier is designed for the US legal limit, runs well above the UK legal limit and would not be cheap to construct.



Nevertheless the design features are of general interest even for amplifiers intended to be run at considerably lower power. The July article is not complete in itself. KN5S uses a 3kV HT supply from a previous project and does not cover the 300V screen supply which needs to incorporate adequate protection circuitry. Similarly, blower cool-down delay circuitry, low-pass TVI filter and sequencing control for the antenna relay and amplifier have been covered in *HAM RADIO*, November 1987, page 17. The classic pi-network output circuit uses two vacuum-capacitors and a roller inductor.

A point worth noting is the care taken by KN5S to lengthen the life of his high-cost tetrode by reducing and monitoring the heater voltage. This topic was addressed earlier in *Technical Topics* (June 1982) under the heading "Use and abuse of valves". Then it was noted that good filament management is particularly important with high-power directly-heated valves having thoriated tungsten filaments. However, it is not unimportant even with indirectly-heated valves with oxide-coated cathodes, where the heater voltage should be kept within at least 5% of the nominal value as measured directly at the valve socket. KN5S claims that, in his experience, for 6.0V nominal 5.7 to 5.8V have proved optimum with a three minute warm-up period achieved by using a thermal delay relay in the bias circuit. He warns that failure to observe this warm-up time may destroy the valve. An air-flow sensor switch disconnects the screen voltage should the blower fail to keep the cooling air flowing correctly.

A Surgistor (GC25-933-S) is in the primary of the filament transformer to reduce in-rush current at switch-on. The AC heater voltage is diode

rectified (lifting the DC voltage above ACrms) and monitored with an "expanded scale voltmeter" based on using a 1mA FSD meter in conjunction with a 6.2V zener diode (1N473), reading approximately 5 to 6V (ACrms) with the heater sampling line connected directly to the valve socket with its own feedthrough capacitor. KN5S mentions that zener diodes behave rather strangely at low currents: "It may be necessary to try diodes of different ratings from different manufacturers. I obtained linearity from only 5.4 to 6.0V, which is more than adequate - for those who demand precision, an op-amp expanded scale metering circuit might be easier." The meter scale does not need detailed calibration since its purpose is to show whether heater voltage is above or below the chosen datum point. The voltage can then be corrected by means of a 25 ohm, 25W wirewound adjustable resistor (R5) in the primary of the heater transformer (this rating is for 117V AC mains, for 240V mains the value may need to be increased).

KN5S continues: "RT1, an in-rush current limiter, provides gradual heater warm-up. Using a 6.3V, 10A transformer for a 6V, 9A tube lets you adjust the heater voltage by varying R5."

It also allows for some drop in RT1... The required three minute warm-up period is provided by a thermal delay relay in the bias using a normally open three minute Amperite no 6N0180 tube. The bias control and delay tube are located on the RF deck, while the circuit forms part of the control panel..."

KN5S provides a detailed tuning-up procedure emphasising the precautions needed with high-gain tetrode amplifiers of this class. For example, he warns that tuning up key-down with

low drive should be avoided as it can produce over 100mA negative screen current. Instead, use a pulsed driving signal, for example using dits from a keyer at 60WPM and full drive level, always using a monitor scope.

Although many precautions need to be taken, in practice if this is done such an amplifier can give very reliable service. KN5S reports that his has given reliable service for 19 years under very strenuous contest operating conditions.

ACID SPILLS CAN BE COSTLY

IN THE AUGUST TT, in introducing an item on safety precautions to reduce hazards when handling lead-acid batteries, I recalled how I had once accidentally damaged beyond repair a jacket when an old 2V accumulator tipped over undetected. An even more costly experience recently befell Brian Davies, G3OYU. This underlines the need to be ready to apply remedial measures in double-quick time. He writes:

"Part of my business is setting up public address systems. Many events do not have access to mains power so batteries are normally used. I use tractor batteries of about 95Ah capacity. I was transporting two of these in my E-registered Saab 9000i and one rolled over when taking a corner somewhat fast! I heard the noise and stopped immediately. By the time I had climbed out of the car, walked round to the back and opened the boot, a quantity of battery acid had spilled out onto the floor of the boot and seeped under the back seat."

"I rushed home, not more than 15 minutes drive, removed the boot floor and flushed out everywhere with a strong solution of sodium

HEATER VOLTAGE REGULATION

IN THE KN5S AMPLIFIER, the heater voltage is monitored with the aid of the expanded-scale voltmeter and then adjusted manually to cope with the appreciable voltage variations that can occur on mains supplies - particularly if your house is well away from the HV line-transformer and subject to wide variations in the load when, for example, a large number of domestic ovens are switched on.

In 'Reflecties door PA0SE' (*Electron*, August 1990), Dick Rollemans includes details of a stabiliser used by Leo Duursma, PA0LMD to stabilise the AC heater supply to a 4CX250 amplifier requiring 6A at 6V (or a little under) (Fig 2). This automatically adjusts the AC heater voltage across the primary of the heater transformer which has its secondary rated at 7V to compensate for voltage reduction by the action of the stabiliser. Note that the electronics of the stabiliser are not isolated from the mains supply so suitable precautions should be taken to avoid potential hazards. It would appear that such a stabiliser would be suitable for use also with amplifier valves requiring a stabilised heater-voltage at up to about 10A.

PA0LMD also draws attention to an adjustable PSU (Fig 3) using the SGS L296 IC regulator. The DC output is adjustable from 5.1 to 15V with a maximum current of 4A (but note minimum load must exceed 100mA). The ripple voltage is less than 20mV. This could be useful for heater/filament supplies with suitably-rated valves or as a general-purpose PSU.

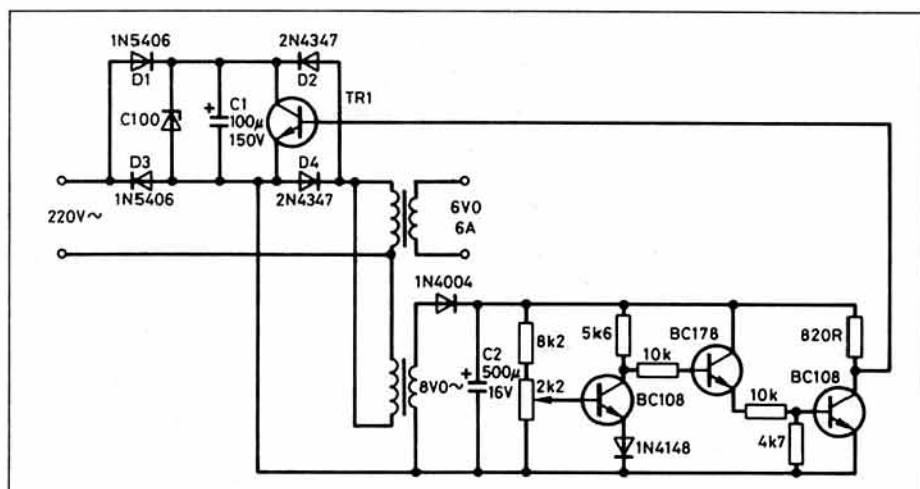


Fig 2. PA0LMD's AC regulator for stabilising the heater voltage applied to valves such as the 4CX250. Note that the electronics of the regulator are not isolated from the mains supply and suitable precautions should be taken.

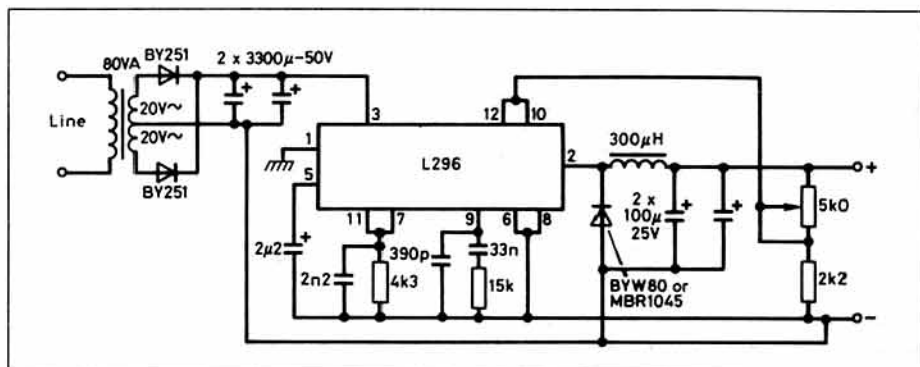


Fig 3. Variable DC PSU using L296 IC regulator. Output adjustable between 5.1 and 15V with maximum current 4A, minimum load 100mA.

bicarbonate in order to neutralize the acid. This it did well, but not quickly enough. Much of the boot floor had soaked up enough acid to make a replacement necessary as the man-made fibre covering the plywood had dissolved! The metal-work beneath the boot floor and the spare wheel were saved, but the carpet under the back seat was not. It too was made of man-made fibre and had dissolved.

"A couple of hours later I stood back to assess the damage, rather more than I had expected. The local Saab agent quoted me for the replacement parts, a new boot floor plus rear carpet and labour for fitting. Nearly £600!

"The point I want to make is that if acid is spilled, neutralizing it rapidly is critical: sodium bicarbonate is cheap, easy to obtain and effective. Have some available when the unthinkable may happen and acid is spilled."

THE BI-SQUARE ARRAY REAPPEARS

RECENT TECHNICAL TOPICS ITEMS have described various forms of antennas using closed loops. But there is another approach in which the loop is open rather than closed, formed from two full-wave sections bent to form a square with an insulator at the top junction, voltage-fed at the base with (600 ohm) open-wire or (450 ohm) ladder line (Fig 4). C Drayton Cooper, N4LBJ (*HAM RADIO*, May 1990) shows that this old favourite, dropped from most recent handbooks, known as a bi-square array, "works wonders on the new 17m band".

Such an antenna is usually hung from a single, high support to give vertical polarization. With a suitable ATU providing balanced output to the transmission line, the whole system can be resonated on several bands. N4LBJ finds his 18MHz bi-square works quite well also on 14 and 21MHz, though gain and directivity will differ somewhat to that on its design frequency. Because current flow reverses at the half-wave points, elements A and A' are in phase: similarly B and B' are in phase. The antenna thus operates as four collinear elements in phase yielding about 4 to 5dBd gain on its design frequency with broadside directivity. It was originally derived in this form as a variant of the once-popular Lazy-H fixed array (I once had a Lazy-H on 28MHz and was delighted with the results). N4LBJ hung his bi-square with two 53ft lengths of wire for a full wavelength at 18.1MHz from a 65ft self-supporting metal tower. Although in the past such antennas generally used wooden (non-conductive) masts, he did not find any obviously detrimental effects. Amateurs without such high supports could probably accommodate a bi-square cut for 28 or 50MHz.

There can be little doubt that the greater use now being made of the 18 and 24MHz "WARC" bands is leading to a revival of interest in antennas capable of working over more than a single band - for example the W8JK and 'BRD Zapper described last month. Another article in *HAM RADIO* (May 1990) by Robert Wilson KL7ISA covers "Non-resonant delta and V-beam Antennas" including a design optimized for 14MHz that can be contained in an area 104ft by 93ft or so (Fig 5). He also introduces the concept of a tie wire between the ends of the V wires, including the terminating resistor (he forms a single 800 ohm non-inductive resistor by parallelling fifty 39K, 2W carbon resistors soldered between two parallel copper wires). This will cope with an average output power of some 200W since half the power will be radiated before reaching the resistor. SSB only can be used at slightly higher powers but excessive average power will quickly

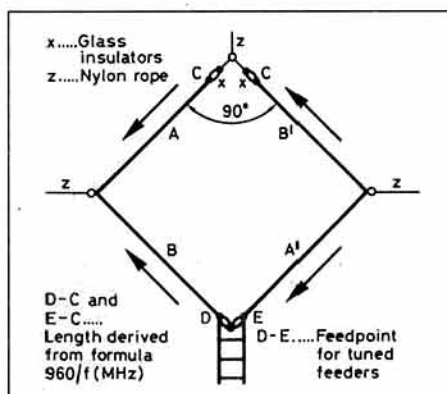


Fig 4. 18MHz bi-square array used by N4LBJ capable of reasonable performance on 14 and 28MHz bands. N4LBJ considers it performs best when feedpoint is about a quarter to a half wavelength above ground but adequate performance possible at lower heights, down to about 3 to 5ft above ground. Note that since the array is voltage fed, care should be taken with medium or high power that this does not represent a hazard to people or animals.

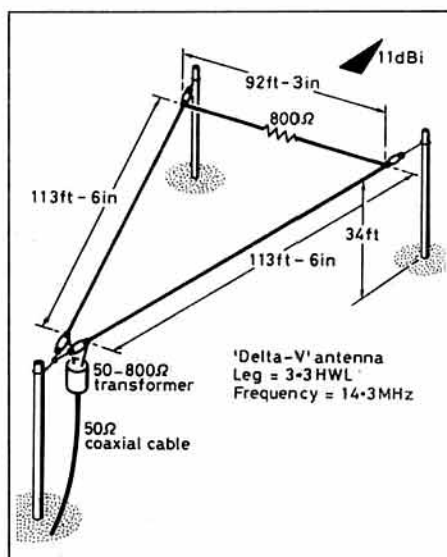


Fig 5. KL7ISA's broadband Delta-V antenna optimised for 14MHz band. Requires a triangular (pie-shaped) area 104ft by 93ft base.

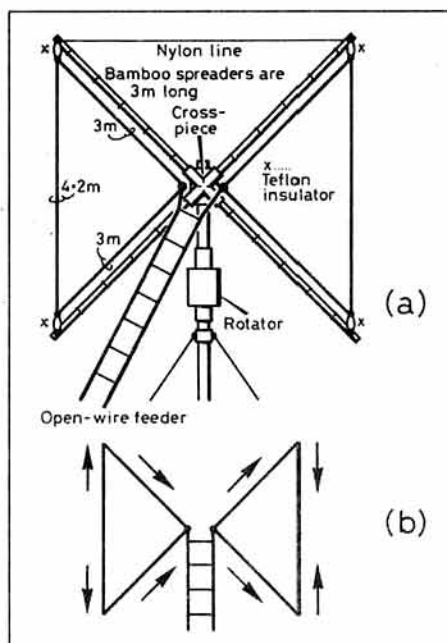


Fig 6. Multi-band V-dipole for 14, 18, 21, 24 and 28MHz bands as used by PA3BNT.

result in a permanent change to the value of the resistors.

A low-cost form of multiband V-dipole which can be used with open-wire feeder and suitable ATU on 14, 18, 21, 24 and 30MHz stems from Maarten v.d. Velde, PA3BNT and appears in 'Reflecties door PA0SE' (*Electron*, August 1990) (Fig 6). This broad band wire dipole uses a framework made from four 3m bamboo spreaders with a centre cross-piece. It could be used as a fixed or rotary antenna.

IS IT REALLY ANCIENT MODULATION?

THERE HAS BEEN RECENT correspondence in both *Practical Wireless* and American journals seeking to encourage more use of low power AM on some of the less crowded bands such as 1.8 and 28MHz or on VHF where it requires less spectrum than FM/NBFM transmissions. Over the years, this view has been echoed several times in *Technical Topics* and there is still quite a bit of AM in use, for example on 28MHz using low cost converted CB AM transceivers re-crystalled for the band.

There is still much to be said in favour of "old fashioned" double sideband with carrier amplitude modulation. With high-level (anode or anode/screen) modulation of a power amplifier (calling for an audio power about half that of the DC input power to a Class C amplifier) it is much easier to achieve near "broadcast quality" transmissions suitable for reception on any HF broadcast-type receiver, without being limited by the use of narrow SSB filters and the need for accurate carrier re-insertion. There is no such thing as good quality SSB with amateur HF transceivers, at least by broadcast standards.

AM lost popularity for a number of reasons: spectrum conservancy and reduction of heterodynes on crowded HF bands (not that all SSB transmissions keep within a 3kHz bandwidth!); a belief that much more effective use of power resulted from eliminating the carrier and one sideband; lower cost by eliminating the need for a high power audio amplifier/modulator, etc. On VHF, AM lingered longer but finally lost out to FM in spite of its better "punch" mainly on grounds of cost, greater tendency to cause EMC problems and the fact that RF bipolar power transistors were not really suitable for coping with the high peaks on the collectors (double the voltage bus). However voltage limitations are much less serious with power FETs than with the usual bipolars. AM and FM share the advantage over SSB that the power amplifier need not be linear, permitting the use of more efficient Class C or D stages (note that any further stage after AM modulation must of course be linear). It is easier to apply quite severe speech processing and clipping to an AM signal than to SSB.

For radio broadcasting, there are now various forms of high-efficiency AM systems, some depending on novel use of digital techniques and some developed from the old carrier-controlled forms of transmission originally developed in the 1930s.

While we would not recommend the use of AM on the main HF bands, it should be remembered that there is probably no easier piece of equipment to build and get going satisfactorily than a 1.8MHz AM rig, based on either still available valves or FET solid state. The main practical disadvantage is the low level of daylight activity on the band, often limited to the occasional local net at weekends.

In the heyday of AM, some amateurs were proud of achieving "near broadcast quality" speech, significantly better than the "communi-

days." Apparently NASA and satellite designers have traditionally used a major proton event of August 1972 as a reference in the planning of space missions since this was the most intense event that had been recorded in space. In practice, the August 1972 event was equalled in August 1989 and was exceeded for several days during October 1989. Back to the drawing board!

High intensity particles also cause problems to on-board computers and satellite electronics. A high energy proton particle or ion from a solar flare leaves a path of ionisation through the satellite causing a "single event upset". Typically, the faults can be overcome by ground control: "The operators are alert, they reload the software, reconfigure the satellite and they keep going, although if they miss the upset the satellite can be lost: "In the large events last year, satellites had these upsets ninety to a couple of hundred times a day at the peak of the events."

Astronauts in Space Shuttle missions (which have tended to coincide with several large flares) have reported seeing flashes caused by the response of the optic nerve to charged particles; in October 1989 they retired to an interior compartment. They discovered that for this level of event the shielding was not really adequate; even though, at the relatively low Shuttle orbital height, high-energy particles are less of a problem than at geostationary altitudes, during interplanetary flight or, for example, on the surface of the moon. Even at the heights reached by supersonic aircraft (such as Concorde) radiation levels during intense flares may reach 100 to 1000 times background level, with dose levels the equivalent of several chest X-rays during a normal flight. During a very large solar flare, as much energy may be radiated in a few hours from a tiny area of the surface as is radiated from the entire Sun in a second.

The Sun is, in effect, a superhot ball of gas with a nuclear bomb at its core, radiating heat and light, with the outer layers of gas forever being churned over while the whole body inside and out shows a complex pattern of rotations - a natural dynamo over 1 million km in diameter, ringing like a bell with sound waves being bounced around and affecting the geometry of the whole body, with not one but several cycles inseparable from the complicated tangle of magnetic fields that thread across the whole surface.

RADIO UNDER PRESSURE

TT (eg JANUARY 1986, pp37-38) has previously noted how secret radio receivers were built and used under extremely difficult conditions in German and Japanese prisoner of war camps. Among the pre-war amateurs know to have built and concealed such receivers were Ernest "Shack" Shackleton, G6SN, Tom Douglas, G3BA, and Herb Dixon, ZL2BO - but there appears to have been others who were not necessarily radio amateurs.

An obituary in *The Daily Telegraph* (July 18, 1990, brought to my notice by Ray Herbert, G2KU,) of a wartime RAF sergeant wireless-operator/air-gunner, John Bristow, reveals how he built sets at three camps: Stalag Luft I, III and VI, after escaping by parachute when his plane was shot down on August 13, 1940. This was during a disastrous daylight bombing raid on a Luftwaffe base at Aalborg, Denmark, when eleven out of 12 Bristol Blenheim light bombers failed to return. John Bristow was initially sheltered by a Danish doctor but insisted on giving himself up when he learned that his host would be shot if he was discovered.

In the camps, his sources of components were limited, often involving considerable ingenuity or risk. He once stole material from the camp commandant's office telephone while others distracted the attention of the office staff; capacitors were fashioned from Red Cross parcel tins, with the plates separated by the India paper from a bible. Crushed razor blades were made into magnets which, with adapted tooth-powder tins, were fashioned into earphones. He persuaded some guards to supply components in undercover black market trading deals and smuggled a receiver from Stalag I to Stalag III hidden in a concertina which could still, after a fashion, be played.

In 1944 he is reported to have built a transmitter (although there seems no evidence that this, or any other PoW camp transmitter, such as the one believed to have been built by G6SN, was ever used to effect secret two-way communication from a camp). In need of a power valve, one was located in an audio amplifier supplied by the Swedish YMCA for the camp theatre. To cover the theft, the theatre was set on fire with a small time bomb. According to *The Daily Telegraph*, he left on the turntable a record of 'I don't want to set the world on fire, I just want to start a flame in your heart.' Son of a London electrical engineer, after the war he returned to the family business but continued to devise gadgets. Two of his secret radio sets - one concealed in a wind-up gramophone, the other in a mess tin - are reported as being on display at the Hendon RAF Museum.

In these days of microminiaturization we tend to forget how big, bulky, fragile - and out of date - most pre-war (and even some post-war) military radio equipment could be, built to be carried by reluctant mules [or camels, see *RadCom* August 90, p9 - Ed]. A long, fascinating article published last year, 'A Polish Odyssey' by Lt Col C A Henn-Collins, GU5ZC (*The Journal of The Royal Signals Institution*, Summer 1989), describes, with a wealth of detail, how, as a young lieutenant shortly before the outbreak of the war in September 1939, he was put in command of a detachment of Royal Signals intended to provide a radio link from the newly appointed British Military Mission, under General Carton de Wiart VC, in Poland back to the War Office, and to supplement the existing Foreign Office HF link. After several changes of plan, the detachment, with crates and crates of equipment, finally left Victoria Station on August 25, with the Army insisting that the party should travel to Poland via Alexandria, Egypt, by train to the south of France, by boat to Egypt and thence via Greece to Romania. Over five tons of equipment in 80 boxes - much of it destined to be deliberately burned in a remote corner of Poland!

As a result by the time the unit actually reached Poland the country had been virtually over-run. However, when the crates were unpacked it was quickly apparent that the Army/RAF equipment was unsuitable: "The SEE (Army Signals Experiments Establishment) receiver was too noisy and unselective to copy the signal well enough for traffic handling. So in disgust I had someone throw it in the river." Christopher Henn-Collins admits to wishing that he could have had the chance to bring along some of his amateur equipment - a feeling that was confirmed later when, after coming out of Poland, he stayed on in Bucharest helping out with the civilian FO radio links using an HRO and Comet Super Pro receiver. He built his own transmitter to establish a link with Cairo, grinding crystals with valve grinding paste scrounged from the Minister's chauffeur. These were much more effective than the military monstrosities. Later when he finally

got back to Alex he was promptly arrested by the police as a deserter!

HERE AND THERE

IN THE AUGUST *Technical Topics* I suggested wrongly that, even with conventional house wiring, a mains earth should not be directly connected to real earth. What I had meant to say was that mains *neutral* should never be connected to real earth (or to mains earth). With protective multiple earthing a real earth should be spaced at least two metres from anything connected to a mains earth, owing to the possibility of a serious hazard arising under fault conditions (see "The Killing Ground - Earth Your Station Safely" *RadCom* June 1987, pp 404-5). Second, in my review of *British Intelligence in the Second World War Vol IV* (August, p38) I twice referred to the BP decrypts of the SD (RSHA) hand coded traffic as Isosoles. This should have been Isosicle. Apologies.

David Newark, AK7M in QST (July 1990) reports that one of his PSUs emitted a noise that sounded like line noise on an AM radio. Thinking this might indicate a power transformer or somesuch, he used a cardboard tube to locate exactly where the noise was coming from. He was puzzled to find the source was the bridge rectifier components, more specifically the disc-ceramic by-pass capacitors. He recalled a 1984 QST tip that the ceramic dielectrics of some capacitors can exhibit piezoelectric properties, generating electricity when vibrated. Recognizing that piezoelectric effects often work both ways, he realized that his 0.01 µF, 1kV disc capacitors were acting as miniature piezo-electric loudspeakers, emitting line noise transients as acoustical noise.

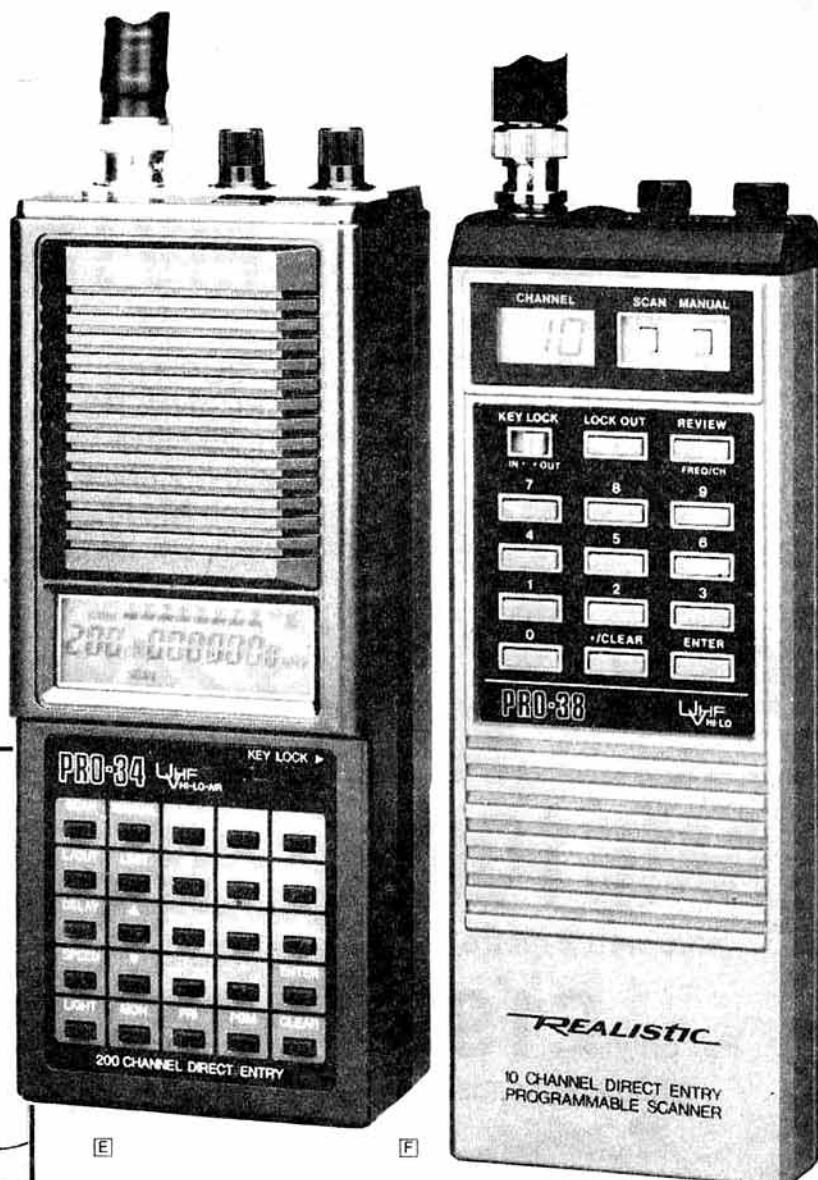
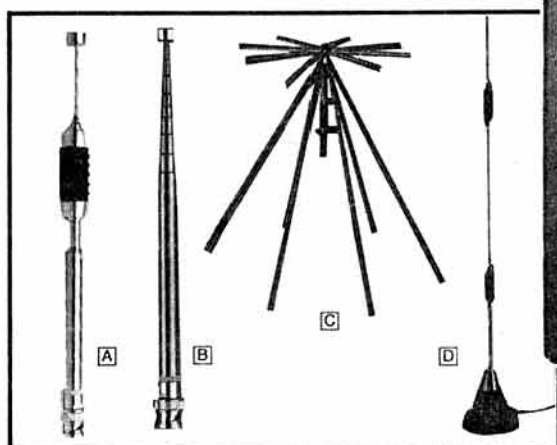
He suggests that if your PSU, when plugged into the mains, emits rather more ticking or buzzing than usual, this may not indicate a component fault, but a noisy, transient prone AC supply mains.

Following the final release of the controversial US Environmental Protection Agency (EPA) report that suggests that there is sufficient evidence to demonstrate a "significant" link between some rare forms of cancer and exposure to extremely low frequency (eg 50 or 60 Hz) electromagnetic fields near electricity power lines, a Bill is being introduced in the US Congress proposing a \$34m federal research programme into the effects of electromagnetic radiation and the setting up of an "Electric and Magnetic Fields Research Advisory Committee" composed of representatives from Government, industry and environmental organisations. *Nature* (16 August 1990) reports this under the heading "Electromagnetic risk - All Aboard The Bandwagon."

Brian Hayes, G3JBU calls attention to the "Powerbank Portable Power System" a 12V rechargeable cordless powersource weighing 3.5kg in a distinctive carrying case for use with domestic appliances, fluorescent tent lights etc with a 60Wh capacity. G3JBU is pleased with the service he obtains with one of these units although it is more expensive than a conventional lead/acid battery which he regards as dangerous to use indoors. The leaflet he sent along gives no information on the type of cells used in the "Powerbank" - personally I suspect these are the new generation of maintenance free "sealed" lead-acid batteries described in recent *Technical Topics* items (eg June 1990). The Powerbank units are available from some of the larger d-i-y stores and certainly appear to be a convenient and safe source of portable power for camping, caravanning and boating - or for use with low power transceivers etc. □

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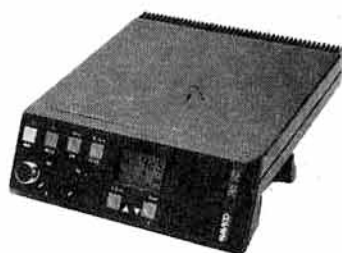
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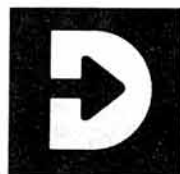
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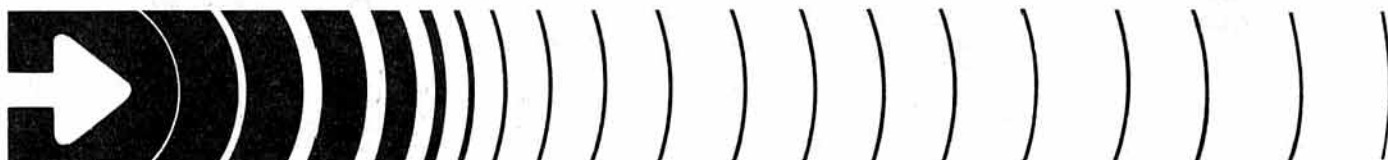
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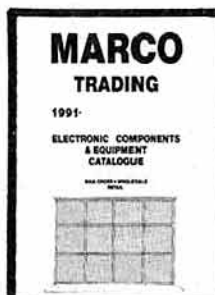
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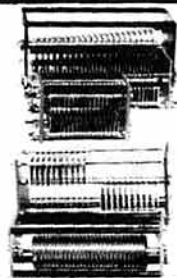
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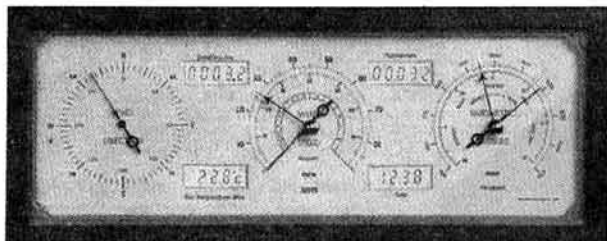
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A Wideband Monitor Receiver for Top Band to Two Metres

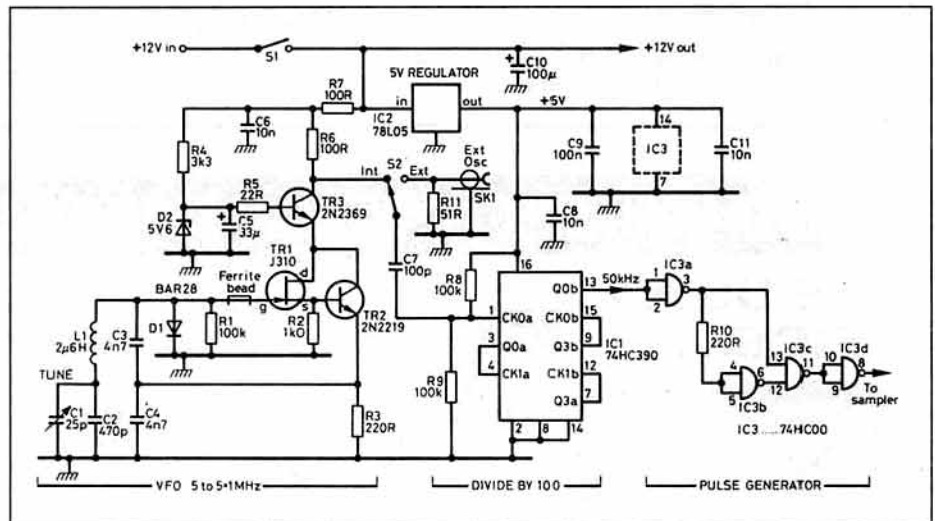
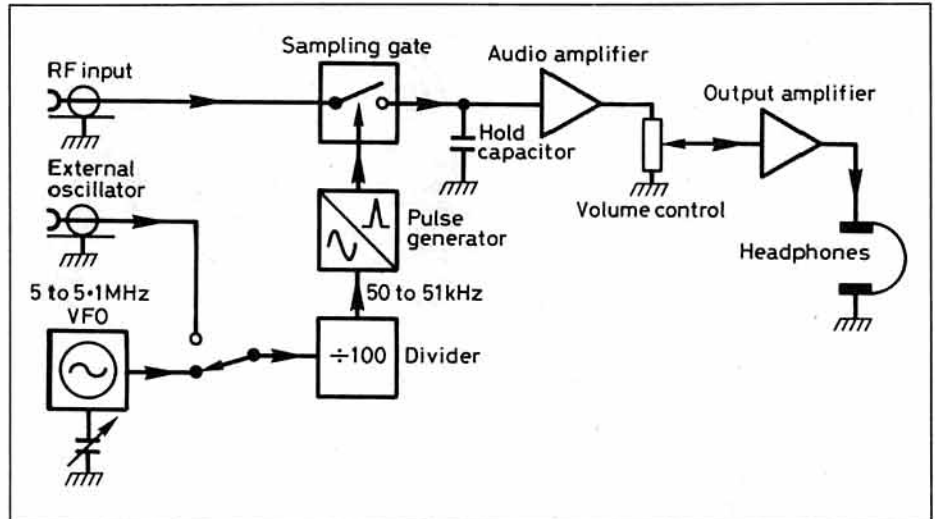
Part one of a two part article by Ian Braithwaite, G4COL

THE RECEIVER described is designed to allow a radio amateur to listen to his own transmissions, relatively cheaply. It can be used on any band from 1.8 to 146MHz and no band switching is involved.

Although I believe that all amateurs wish to radiate signals of which they can be proud, a listen round the bands shows that quite a number leave a lot to be desired. Poor modulation quality on SSB [1], and drift, key clicks and chirp on CW can quite frequently be heard from transmitters ranging from the humblest to the most sophisticated. If it were possible to hear these defects at large distances, the amateur responsible could have detected them himself and set about curing the problem. That this has not happened may be due to the popularity of the transceiver, commercially produced or home-made. Provision of a separate monitor receiver may often be felt to be too costly, too difficult, or both. I hope that this article will demonstrate that this need not be so.

My design, a modified direct conversion receiver, will demodulate CW and SSB signals and let you listen to your own voice quality or CW keying. To a limited extent, it will detect the presence of harmonics or spurs. I have also used it with a bridge to tune up antenna systems using very little radiated power by listening for a null.

The receiver block diagram is shown in fig 1. It is very similar to a conventional direct conversion receiver, except for the mixer and local oscillator. Instead of a variable frequency oscillator (VFO) covering the receive frequency range of interest, a narrow range VFO signal is divided down to a relatively low frequency at which very narrow pulses are formed and applied to a diode sampling mixer. Radio frequency (RF) signals being monitored at the sampling mixer input mix with the oscillator pulses. Audio difference frequencies produced in the mixer are amplified and fed to headphones.



Above:
Fig 1: Monitor receiver block diagram.
Fig 2: Circuit diagram - signal generation section.

Left:
The front panel layout of the receiver.

CIRCUIT DESCRIPTION

The circuitry is shown in **fig 2** (signal generation) and **fig 3** (sampling mixer plus audio). In figure 2, Tr1 and Tr2 form a composite transistor Clapp oscillator. This covers about 5 to 5.1MHz and is capable of high stability such that, with care in construction, SSB transmissions on 2 metres (where oscillator drift is magnified nearly thirty times) can be monitored. C1 is a high quality air-spaced variable capacitor. D2 and Tr3 provide a stable supply voltage for the oscillator, and Tr3 also acts as a common base buffer amplifier with an output sufficient to drive HC TTL device IC1. R8 and R9 bias the high impedance input to half the 5 volt supply rail supplied by regulator IC2. This is close to the switching point. IC1 divides the VFO frequency by 100 and its output drives the pulse generator circuit which uses the NAND gates of IC3 as a crude monostable, the necessary delay given by R10 in conjunction with the input capacitance of IC3b. The output of IC3c is a train of very narrow negative-going spikes at a repetition rate around 50kHz. IC3d inverts to give positive pulses. Spectrum analyser measurements showed the width of the pulses to be about 8 nanoseconds (1 nanosecond = 10^{-9} seconds).

The sampling pulses are fed to the sampling gate of figure 3.

Trifilar toroidal transformer T1 produces antiphase pulses which turn on Schottky diodes D3 and D4 together. When the diodes conduct, charge can be put on or withdrawn from hold capacitor C14 which thus stores a voltage proportional to the RF input waveform at the sampling instant. The sampling process is illustrated in **fig 4** which shows how beat frequencies can be generated. High beat frequencies are rejected by a low-pass RC filter which follows the sampler. Audio frequencies are amplified by IC4 (gain $\times 100$), and after the volume control, IC5 provides an output suitable for driving headphones with an impedance of as low as 4 Ω . Headphones are far superior to a loudspeaker for monitoring as the latter could produce howl-round with a microphone.

Fig 5 shows how, by dividing the narrow range VFO signal, continuous coverage can be obtained above 2.5MHz, which is the 50th harmonic of the 50kHz signal fed to the sampler, since each harmonic is potentially capable of producing an audible beat note when mixed with the input signal. This comes about by using narrow local oscillator pulses.

... to be concluded.

REFERENCES

- 1) "Sideband slip-ups" by "Eavesdropper", RadComm, July & September 1988.
- 2) Solid State Design for the Radio Amateur by Hayward & DeMaw, ARRL.
- 3) Radio Data Reference Book by G R Jessop, RSGB.

Next month: Details of constructing, testing and using the monitor receiver, including a full list of components.

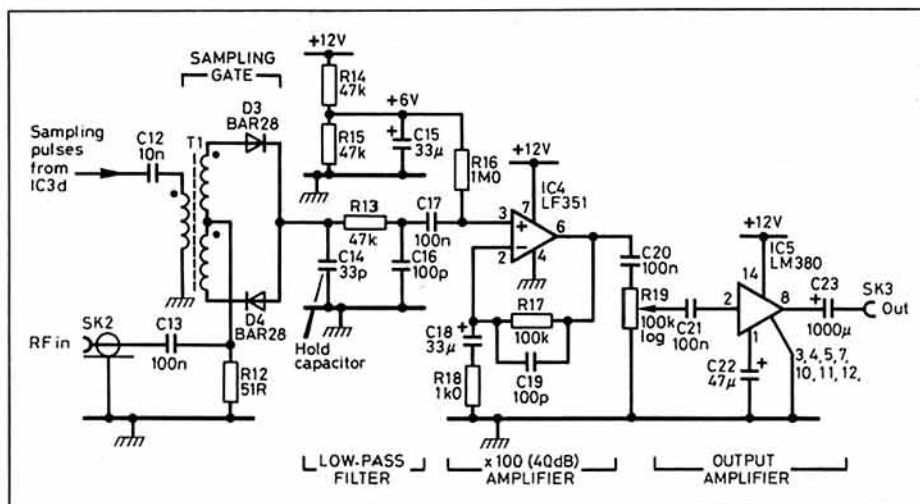


Fig 3: Circuit diagram - sampling mixer and audio section

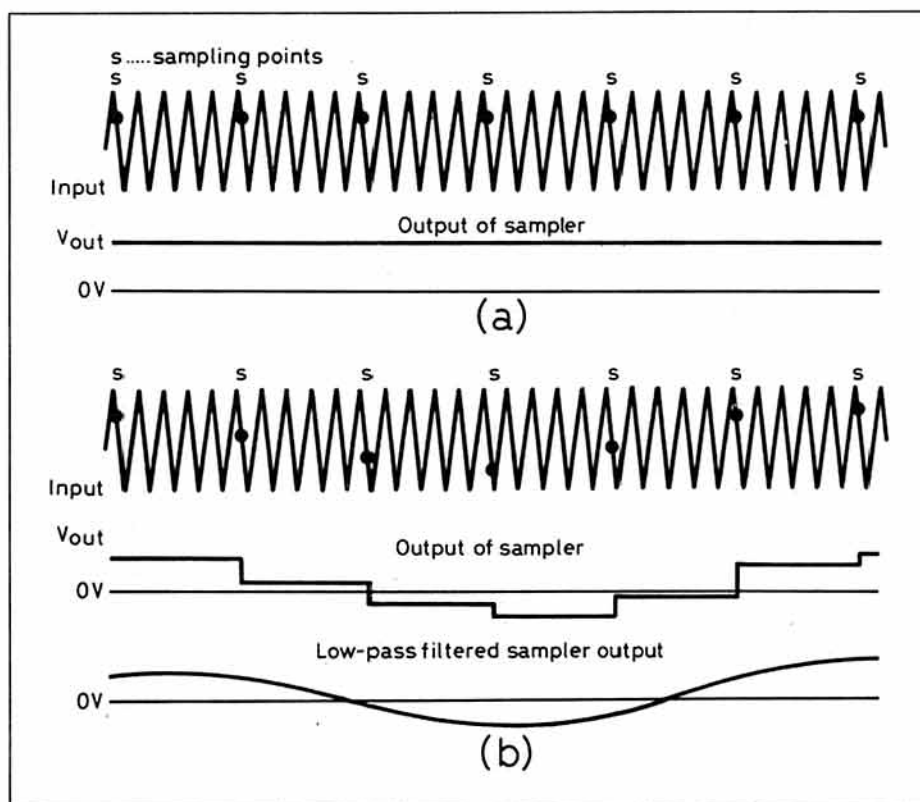


Fig 4: Sampling action: a) Input waveform sampled at the same instant on each cycle. b) Sampling is non-synchronous with input signal.

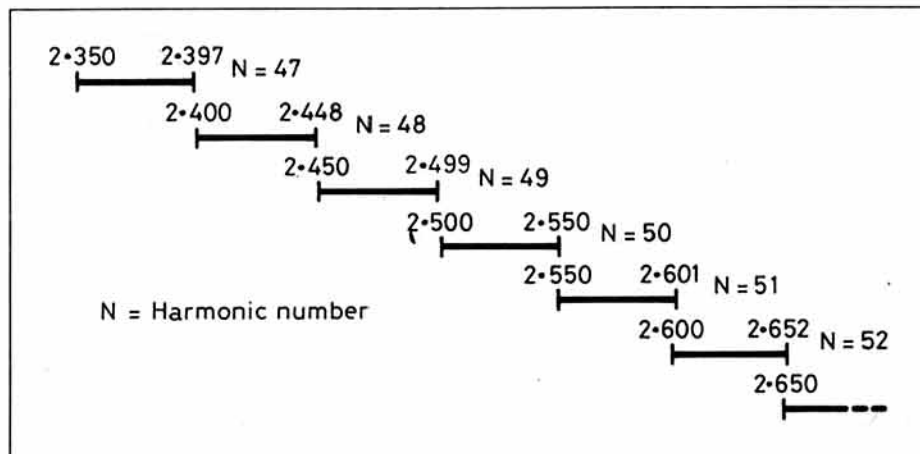


Fig 5: Frequency coverage obtained with a local oscillator covering 50 to 51kHz (5 to 5.1MHz divided by 100)

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A Simple 70/144MHz Diplexer

THE DESIGN of this diplexer was prompted by the wish to be operational on both 70MHz and 144MHz without having to erect two separate external aerials, or switch cables frequently between two transceivers. A 144MHz colinear antenna was to be used for both bands. The colinear has a rather high VSWR of about 2.5 on 70MHz, while on 144MHz the VSWR is less than 1.2. The requirement was for the minimum signal loss in the unit, rather than a high degree of isolation. Overcoupled tuned circuits were employed to ensure minimum signal attenuation and provide a flat response over the amateur band to be used. The overcoupling also provided a degree of matching on the 70MHz band.

DESIGN

The starting point for the design was the band pass filter described in the *RSGB VHF/UHF Manual* p.7.2, Fig 6. In principle two of these filters would suffice, one for each transceiver, except that each filter would appear to the other as a short-circuit across the aerial. This problem can be overcome with the configuration of Fig 1, in which each filter section presents a high impedance at the operating frequency of the other.

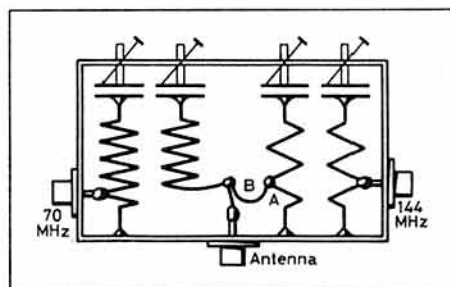


Fig 1: Recommended configuration

The degree to which the aerial is coupled to each of the two filter circuits can be altered by changing the inductances of the two sections A and B. Section A controls the coupling to the 144MHz circuit and is about half a turn up the coil. The coupling to the 70MHz circuit is determined by the sum of the inductances of the sections A and B, and may be adjusted by altering the length of B.

A problem was the choice of tuning capacitors in view of the high voltages developed in the filter when transmitting. Initially, small variable capacitors with solid dielectric were tried, but these were destroyed by a few watts of RF. Air-spaced trimmers were then substituted, but these tended to arc over on transmit as soon as the circuits were tuned to resonance.

The solution finally adopted was to use two brass discs, about 25mm in diameter, as the plates of a variable capacitor. The fixed plate of each capacitor was soldered to a ceramic stand-off insulator, which was also used to secure the end of the corresponding coil. The movable plate was soldered to the end of the 2BA screw which was mounted in an anchor nut attached to the side of the diecast box. Turning the screw from outside the box provides a smooth adjustment of the capacitance between the two plates.

CONSTRUCTION

The unit was constructed in a diecast box measuring approximately 5in by 4in by 3in deep. Square SO239 sockets were used for the connections to the two transceivers and the antenna. The 144MHz coils have seven turns and

Dr LC Waring, G13WUO, shows how to avoid putting up an extra aerial to get on the increasingly popular 70MHz band

the 70MHz coils fourteen turns, all of $\frac{1}{8}$ in internal diameter. The tap positions were at $\frac{2}{3}$ turn for 144MHz and $1\frac{1}{2}$ for 70MHz. The coils were made from 14SWG wire for the 144MHz section and 16SWG for 70MHz. The exact gauge of wire used is not critical, but if thin wire is used the coils will be susceptible to vibration, which will induce amplitude modulation on both transmitted and received signals.

Construction of the diplexer is straightforward. The coils are assembled and the earth ends connected to tags on the inside of the diecast box. The other ends are soldered to ceramic stand off insulators, which also hold the fixed discs of the tuning capacitors.

The only difficulty encountered was the assembly of the variable tuning capacitors. The best approach was found to be as follows (see Fig 2). Screw the tuning bolts fully into the anchor nuts. Screw a 2BA nut onto the end of each bolt and adjust until the length of the screw projecting past the nut is equal to the thickness of the one-inch brass discs. A hole of $\frac{3}{16}$ in diameter, to suit 2BA, is drilled in the centre of each brass disc, then the centre of each disc and the ends of each of the tuning bolts is lightly tinned. The tuning screw head is then firmly clamped in a vice with the end of the bolt upwards. The brass disc is placed on the end of the screw, supported by the nut, ensuring that the disc is at right-angles to the screw. The disc is then soldered in position and all four bolted in position in the box.

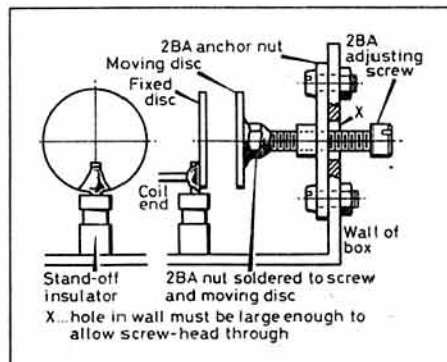


Fig 2: Construction details of tuning capacitors

The final step is to solder the fixed discs to the stand-off insulators so that they are parallel to, and in line with, the moving discs. The easiest way to do this is to clamp a fixed disc to the corresponding moving disc, separated from it by an untinned washer of appropriate size, using a small G-clamp or crocodile clip. The tuning screw is then adjusted until the fixed disc touches the top of the stand-off insulator. The two are then soldered together, the position and angle of the fixed disc being guaranteed by its being clamped to the moving disc.

A slight problem was encountered with some of the anchor nuts which did not always have

good electrical contact with the tuning screws, causing erratic variations in output power as the bolts were adjusted. The only cure for this is to select anchor nuts which are in good condition and to replace any which exhibit this problem.

ALIGNMENT

For initial tuning a dummy load is connected to the output of the diplexer. It was found useful first to connect a VSWR meter between the transmitter and the appropriate filter section and adjust the tuning screws for minimum VSWR.

When the filters have been pre-tuned in this way, both transmitters are connected and the power meter placed between diplexer and dummy load. The power delivered to the load is separately maximised for each transmitter by adjustment of the appropriate tuning screws.

All tuning should be done with the lid of the box bolted in position. The adjustments of each filter section interact strongly with one another, and repeated tuning is necessary to find the optimum positions. There is also slight interaction with the settings of the filter section for the other band, so the tuning of each side may have to be repeated a few times.

Final tuning must be done using the aerial, since the tuning points of the coils are affected by the impedance of the aerial.

TEST RESULTS

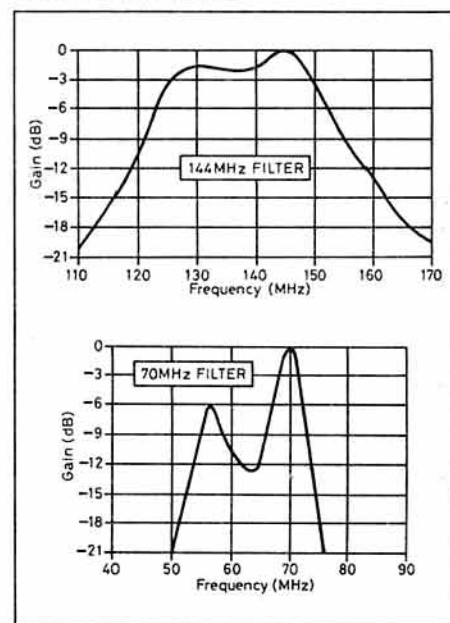


Fig 3: Frequency response of 144MHz and 70MHz filters

The frequency response of each filter section of the prototype is shown above. The insertion loss at the operating frequency is negligible, certainly less than 0.2dB. The measured rejection of the unwanted frequency was 35dB for the 144MHz section and 40dB for the 70MHz section.

The isolation between the two transceivers has been found perfectly adequate in practice. Transmitting on one band does not produce any noticeable effect on the other receiver, even when receiving weak signals. It would be easy to increase the unwanted frequency rejection by building the unit in a larger box and positioning the coils and tuning capacitors further apart, and by incorporating screens. This improvement in filter response would, however, be at the expense of increased insertion loss. □

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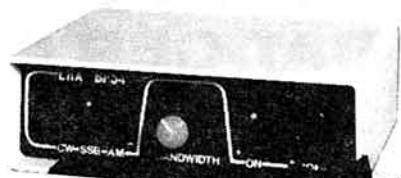
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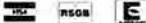
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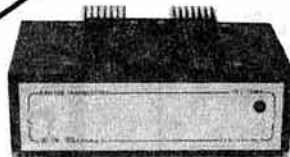
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Avoiding Wind Vibration Damage to Aerials

by Arthur Bolton, GM3BMI

INTRODUCTION

AN EXCELLENT PAPER (1) has already set out the way to design aerials and masts for static strength against wind forces, as well as giving much practical advice. If the guidance offered therein is followed, aerial damage by static wind forces should be avoided. Unfortunately aerials may be set into vibration by the wind and the alternating stresses for vibration are increased by a dynamic magnifier, which has exactly the same mathematical basis as the Q value of a tuned circuit, and may have a value of 60 or 70 times. This article is intended to extend G3ZPF's paper by describing the dynamic behaviour of typical aerials under the action of wind forces and to show how damage arising from vibration might be avoided.

The usual and most serious dynamic problem arises from vortex shedding, which can set an aerial into prolonged vibration across the wind. This can cause rapid failure when the wind speed rises during a big storm and the amplitude exceeds the failure limit. Failure in the first big storm shows that the strength was insufficient for the combined static (D.C.) and dynamic (A.C.) loads in spite of the fact that the calculations concerned with static conditions include an allowance for gusts. The trouble is that the allowance is only 10% or so when the dynamic magnifier for vibrations is 6000%.

Vortex shedding might alternatively give rise to failure after a relatively short time in service, during which wind speeds were never more than moderate. In this case metal fatigue is the culprit and arises from repeated loading at stresses far less than would be required to fail the element or mast if applied only once.

Fatigue cracks often start at surface scratches, holes, clamps or changes of cross-section, and then progress across the whole member until, for example, half an element falls off. The failure surface often shows 'tidal marks' where the failure progressed through the metal by fits and starts. It is known that fatigue arises from hundreds of thousands of repetitions of small stresses. Notice that if an aerial element vibrates in the wind at 10Hz this is 600 repetitions per minute or well over 400,000 repetitions when the wind has blown at the 'awkward' speed for as little as twelve hours in total. This awkward wind speed is the one which sets the aerial into oscillation and might be only five or six metres/second rather than the full gale force which could occur at the site.

The ideal solution to the problem of vortex shedding is at the design stage by avoiding any resonances which might be excited by the wind. This will not always be possible and any existing aerial which presently vibrates in the wind also

needs to be protected. The remedies available are of three kinds: to reduce the amount of excitation fed in by the wind, if possible to zero; to damp out whatever energy is unavoidably fed in by using suitable devices; or to move the frequency of any resonance to a less troublesome value by changing the diameter or wall thickness of the member concerned, or adding a brace to prevent that mode.

VORTEX SHEDDING

The wind and the aerial can form a self-excited oscillator. Vortices are shed from the elements or the mast as in Fig 1, and trail downwind imparting a series of synchronous force pulses to an element or the mast as each vortex breaks away. These pulses can maintain the vibrations in the member if the shedding frequency is within about 20% of the natural frequency of vibration of the element. The frequency of vortex shedding is:-

$$f_v = v \times S / D \quad (1)$$

where:-

f_v is the frequency (Hz) of shedding pairs of vortices, one from each 'edge' of the section,

v is the wind velocity (metres per second), perpendicular to a horizontal element, or in any direction for a vertical mast,

S is the non-dimensional Strouhal number, 0.2 for cylindrical sections and about 0.13 for most 'structural' sections, and

D is the depth (metres) of the section facing the wind (the diameter for tubular members).

The use of a consistent system of units has been emphasised to prevent errors in calculations concerned with mechanical vibrations, eg the metre for length, kilogram for mass, Newton for force and Hz for frequency. It might seem natural to use centimetres or millimetres especially for areas or the physical constants of materials but this often leads to errors and is best avoided. It might seem even more natural to use pounds and feet or inches but the system listed really is better for vibration and easier after a little practice.

It will be seen from equation (1) that as the wind speed rises the frequency of vortex shedding increases proportionately. The owner of an aerial needs to consider a frequency band stretching from zero to the frequency generated at the highest wind speed possible at the site, because the wind might blow at any speed in between. For example, if an aerial mast is a pole of 50mm external diameter and the maximum wind speed is 40 metres/second the band of vortex frequencies stretches from zero to:-

$$f_v = 40 \text{ m/s} \times 0.20 / 0.050 \text{ m} = 160 \text{ Hz}$$

This shows that the band of exciting frequencies is very wide and could lead to vibration as the wind speed rises through each successive natural frequency of the mast. Over such a range it might possibly excite any of the lowest three or four natural frequencies. This indicates the difficulty of dealing with vortex shedding by bracing or other structural design techniques alone. It points up the need to consider spoilers of some kind to prevent vortex shedding as far

as possible, and dampers to reduce any remaining amplitudes of vibration.

The size of the dynamic forces exerted on the aerial.

The amplitude of the vortex shedding force depends on the square of the wind velocity, the geometry of the section and the density of air. With a safety allowance for different sectional shapes, and converting the force to Newtons per metre run of element for convenience in the later calculations, it works out as about:-

$$F = 0.33 D \times v^2 \text{ N/m} \quad (2)$$

Suppose the 50mm mast in the previous example were 5m high, the maximum amplitude of force acting on the mast would be:-

$$F = 0.33 \times 0.050 \times 40^2 = 26.7 \text{ N/m}$$

This is about 134 N overall (over 30lbs in Imperial units) repeatedly applied from side to side and, if the mast had a natural frequency close to 160Hz, would surely destroy it, even though it met the static requirements of reference [1].

Coupling of the vortex shedding forces to the mechanical structure of the element, boom or mast.

The vortex shedding forces are only able to exert their damaging effect if they are in tune with a mechanical vibration of the aerial. If the natural resonant frequency of vibration of the aerial is close to the vortex shedding frequency being generated by the wind, the forces produced by vortex shedding will maintain vibration of the aerial at that natural frequency. This is much like the way in which a tuned circuit can couple to a tuned circuit in the next stage as long as both are tuned to the right frequency. If one circuit is mistuned the amplitude will be reduced or may even disappear.

The mechanical vibration depends upon the closeness of the natural frequency to the forcing frequency of the vortex shedding. If the two frequencies are identical, experiment shows that the mechanical dynamic magnification, or Q, of a typical aerial array is about 60 times (although if it were welded together the Q might reach 100). This means that the amplitude of deflection produced by the continuous application of the vortex shedding forces will be 60 times as great as would be produced by the single application of a static force of the same size. The stresses in the aerial are likewise 60 times as great for the vibrating case as they are when the same forces are applied but there is no vibration.

The natural frequency will be exactly matched by the vortex shedding frequency at the 'awkward' wind speed and Q will be 60. If however the lowest natural frequency is different from the vortex shedding frequency being generated by the wind, the dynamic magnifier will be reduced to a value:-

$$Q = 1 / \sqrt{[1 + r^2 \{2 - 1/60^2\}]} \quad (3)$$

where r is the ratio of forcing frequency to natural frequency.

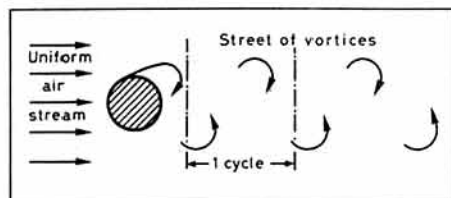


Fig 1.

It is possible to calculate the amplitude of any vibration of an aerial in the wind. The procedure is to find the band of vortex shedding frequencies for the mast and any of the elements using equation (1) and confirm either that there is a natural frequency within that band or to find the nearest corresponding natural frequency above that band. This amounts to finding the lowest natural frequency using the coefficients given in the appendix. If the natural frequency lies within the vortex shedding frequency band, Q will be 60. Otherwise, the ratio of the highest vortex shedding frequency to the natural frequency can be found and thus the value of Q from equation (3). The value of the force applied to the aerial can be determined from equation (2) and the elastic deflection for a static force of this size, again using the data given in the appendix. Multiplying the static deflection by the magnifier Q will give the required amplitude of vibration. The dynamic stresses can likewise be determined.

All this calculation is a lot of trouble but if a radio amateur were embarking on an expensive new multi-element array to be set up on a mountain somewhere, it might be worthwhile to do this calculation and design out any problems before a single element is cut. Most of us, however, merely wish to cure that noisy vibration on the roof, or try to make the array last longer than the first six weeks of every winter. In this case we can short cut the calculations and rely on Murphy's Law to ordain that there will surely be an 'awkward' wind speed which we cannot prevent by design and which will impair our aerial unless we can circumvent it.

Methods of reducing problems.

Wind excited vibration can be reduced or even prevented by:-

1. Making members less liable to easy vibration
2. Using spoilers on any members at risk to prevent vortex shedding from the whole member at the same time
3. Incorporating more damping

and in every case by using common sense like at least pointing a Yagi in the best direction during a storm.

IMPROVING THE STRUCTURE

Cantilevers with one end free are notoriously easy to vibrate and a Yagi array is just a collection of cantilevers fastened to a boom. There are seldom problems at vhf where the cantilevers are short and stiff but the longer cantilevers of lower frequencies are vulnerable. An element which visibly sags can be stiffened by supporting the ends with a cord to a support point above the boom, or by passing the cord through the element and using the tension in the external

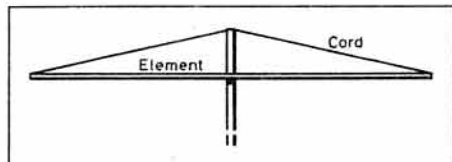


Fig 2.

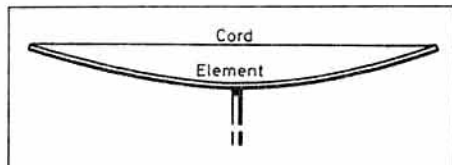


Fig 3.

horizontal cord to support the ends as in Figs 2 and 3. Both are preferable to drooping elements if there is any sign of vibration. Often an array can be improved considerably by using thin cords as triangulated bracing between the various elements of the array. It is cheap, light and 'invisible' and it improves both aerodynamic and structural damping.

Sometimes one particular mode of vibration is evident, for example, although the strength of an unguyed mast is quite sufficient, it does vibrate appreciably at some steady wind speed. Common sense tells us to guy the mast with three stays too prevent that mode. Very little strength will be needed in the guys if the mast really is sufficiently strong, and almost invisible guys might get rid of the trouble.

SPOILERS

Spoilers are of several kinds but the simplest and cheapest is to wrap a spiral of thickish cord from end to end of the member as in Fig 4. This prevents the simultaneous shedding of a vortex along its whole length. Wire is not as satisfactory as cord because of its weight and the likelihood of electrolytic corrosion. The 'strakes' often seen spiralling round the top third of steel chimneys are a luxury version of course. They are often a 'three start helix' with the pitch carefully chosen, but a vibrating oil rig under construction was stilled by wrapping a handy rope spirally round the vertical members as a stop gap until the tops were properly welded.

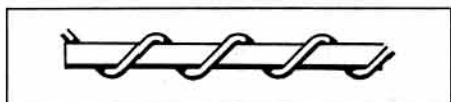


Fig 4.

It is possible to use a shroud fitted close to the end of an element and consisting of a hollow cylinder, about 10% larger in diameter than the element and about 10% of its length, punched with square holes (not round) and fitted over the element close to the ends. The air entering from the windward side, flowing round the element and out on the lee side, stabilises the element. They are troublesome to make in small diameters but large examples are sometimes seen near the top of steel chimneys.

Vortex shedding does not take place in a synchronous way unless the member has a clear uniform section at least 20 diameters long. Moreover, members of the 'wrong' diameter at any given wind speed, damp out much the same amount of energy aerodynamically as that which those of the 'right' diameter receive from the wind. It is possible to balance the positive excitation and the damping by a suitable mixture of element diameters as in Fig 5. The two diameters of the element must differ by about 25% and approximately equal frontal areas of the two diameters should be used.

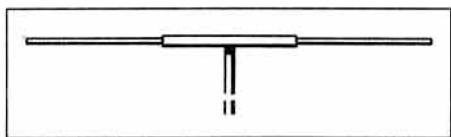


Fig 5.

The vortex street can be disrupted by using a fin on the downstream side of the member. Sometimes short tabs are used at intervals along the length and sometimes a single fin near the free end, Fig 6. The problem in this case is to make sure the aerial points in the right direction

to make the fin 'downstream' when the awkward wind is blowing. Of course if the storms always blow up from one direction a fin might be a useful adjunct to a mast.

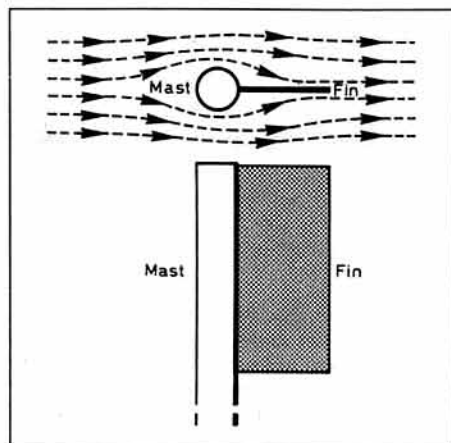


Fig 6.

DAMPING

Damping is a marvellous cure for vibration. The problem is to obtain dampers light enough and of the right range of strength for aerial arrays, and to find a suitable anchor for them. A car shock absorber is just a damper, of course, consisting of two eyebolts held together by a spring in parallel with a dashpot. The eyebolts apply external force from the part to be damped but the spring cannot be compressed or return to its original position without oil in the dashpot being forced through a small hole or round the edges of a slightly undersized piston. There is a fully worked out theory about how much damping to use but lorry shock absorbers rated for 10 tons have been used as dampers in structures. Few amateurs can have a stayed mast tall enough to merit this treatment but, if a mast were suffering vibration from vortex shedding, a suitable damper connected between the end of the stay and the ground could work wonders, Fig 7. Even a layer of soft fabric or other material between an aerial element and its clamp can make a difference.

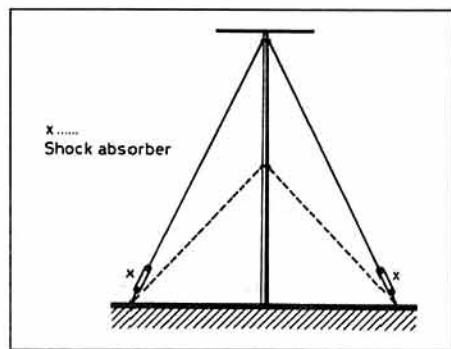


Fig 7.

Aerodynamic damping is equally acceptable and often easier to arrange. If a vibrating member carries members of other diameters across the airstream much damping can be gained. Imagine details of the 'flyswat aerial' appearing in which the owner swears that by soldering a wire mesh flyswat to each end of his Yagi elements he has not only cured all vibration but improved his SWR, the bandwidth of his array, and worked all the squares in Europe. Perhaps some of these advantages might be gained by ending each of the elements with a skeleton wire cone as in Fig 8. I vaguely recall a paper many years ago advocating this for electrical reasons,

although the length of the element has to be adjusted slightly. The aerodynamic damping of the elements is what normally prevents the boom of a Yagi vibrating when the wind is blowing at right angles to it.

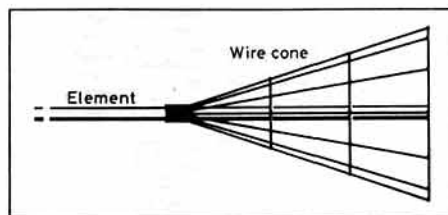


Fig 8.

G3VA in his 'Technical Topics' (which actually inspired this article) has more than once drawn attention to another form of damper in which energy is dissipated by a piece of split hose or the like fixed near the end of elements [2].

Common sense is important, if there is a problem about vibration it is important to do something about it quickly. The calculations necessary for a mast carrying a boom supporting an array are given in the appendix and may help. All radio amateurs have learned some A.C. theory and mechanical vibration is merely a branch of audio oscillation, which can be tackled with confidence if we set our minds to it.

APPENDIX

1. Useful Data

Young's modulus, E,

Steel:	2.05 x 10 ¹¹ N/m ²
Aluminium alloy:	7.00 x 10 ¹⁰ N/m ²
Copper:	1.03 x 10 ¹¹ N/m ²

The densities and ultimate tensile strength of the three metals are:-

Steel:	7830 kg/m ³	430 N/mm ²
Aluminium alloy:	2680 kg/m ³	300 N/mm ²
Copper:	8860 kg/m ³	300 N/mm ²

Maximum working stresses are about two thirds of the ultimate values.

2. Fatigue Stress

If the alternating stress can be kept below about 70 N/mm² for steel there will be no fatigue effects. Unfortunately there is no such fatigue limit for aluminium alloy or copper and fatigue damage will accumulate even at very low stresses. If the alternating stress can be limited to 20 N/mm², however, a satisfactory service life will be obtained.

The second moment of area, I,

For a thin-walled tube of outer diameter D metres and wall thickness to metres

$$I = \pi \cdot t \cdot D^3 / 8 \text{ m}^4$$

3. Natural frequencies

There is a wealth of information on natural frequencies, usually via differential equations, and matrix algebra. Most amateurs would prefer an approximation within about 10% of the 'exact' frequency if it could be obtained by simple arithmetic and this is what is shown below.

Basically, any vibrating system can be related to the case of a single mass vibrating on the end of a spring. In this case the natural frequency is:-

$$f_n = (1/2\pi) \times \sqrt{\text{elastic stiffness/mass vibrated}} \quad (4)$$

There are therefore only two things needed, the appropriate stiffness and the appropriate mass of the elements. The theory does not depend on the shape of the spring, it might be a leaf spring or a cantilever instead of a coiled spring; it could be a structure as in Fig 9, which you might otherwise have thought was one element of an aerial array supported by two booms. If

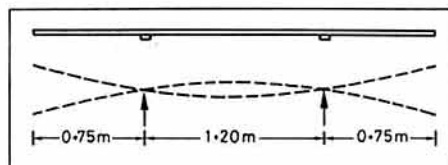


Fig 9.

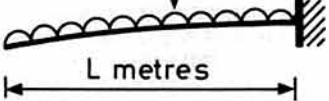


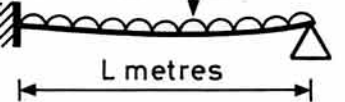
Type of member	Frequency $\sqrt{(EI/pL^4)} \times$	Equivalent spring stiffness $(EI/L^3) \times$	Equivalent mass (ME) $(pL) \times$
Cantilever p kg/m 	0.560	3	0.242
Cantilever end p kg/m 		0	0.242
2 Pin ends p kg/m 	1.571	48	0.493
Fixed/Pinned p kg/m 	2.45	101.9	0.422

Table 1.

it vibrates in the mode shown it can be seen to consist of two cantilever ends and a central beam. We could find the stiffness of the centre of the member experimentally by hanging a weight of, say, 80 N there and measuring the deflection under the load. If this were 5mm (0.005 m) the stiffness would be the force applied divided by the deflection caused, ie 80 N/0.005 m or 16,000 N/m.

A table of stiffnesses to obviate the experimental effort for members often used is given in Table 1. The difference between cantilever ends and cantilevers in the table should be noticed. The cantilever end has no stiffness of its own, any stiffness it possesses is merely taken from the main member leaving the total unchanged. A true cantilever gains stiffness from its fixed support as does a double cantilever member, eg an element fixed only at its centre. The table allows you to work out the numerical values for tubes of different diameters, metals and wall thicknesses from the data given.

Now what about the appropriate mass? According to the theory the mass is vibrating on the end of the spring, ie where we measure the stiffness. This presents a problem because the mass of an element is distributed uniformly along its length rather than being concentrated at the point where we measure the stiffness. If the members were so light as to be of negligible self-mass and a 3kg mass were hung in the centre of the element, the frequency from equation 4 would be:-

$$f_n = (1/2\pi) \sqrt{(16,000/3)} = 11.6\text{Hz}$$

In fact the self-mass of the array is all important and separate masses are seldom applied. The appropriate mass mentioned earlier is that which, concentrated where we measure the stiffness, would have the same effect on the frequency as the distributed mass of the element. This can be calculated and is shown in Table 1. You will notice that for a cantilever the equivalent mass applied at the end is about one quarter of the self-mass and for a member supported at both ends about a half of the total self mass applied at the centre.

Occasionally there will also be a concentrated mass to consider as, for example, when a cantilever mast carries a rotary array on the top. In this case, add the concentrated mass of the array to the equivalent self-mass of the mast to obtain the total equivalent mass. Sometimes there will be more than one member, for example, when a mast is guyed at two levels. There are then in essence two vertical members, the lower with one end fixed in the ground and its top end pinned by the guys but free to rotate; and probably a cantilever end on top to carry the array. In this case add the separate stiffnesses and equivalent masses from Table 1 to obtain the total equivalents.

4. Stress imposed on the material

The maximum dynamic stress is obtained from F, the vortex force given in equation (2), the dynamic magnifier, Q, the length, L, of the member, its I value, and its diameter, D.

The formula for a cantilever, or a cantilever end is:-

$$\text{Stress} = [F \times L^2 \times Q \times D] / [4 \times I] \quad (5)$$

The formula for a member supported at both ends is:-

$$\text{Stress} = [F \times L^2 \times Q \times D] / [16 \times I] \quad (6)$$

If you substitute for F, Q = 60, and I in (5) you will find the stress is:-

$$= [40 \times (v \times L)^2] / [\pi \times t \times D] \text{ N/m}^2$$

$$= [12.73 (v \cdot L)^2 / (D \cdot t)] \times 10^6 \text{ N/mm}^2$$

The corresponding stress for a member supported at both ends is:-

$$= [3.18 (v \cdot L)^2 / (D \cdot t)] \times 10^6 \text{ N/mm}^2$$

Since the lengths of the cantilever end and the part between the two supports will be different, it is necessary to calculate both stresses and choose the higher. An element with two supports and two cantilever ends has its 'middle of the span' stress reduced by the amount of the cantilever end stress because of the continuity. The effective fatigue stress is then the larger of the cantilever end stress and this reduced central stress.

5. The amplitude of vibration

The amplitude of vibration of the end of a cantilever is:-

$$F \times Q \times L^4 / 8 \times E \times I \quad (7)$$

where all the terms have been defined before and their values can be substituted for particular members. The amplitude of the centre of a member simply supported at both ends is likewise:-

$$5 \times F \times Q \times L^4 / 384 \times E \times I \quad (8)$$

5. Examples

1) A steel mast of 65mm external diameter and 6mm wall thickness, 12m high and carrying an array of total weight 25kg.

a: Member properties

$$E \text{ value} = 2.05 \times 10^{11} \text{ Nm}^2$$

$$\text{Mass per metre} = \pi \times 0.065 \times 0.006 \times 1 \text{ m} \times 7830 = 9.59 \text{ kg/m}$$

$$I \text{ value} = \pi \times 0.065^4 / 8 = 6.47 \times 10^{-7} \text{ m}^4$$

$$EI \text{ value} = 1.326 \times 10^5 \text{ Nm}^2$$

b: Maximum vortex shedding frequency

$$F_v = 45 \text{ m/s} \times 0.20 / 0.065 \text{ m} = 138 \text{ Hz}$$

c: Natural frequency

$$\text{Equivalent spring stiffness} = 3EI / L^3 = 3 \times 1.326 \times 10^5 / 12^3 = 230 \text{ N/m}$$

$$\text{Equivalent mass} = 0.24 \times p \times L + \text{concentrated mass} = 0.24 \times 9.59 \times 12 + 25 \text{ kg} = 52.9 \text{ kg}$$

$$\text{Lowest natural frequency} = (1/2\pi) \times \sqrt{(230)/(52.9)} = 0.332 \text{ Hz}$$

It is seen that the natural frequency lies within the possible band of excitation which stretches from zero to 138Hz. A check should therefore be made on any liability to fatigue and the amplitude of vibration. For stresses and amplitudes of vibration only the dynamic forces are concerned since these are what force the vibration, ie the steady wind drag force is not included. The dynamic stress produced by vortex shedding along the 12m mast is from equation (5):-

$$= [12.73 (v/L)^2 / (D.t)] \times 10^{-6} \text{ N/mm}^2$$

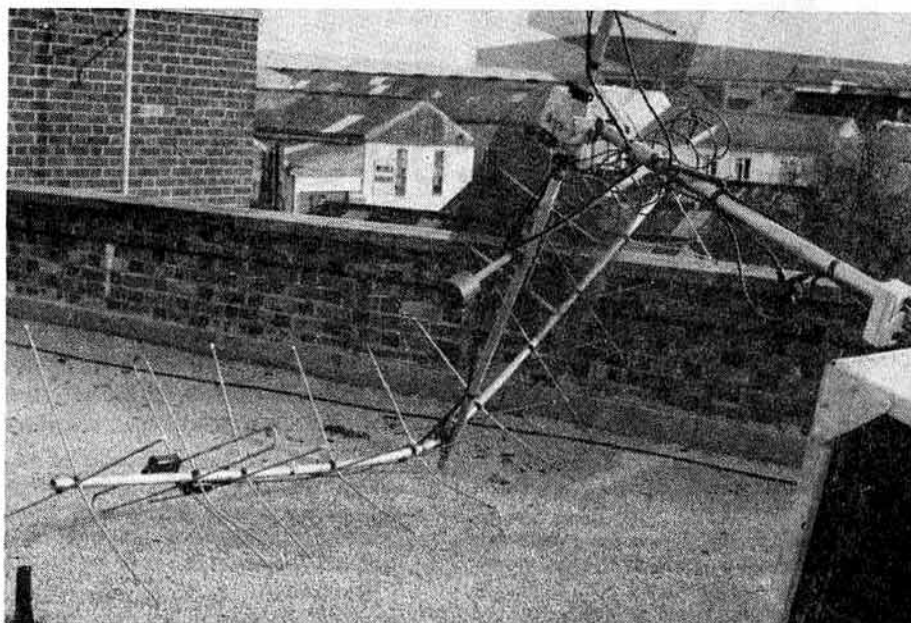
where v is the velocity driving the lowest natural frequency and can be obtained by simple proportion. If 138Hz is the vortex frequency produced by a wind speed of 45m/s then the operative 0.332Hz will be produced by a wind speed of $45 \times 0.332 / 138 = 0.108 \text{ m/s}$. The dynamic stress in the steel tube at its base is therefore:-

$$[12.73 \times (0.108 \times 12)^2 / (0.065 \times 0.006)] \times 10^{-6} \text{ N/mm}^2 = 0.05 \text{ N/mm}^2$$

This is far too small for any fatigue damage but there is still the need to check the amplitude of vibration by equation (7). Substituting for F , Q , L and EI gives:-

$$0.108 \times 60 \times 12^4 / 8 \times 1.326 \times 10^5 = 0.127 \text{ m} = 127 \text{ mm}$$

This is rather large for comfort although it is safe as far as the stress is concerned and commercial specifications often allow a deflection of 1% of the mast height. It would be wise to guy the mast and recalculate the frequency, stress and amplitude for the new configuration.



This article arrived just before the Jan 25 storm. As the photograph shows, we didn't read it in time!

2) The same mast but stayed at its top and mid-point with light guy ropes. It therefore consists of two members each 6m long with the lower end fixed in the ground. Using Table 1:-

$$\text{Total equivalent stiffness} = (48 + 101.9) \times EI / L^3 = 149.9 \times 1.326 \times 10^5 / 6^3 = 92022 \text{ N/m}$$

The self-mass of the array is now fixed by the top stay, therefore:-

$$\text{Total equivalent mass} = (0.493 + 0.422) \times p \times L = 0.915 \times 9.59 \times 6 \text{ kg} = 52.65 \text{ kg}$$

$$\text{Lowest natural frequency} = (1/2\pi) \times \sqrt{(92022)/(52.65)} = 6.66 \text{ Hz}$$

The dynamic stress produced by vortex shedding along the 6m span is from equation (6):-

$$[3.18 (v/L)^2 / (D.t)] \times 10^{-6} \text{ N/mm}^2 \text{ where } v = 45 \times 6.66 / 138 = 2.17 \text{ m/s}$$

The dynamic stress in the centre of the 6m upper span is therefore:-

$$[3.18 \times (2.17 \times 6)^2 / (0.065 \times 0.006)] \times 10^{-6} \text{ N/mm}^2 = 1.38 \text{ N/mm}^2$$

Again this is far too small for any fatigue damage.

The amplitude of vibration from equation (7) gives:-

$$5 \times F \times Q \times L^4 / 384 \times E \times I = 1.54 \times 10^{-4} \text{ m or } 0.15 \text{ mm and quite satisfactory.}$$

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- [1] 'Wind Loading', DJ Reynolds, G3ZPF, *Radio Communication* April/May 1988, pp 252-255, 340-341.
- [2] 'Technical Topics', Pat Hawker, G3VA, *Radio Communication* November 1989, pp 36-37.



Book Review

GUIDE TO BROADCASTING STATIONS

Edited by Philip Darrington

Published by Heinemann Newnes: ISBN number 0 434 90309 4

THE 1989/90 EDITION of this popular handbook has been on the bookshelves for several months now, but we have only just got around to reviewing it. It is edited by Philip Darrington, but has chapters written by several leading personalities and is well worth a place on your bookshelf, even if you are not keen on broadcast listening.

It successfully combines useful introductory material for anyone new to Short-Wave Listening, and provides a formidable list of long-wave, medium-wave and short-wave broadcast stations. It also provides a useful alphabetical list of which countries have transmitters on which frequencies, an example being that anyone looking for a transmission from the Cape Verde Islands is told that 3,931kHz is the place to monitor. Going to the other extreme, it is useful to know that if you are looking for Radio Moscow, you have 406 frequencies to choose from! There is also a worthwhile section which tells you when a particular

country beams its transmissions to the United Kingdom.

Let us take a slightly more detailed look at the first 50 pages which act as the guide for the beginner. Firstly, it looks at the world of broadcasting outside the UK, offering the view that with so many powerful transmitters here, most people only find the occasional interference from an adjacent broadcast station an annoyance. However, those interested in broadcast band listening would be more likely to try to receive the 'interfering' station rather than the local, stronger one.

Just like broadcast stations here, foreign stations will transmit news and current affairs programmes, but will encourage you to listen longer by broadcasting feature programmes about their corner of the globe. There are also stations that feature special programmes for the SWL, and provide technical tips, equipment reviews and DX information.

For those interested in getting into BC listening, there is a useful table showing which receivers are on the market and their capabilities. From this it would be possible to form a view about which receiver you might wish to purchase. The details are only brief, but they give a hint of the capabilities of the sets.

Pat Hawker, who needs no introduction, provides a

fine in-depth general look at listening, introducing us to the frequencies, conditions, interference, fading and distortion, aerials and propagation, and signal identification.

Most SWLs, whether amateur or broadcast enthusiasts, find most pleasure in sending reception reports and getting QSL cards. The next section is a must as it provides a very detailed insight into what BC SWLs should concentrate on when sending reports to stations. In broadcast circles, some of the QSLs (and pennants) on offer for a useful reception report are superb colour cards which are well worth displaying on the shack wall. It advises SWLs to make their reports stand out, but in the BC business it seems that some DX clubs offer standard printed forms - not at all appropriate for amateur reports, and, I imagine, not very easy to make them 'stand out'. However, the chapter has some useful advice which will obviously benefit the BC SWL.

The final section before the list of frequencies and stations is one which describes loop antennas. This will be of particular interest to those BC SWLs who cannot put up external antennas.

The guide has obvious advantages to the SWL who specialises in listening to broadcast stations, as it provides a comprehensive list of frequencies and the stations which use them. It is in its twentieth year and will quite obviously continue for many years yet.

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Many of you will have heard of changes going on at Raycom recently. Regular visitors will have already seen many changes to our showroom and there are still more to come. New staff are also in place to provide coffee, idle chat and the rundown on the latest technology for radio amateurs and shortwave listeners!

Raycom is THE place to see all the new products and developments in communications. All the latest equipment and accessories are here and you can try before you buy on our new demonstration area. We can offer full RX/TX facilities from HF to UHF via our HF5 and Royal 1300 verticals. The tribander and VHF/UHF beams will be going up soon! Why not add your call sign to our log book on your next visit.

We will shortly be adding many new products to compliment our main Icom and Yaesu dealerships. We will continue to support UK manufacturers like Navico, AKD and Microwave Modules and by the time you read this we should have many items from BNOS, SEM, BARENCO, CAPCO and ERA. We are pleased to be representing Siskin Electronics in the midlands and PacComm products are already ex-stock.

We are also looking East and West and should shortly have some good news from the USA. Looking East, we have just added the ALINCO range to stock. You must come and try out their VHF/UHF mobiles and handies. Quality is good and the price is better. See them also at Leicester. You must also see our new Maldol mobile whips and the versatile FM101 mount.

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If you can't call in personally, anything we have in stock can be with you next day. What we haven't got may take a day or two longer!

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73s and 88s — Tom G6PZZ and Ray G4KZH

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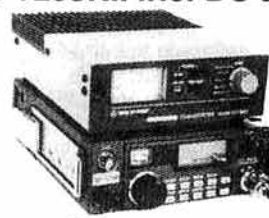
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Q R P

GEORGE DOBBS G3RJV

St. Aidan's Vicarage, 498 Manchester Road,
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NO ANTENNA SPACE?

"RADIO AMATEURS DIVIDE roughly into two groups: those who have small back gardens which badly restrict their hobby... and those who have small back gardens and make the best use of what space they have." A trite statement but it does sum up the perverse nature of our hobby. Wanting to maintain world-wide short wave communication from a private house is a rather odd aim. Many amateurs curse the restrictions endemic to such a pursuit but for the "true" amateur this is what puts the edge on the hobby. Those restrictions of space, money and time are challenges rather than curses, they are what makes the hobby so fascinating. To these restrictions, the QRP operator adds another, the limitation of power.

It is commonly assumed that QRP stations must have large and effective antennas in order to achieve any results. The truth of the matter is that many QRP operators are working under severe antenna restrictions. Very few QRP stations appear to use a rotatable beam. It may be that using a beam and tower costing several hundred pounds does not seem appropriate to a home built transmitter costing a few pounds. Certainly, if the G QRP Club membership represents a typical sample of QRP operators, many of them work within strict constraints of antenna space. An inspection of many QRP stations would reveal ingenious use of cheap wire in small spaces.

SPRAT, the journal of the G QRP Club has

published many antenna designs from these undaunted spirits. Recently, there has been a lot of interest in the use of magnetic loop antennas. There have been so many variants on this theme that *SPRAT* has contained an example of a loop antenna design in every issue for the last two years: everything from sophisticated plumbing to bits of wire wrapped around wooden frames. One example folded down to fit into a suitcase for the traveller to use in hotel rooms.

Gus Taylor, G8PG, has been interested in small antennas for many years and has offered invaluable advice to individual radio amateurs with antenna problems. In the autumn issue of *SPRAT*, G8PG, offers a non-inductively loaded balanced antenna that is ten feet long. It is based upon an idea I have used in the past for restricted space counterpoise wires; in fact I think I got that idea from Gus. The technique is to compress the length of a wire by arranging it in a zig-zag fashion. Not only does this get a lot of wire into a small space but the loading effect, which is non-inductive increases the electrical length of the wire. Two such elements are fed with balanced feeder and can be loaded up on seven HF bands. The results achieved with the prototype using 3W of RF power are very impressive. The details can be found in *SPRAT* 64, and G8PG is to follow this up with a very simple loop design for indoor use on seven HF bands.

Oddly enough, when G8PG first sent me details of this antenna, I had just tested a commercial restricted space antenna. An example of the Sagant ZA-14 end fed zepp had been sent to me for evaluation. The total length of this antenna is 9.9m which would fit into a very modest garden. I hoisted it up in my small front garden between the first floor window frame and a tree to a height of about 20ft. My first QSO using 5W gave me a report of 599 from UW9CM which was pleasing enough. But the second QSO was a two way QRP QSO, 5W both ways, with FY/DJ0PJ with mutual 569 reports. A nice reminder to me that contacts like that are worth ten times more when the odds are being beaten.

PHOTOGRAPH: W6ZH



The complete W6ZH Portable Operation Package. The Worldradio Transceiver and Power Supply Unit with the 12 foot collapsible whip antenna and counterpoise wire, 20 metre dipole and feeder, clamp for the whip, mains adaptors, tools, multimeter, fishing line and tennis balls for throwing up the dipole. The complete package fits into one carry-on bag.

QRP FROM THE ISLANDS

HERBERT (PETE) HOOVER III, W6ZH enjoys QRP and Islands. In recent years he has been taking a small home built station on travels to islands. Pete has worked from several Southern Pacific islands, and last year worked from Scandinavian islands and Iceland. Next he plans to work from the Orkney Islands, the Hebrides and the Isle of Man. His station is an illustration of what I was saying above. The transceiver is based upon the "Worldradio", a 14MHz superhet design by Rick Littlefield, K1BQT, and published in the January 1988 issue of the now defunct *HAM RADIO* magazine. Alongside this small transceiver he has an identical case which houses a mains power supply, ATU and SWR Bridge. The transceiver contains an audio filter and keyer, giving a complete compact station in two boxes. The antenna system is based upon the probable restrictions of hotel rooms and "wayside" operating. Pete takes two antennas. The main antenna is a simple 20 metre dipole. It is surprising where a 20 metre dipole will fit and tennis balls are used to launch fishing line over available support points. The alternative antenna is a home made collapsible centre loaded 12 foot whip. This whip is mounted using a "mole wrench type" clamp to window frames, fence posts, trees, car doors or whatever. The whip is tuned against counterpoise wires laid out wherever they will fit.

I met Pete at the Dayton Hamvention this year where he introduced me to his "wandering station". When he left Dayton he took a 30 day 9,000 mile trip round the USA and had QSOs from each of the 10 USA call areas using the transceiver and the loaded whip antenna. With his inexpensive home built station and antenna system to set up wherever he happens to find himself, W6ZH is a fine example to all those who say that they cannot work the HF bands from their location.

OVERSEAS QRP CLUB

THERE IS A WHOLE network of QRP groups and clubs worldwide most of which belong to the World QRP Federation (WQF) an international grouping of organisations which accept 5W or less of RF power as the accepted level for QRP operation.

Amongst the more recent clubs, the OK QRP Club is now firmly established and has just begun its own magazine, OK QRP INFO. This is mainly in Czech with some English text. Overseas radio amateurs can join the OK QRP Club for 15 IRCs a year. Applications should be made to Petr Doudera, OK1CZ, U1 Batterie1, 16200 Praha 6, Czechoslovakia.

Many UK QRP operators are members of the American Club called the QRP ARCI. Membership is \$14.00 for overseas members and then \$12.00 to renew each year. Applications can be made direct to the Membership Chairman: Mike Kilgore, KG5F, 2046 Ash Hill Road, Carrollton, Texas 75007, USA. The club promotes a wide range of activities and issues a well produced quarterly magazine called the *QRP QUARTERLY*.

Radio amateurs from any part of the world are welcome to join the G QRP Club and receive its quarterly journal *SPRAT*. Application forms and a free sample of *SPRAT* can be had from David Jackson, G4HYY, Castle Lodge West, Halifax Road, Todmorden, Lancashire, OL14 5SQ. The membership subscription is £5.00 or \$10 per year.



Satellites

ARTHUR GEE G2UK

21 Romany Road, Oulton Broad, Suffolk
NR32 3PJ

SATELLITE COLLOQUIUM

THE FIFTH AMSAT-UK Satellite Colloquium was held at the University of Surrey from 26 to 29 July 1990. A very comprehensive programme had been arranged for the 180 delegates who attended from 29 countries. The lectures and discussions covered a great variety of topics relevant to the satellite scene.

Thursday, 26th, designated 'International Amateur Satellite Day', was given over to discussions by leading personalities in that field on the present and future use of amateur satellites. The day's proceedings were chaired by C. Van Dijk, PA0QC, Chairman of IARU Region 1's VHF Committee. He covered very thoroughly recent IARU events and decisions towards WARC '92. Dr. Karl Meinzer, DJ4ZC, had some pertinent words to say on 'What do you want on the next Phase 3 Satellite, and are you willing to pay for it?'.
Doug Loughmiller, President AMSAT-NA, dealt with 'Future satellite projects by AMSAT-NA'. Some interesting comments came from Dr Martin Sweeting, G3YJO, Director UoSAT, who spoke on 'Satellites in education - Is there a future role?'. This topic was also covered by Hans Groenendaal, ZS6AKV, who described the steps being taken in South Africa to introduce spacecraft knowledge into their educational system. Richard Ensign, who edits the *AMSAT Education News* from Michigan, U.S.A., dealt with the 'educational aspects' of the microsats, particularly Webersat.

Friday, 27th, saw the Colloquium get off to an early start with reception and registration from 0830 to 0930, when Dr Martin Sweeting and Dr Arthur Gee, G2UK, Chairman AMSAT-UK, jointly welcomed the Colloquium delegates, followed by a very full day of lectures and discussions.

The opportunity was taken to hold the AGM of AMSAT-UK in the evening, which was well attended. The Treasurer's Report showed a balance of £32,427. It was announced that there might be an opportunity for a launch for another UoSAT type satellite and, with AMSAT-UK's funds being at such a satisfactory level, AMSAT-UK's Committee had proposed making a grant of £25,000 towards this project. They suggested this satellite should have a Mode A transponder (2m uplink - 10m downlink). This project would be designated UoSAT F.

An interesting presentation was given by Louis Meyers, an enthusiastic satellite SWL who, at the AGM, gave a spirited talk on the activities of the Short Wave Listener fraternity in the satellite scene. He quite rightly described how the SWL was almost forgotten in AMSAT organisations in spite of them outnumbering those with transmitting facilities by a large margin. He asked that the SWL should be given more consideration by the satellite service organisations. He thanked Dr

Martin Davidoff, K2UBC, for all the work he had put into producing the *Satellite Experimenter's Handbook* (available from RSGB publications - see page 79), which had proved so useful in helping SWLs and newcomers to satellites to overcome their initial difficulties. He presented Martin with a 'coffee table' space book, as a token of SWLs gratitude to him. He also presented Ron Broadbent with a FAX machine from the SWL fraternity for use in his work with AMSAT-UK. This report on the SWL interest in satellites came as a bit of a surprise to those responsible for amateur satellite organisation and it was apparent that the SWL requirements should receive more attention in future.

Saturday's programme included a talk by Geoff Perry, well known broadcaster and writer on satellite affairs, who gave an entertaining account of some of his recent experiences under the title 'I haven't got a callsign, but!'. Laurence Howell, GM4DMA, gave a fascinating account, illustrated by some beautiful slides of his radio activities with Sir Ranulph Fiennes's North Pole '90 Expedition. Dr Martin Sweeting spoke on UoSAT Spacecraft on Ariane, and Dr Karl Meinzer gave an overview of the Phase-3 D project. Numerous other topics were covered by specialist speakers. The Colloquium Buffet Dinner completed Saturday's proceedings, following which the traditional Junk Sale was held, adding considerably to the Colloquium funds.

Sunday saw another day of lectures covering a variety of topics too varied to detail here. Dr F Yamashita, of the Japanese amateur radio society spoke on FO-20 operations. An excellent talk on Mode L and S operation on Oscar 13 was given by David Silvester, G2BFO, who continued his presentation by further talks in one of the 'Workshop' sessions which had been arranged to run concurrently with the more formal items in the programme, which included useful lectures on Microsat packet operation, satellite tracking, RS14 and RUDAK-2 operation. Pat Gowen, G3IOR, gave an informative talk on EME, illustrated with slides of D Mallet, G3HUL's excellent EME set-up at Norwich. Whilst reflecting radio signals from the surface of the moon cannot be quite the same procedure as normal satellite activity, Pat's talk was most informative and interesting. Dr B Pidoux, the French delegate, spoke on ARSENE. This project has been in the planning stage for several years but is now well on the way to being launched in 1992. On the future of amateur radio satellites, news came out during the Colloquium of several further satellites in the planning stage. Many interesting projects were put forward by delegates representing their national satellite organisations and, even if all do not see a successful conclusion, there will certainly be enough activity in this sphere to keep satellite interest going for the next few years.

It has been quite impossible in these notes to give anything but a very sketchy account of the Colloquium. It was very well attended by delegates from widely distributed countries across the world. The topics covered a wide spectrum of satellite activities, and the technical standard of the talks hit a high level of space technology. The Colloquium brought together those who represented amateur radio

continued on page 72

Meteosat



MET-2 Weather Satellite Receiver

A complete weather satellite receive system to operate with your IBM-PC (or clone) for less than the price of a good HF receiver! All IBM-PC display modes are covered up to enhanced VGA at 600 x 800 x 64 grey levels or colours. This is the maximum resolution of the satellite. A plug in NOAA low earth orbiting satellite receiver option is available. Screen animation and laser printer dump software are included in the price. The package includes:-

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System enhancements include:-

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Keyer



MM-3 Morse Machine

The MM-3 has all the features needed in a memory keyer, including 2-99 WPM speed selection and over 8 KBytes of soft partitioned memory. 20 memories store variable length messages and total memory can be expanded to 36 KBytes. All memory is Lithium battery backed.

Comprehensive Morse training facilities are built in. A **Proficiency Trainer** for random code group practice. A **Random Word Generator** which generates four letter words and a **QSO Simulator** which allows you to call stations, answer a CQ or listen to realistic QSOs.

The MM-3 features automatic serial number generation within any memory message. Use the front panel knob to adjust your sending speed or enter a precise speed with the keypad, toggling between the two at any time. Exchanges can be expedited by having parts of your message sent at a higher speed. You can even add remote switches for four of the memories to send your response or call CQ. The MM-3 can also be programmed for automatic beacon use. The RS-232 port enables computer control of the MM-3 and monitoring of Morse training.

The keypad offers an easy to use method of quickly changing parameters to customise the MM-3.

MM-3: £169.95 inc. VAT
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EMC

HILARY CLAYTONSMITH, G4JKS
115 Marshalswick Lane, St Albans,
Herts. AL1 4UU

EMC STANDARDS UPDATE

FOLLOWING THE ARTICLE in July 1990 *RadCom* on EMC Standards and Regulations, I have received a number of requests for further information about certain aspects of EMC standards which are of particular interest to radio amateurs. The following information is only a brief summary of selected aspects of certain standards. For further information, readers are advised to refer to copies of the actual standards.

IMMUNITY STANDARDS - RADIO AND TV

THE AREA WHICH is probably of most interest to radio amateurs is the immunity (or otherwise) of radio, TV, audio and video equipment. Although this is covered to a limited extent by BS905:Part 2:1985, manufacturers are not currently obliged to meet this standard. The test involves injecting signals onto the braid of the antenna coax, and onto other cables such as the mains cable and cables to any external loudspeakers. This is a conducted susceptibility test, as it tests for pick-up via the cables, but not for direct pick-up in the equipment itself. Immunity limits are only specified from 26 - 30MHz. Sets which meet BS 905:Part 2:1985 do not necessarily have better immunity at other frequencies such as 144MHz.

BS 905:Part 2 will probably be aligned with (ie. made identical to) European Norm EN 55 020 in due course. It is anticipated that all broadcast radios, audio, TV and associated equipment, but not equipment without a mains connection or without an external antenna terminal, will have to meet this Norm from 1992. EN 55 020 includes various tests such as rejection of in-band and out-of-band signals at the antenna terminals at various VHF and UHF frequencies. Immunity from conducted voltages injected into other terminals, such as mains or loudspeaker terminals, is tested between 150kHz and 150MHz, except at certain frequencies such as IFs and chroma sub carrier frequency. Immunity from conducted currents injected via the braid of the antenna coax is tested from 26 - 30MHz and tests for susceptibility to radiated fields are performed over the range 150kHz - 150MHz. A field strength of 125dBµV/m (1.78V/m) is specified for audio functions and 101 - 125dBµV/m depending on frequency for radio and TV functions.

GENERIC IMMUNITY STANDARDS

A GENERIC IMMUNITY standard has been issued in draft form (prEN 50 082-1) which is applicable to all electronic equipment not specifically covered by other harmonised European standards. Immunity of equipment to radiated fields is tested from 80MHz - 1GHz. The field strength with an unmodulated

carrier is set to 3V/m +/- 3dB then the carrier is modulated with 80% AM at 1kHz. There is also a radiated susceptibility test at 2.45GHz using a 10V/m pulse modulated signal with 0.1% duty cycle. This is presumably to simulate fields which might be produced by microwave oven leakage. There are other tests including immunity to conducted signals from 150kHz - 100MHz injected onto power supply, signal and control lines.

COMPUTER IMMUNITY.

IMMUNITY OF INFORMATION technology equipment to radiated fields is covered by another draft standard, prEN 55 101-3. Tests for radiated susceptibility are at the same level and modulation as in the generic standard prEN 50 082-1 but the frequency range is 30MHz - 1GHz.

What the immunity limits mean to radio amateurs

New electronic equipment sold after 1992 should be more immune than much existing equipment but the level of immunity will not be as high as radio amateurs might wish. For amateur radio purposes, immunity to field strengths of at least 10V/m would be desirable whereas some manufacturers didn't want immunity standards at all, arguing that this was a "quality" aspect of their product, that is, it should be up to them how immune or otherwise their products are.

EMISSION STANDARDS.

Broad band interference.

An example of broad band interference is interference from the commutator of an electric motor which can affect a whole amateur band uniformly. Although reducing the bandwidth of the amateur receiver would reduce the absolute level of received interference, the weakest detectable signal (in the absence of interference) is also reduced which cancels out any apparent improvement in signal to interference ratio.

'Quasi-peak' detector.

A complication with measurement of broad band interference is that the signal fed to the detector of the measuring receiver may be amplitude modulated, possibly with pulses of low duty cycle as in the case of interference from vehicle ignition systems. A 'quasi peak' detector is designed to model the subjective annoyance of impulsive interference and, depending on pulse repetition rate, gives an output greater than or equal to that of a normal envelope detector, which is referred to as 'average responding'. Measurements may be specified with both a quasi-peak and an average responding detector, with different limits for each measurement, or quasi-peak measurements only may be specified. It is not normally necessary to determine whether a source of interference is broad band or narrow band in order to make a measurement.

Narrow band interference.

An example of narrow band interference is harmonics from a crystal clock oscillator in a computer where a harmonic might fall on a certain frequency in an amateur band with almost all its energy concentrated within a bandwidth of a few Hertz or tens of Hertz. If there were more than one of these in an amateur band, each one would be measured

as a separate emission and subject to the relevant limit (provided they were not too closely spaced - see below). Reducing the bandwidth of the amateur receiver does not reduce the absolute level of this type of interference but does of course reduce the level of weakest detectable signal (in the absence of interference). Such interference is therefore even more of a nuisance to operators of narrow band modes such as CW. The only consolation is that this type of narrow band interference renders a smaller proportion of the band unusable! This is no consolation however if narrowband interference happens to fall on a frequency which one wants to use, such as the 144.400 MHz meteor scatter reference frequency!

But what about interference from a source such as TV line timebase harmonics with uniform amplitude at multiples of 15.625kHz across an amateur band? This would be considered narrow band at HF but broad band at VHF! At HF, where a measuring receiver bandwidth of 9 kHz is specified, the measuring receiver passband would encompass the principal spectral energy of a single harmonic only and the harmonics would be considered as a series of narrow band emissions with each one being measured separately. At VHF, where a 120kHz measuring receiver bandwidth is specified, there could be 7 or 8 within the measuring receiver passband at any time. They would therefore be considered as broad band emissions because the measured level would not vary significantly when the tuning of the measuring receiver was varied. In this case, the measurement would represent all the signals within the measuring receiver passband. Therefore, in order to be below the limit, each individual harmonic would have to be at a lower level than would be the case if measured with a 9 kHz receiver bandwidth.

EMISSION STANDARDS

Household appliances etc.

BS 800:1988 is the English language version of EN 55 014:1987 and covers emissions from equipment such as household appliances containing motors, thermostats, semiconductor controls or rectifiers. This includes any broad band emissions from audio equipment. Conducted emission limits are specified between 150kHz and 30MHz. From 30 - 300MHz interference power from mains operated appliances is measured using a special ferrite clamp (called an MDS clamp) around the mains cable. Limits are specified in units of dBpW (reference level 1 picowatt!). Statutory Instrument SI 1989 No 562 which supersedes some earlier SIs, makes compliance with BS 800:1988 mandatory.

Computers etc.

BS 6527:1988 is the English Language version of European Norm EN 55022:1987 which is a specification for interference generated by information technology equipment (ITE). However, no equipment in the UK is yet required to conform with BS 6527. From 150kHz - 30MHz, BS 6527 specifies a conducted emission test, that is interference coming out of the terminals of the equipment under test, whereas from 30 to 1000MHz radiated emission tests are specified. The reasoning behind this appears to be that below 30MHz, the size of IT equipment is thought to be too small a fraction

of a wavelength to radiate much interference directly; the primary mechanism is considered to be radiation via cables such as the mains supply cable. Thus limits are specified for common mode and differential mode conducted emissions measured via a Line Impedance Stabilisation Network (LISN).

Two sets of limits are specified, class 'A' and class 'B'. According to BS 6527, the class 'A' limits are derived for typical commercial establishments for which a 30 metre protection distance is used for radiated emissions, and they may be too liberal for domestic establishments and some residential areas. The limits for Class 'B' equipment are derived for typical domestic establishments for which a 10m protection distance is used. The BS 6527 class 'B' limit is 30dBpV/m at 10m between 30 and 230MHz and 37dBpV/m between 230 and 1000MHz. Both limits are measured using a quasi-peak detector in the measuring receiver and 120kHz receiver bandwidth.

The US FCC 47CFR Part 15J regulations for computing equipment are similar to BS 6527 and have 'A' and 'B' limits. The FCC 'B' limits are specified at a distance of 3m but the equivalent values at 10m are within 1dB of the BS 6527 'B' limits in the 50, 70 and 432MHz amateur bands while the FCC limits are 3dB higher in the 144MHz band. It was reported in *Technical Topics* (August 90 *RadCom*) that even computers conforming to FCC Class 'B' limits are hard enough to 'tame' for amateur radio use.

Generic emission standards.

prEN 50 081-1 is a draft generic emission standard for all equipment containing active electronic devices and not covered by other standards. The radiated emission limits, which are only applicable to apparatus containing processing devices with a clock frequency greater than 100kHz, are identical to EN 55 022 (BS6527) 'B' limits. The generic emission standard refers to a frequency range of 0 - 400GHz but no limits are currently specified below 150kHz or above 1GHz.

Copies of draft standards mentioned above may be purchased from BSI Sales Administration (Drafts) at Milton Keynes.

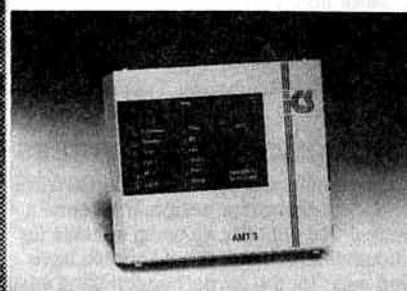
What the emission limits mean to radio amateurs.

It is difficult to relate BS 6527, BS 800 conducted emission limits or BS 800 interference power limits to received levels of interference in an amateur station.

With regard to radiated limits, the BS 6527 'B' limits should offer protection from interference to 'protected' services such as broadcasting, but not to the amateur service which is unprotected. With VHF/FM broadcasting for example the boundary of the service area of a transmitter is considered to be where the field strength is 54dBpV/m (500pV/m) at a height of 10m above ground. BS 6527 'B' limits should give adequate protection to VHF/FM and UHF TV broadcast reception within the service area of the transmitter using a roof mounted antenna at least 10m from the source of interference. Protection may not be provided outside the service area of a transmitter or with an indoor VHF or UHF antenna particularly if it is closer than 10m to the source of interference.

continued on page 72

Amtor



AMT-3 Amtor/RTTY Terminal Unit

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10GHZ BEACON FREQUENCIES

I mentioned, in connection with the G3WDG-001 multiplier/amplifier design, the use of a crystal of 108.009MHz as being suitable for the beacon sub-band. What I should have added was "for the formal beacon band which is 10,368.800 to 10368.990MHz". The area for attended personal callsign beacons in the UK is 10368.000 to 10368.800MHz, but preferably in the area 10368.300 to 10368.400MHz, requiring a crystal between approximately 108.0031 and 108.0041MHz.

Although some European personal callsign beacons may be found between 10368.000 and 10368.200MHz, we cannot recommend this because of its proximity to the CW and EME frequencies right at the bottom of the band. Yes, there is now EME activity in the USA and possibly soon (listening activities, at least) in the UK. There is no objection, in principle, to use of frequencies in the 'formal' part of the band, except that it breaks the spirit of the bandplan and may interfere with propagation monitoring studies involving formal beacons. In other words, please try to observe the bandplans. My apologies if I'd slightly misled you by suggesting a crystal frequency of 108.00900MHz!

MORE ON THE G3WDG001 MULTIPLIER/AMPLIFIER

'Kitchen table hi-tech' has arrived! The Components Service introduced its first "mini-kit" from August (as I write), in the form of the G3WDG-001 multiplier/amplifier for 10GHz, stock reference UC42. What's so marvellous about this? - what is it and what does it do?

First, it represents a new departure for the Components Service. Next, it represents a considerable advance in home construction

technology for the 10GHz band, where much amateur effort until now has been directed to either simple wideband activity or, through the advent of some commercial gear, to minority narrowband activity. We hope that the first of the three designs will add impetus to ATV, packet link, beacon and repeater usage in this popular band. The module has been designed primarily as a simple CW/FM/FSK transmitter, using GaAs technology and covering the entire 10GHz band from 10.000GHz to 10.500GHz. What follows is condensed from the full write-up, by permission of G3WDG and co-designer G.B.Beech.

The schematic circuit is shown in Fig 1. In this diagram, the heavy lines are sections of printed transmission line on the PCB. The various "wings" on the lines are matching elements and the elongated rectangle and the triangular elements are various types of stubs for decoupling, whilst the square with one corner missing (on L5) is a printed capacitor. Inductors L2 to L9, inclusive, are lengths of thin wire lying on the surface of the board and soldered to the stubs and pads provided.

Signal drive in the 2.5 to 2.6GHz region is supplied by the G4DDK-004 oscillator/multiplier source, described in the August issue of *RadCom*. It should be crystallised for output in the range 2.5000 to 2.6250GHz, the fifth overtone crystal lying in the range 104.1660MHz to 109.3750MHz, according to application.

Drive input to the module is first amplified by IC1, an Avantek MSA0504 broad-band amplifier MMIC. If the drive level available is at least 10mW this stage may be omitted although, if you are unsure about the drive level, it is better to fit it. The output from the MMIC (or the input to the multiplier FET, F1, depending how you look at it), is broadly tuned and matched by means of L2 and L3 whilst the operating bias point of the FET multiplier is set, from a negative rail, by means of RV1. The output circuit consists of a suitably matched 10GHz line whilst L4 and the printed capacitor form a series resonant circuit, (rather like an idler circuit in a parametric multiplier) which 'shorts' the input frequency at the drain to ground and increases the efficiency of the multiplier considerably. The output consists of several harmonics, but mainly the wanted fourth harmonic.. FL1 is a small cavity resonator filter soldered to the board, used to select the

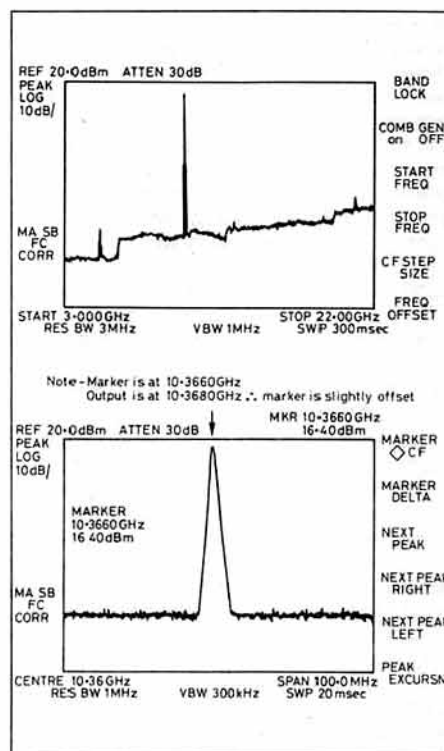


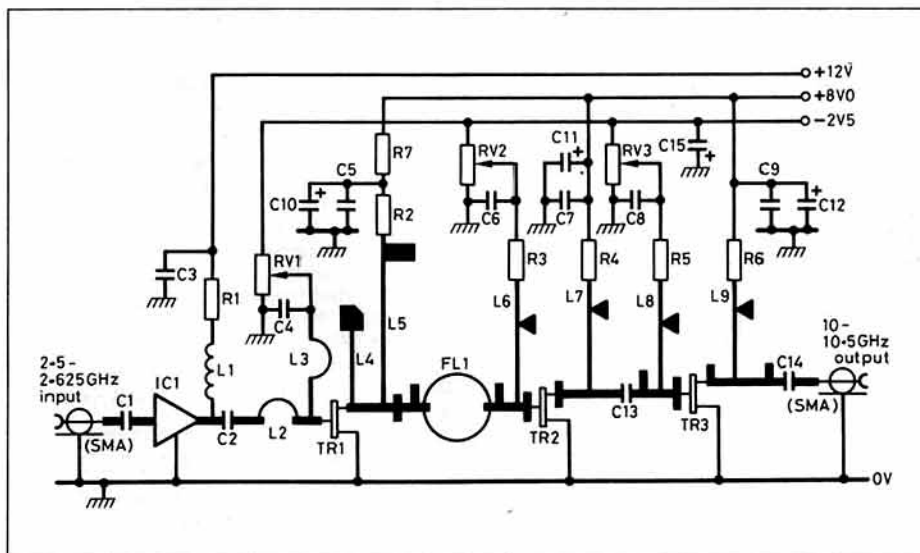
Fig 2 Output spectrum, 3-22GHz, showing the very low levels of sub-harmonics and harmonics. The rising noise level is due to the spectrum analyser, not the multiplier! Drive source G4DDK-004 at +10dBm.

Fig 3 "Close-in" view of the output spectrum showing the clean output from the G3WDG-001 design when driven by the G4DDK-004 source.

correct harmonic, and both input and filtered output are coupled by means of PCB-pin probes.

GaAsFETs F2 and F3 form a cascaded two-stage amplifier yielding about 20dB gain. The operating points of the devices are set by means of two more pots, RV2 and RV3. Output is taken off the drain line of F3 by means of a capacitor.

Mentioned in this column earlier this year, the design has now been fully proved by a number of 'test-persons' (of varying ability) constructing the design and ironing out the few minor problems also mentioned earlier. It was my first real attempt to use GaAsFETs and PCB techniques at such frequencies and I must say I was pleasantly surprised at how relatively easy it was to build and align such equipment, even though a good deal of care and attention to detail is needed for success: the designers (and testers) have put in a lot of hard work to arrive at this state of affairs. Reproducibility was one of the main criteria, and a reproducible design it has so far proved to be - provided you are careful about what you do and how you do it. The methods and order of construction are vital ingredients, as are the specified components. Full details are given in the comprehensive 20-page booklet which is part of the kit. Other items in the kit are two boards, the main PTFE RF board and a small fibreglass PCB for the regulator and voltage inverter circuits, silver-plated resonator, circuit pins and all the other critical components: not included are the ordinary, easily obtained components and FETs. Please see the regular lists for availability/cost. [Turn to page 78 for details of this and other Microwave Components Service items - Ed].





OCTOBER TRADITIONALLY marks the beginning of the winter DX season. It also brings the start of a busy period on the bands where many contests and activity periods can be entered. Assuming that the peak of the current sunspot cycle has been reached - there is some debate - conditions on the amateur bands should be maintained. The 28MHz band should still be capable of some very good DX, as should the more dependable 21 and 14MHz bands. As we head towards the end of the year, conditions on the LF bands - 7 and 3.5MHz - should get better. Some would say that 7MHz cannot get much better, with a never ending list of good DX heard every month so far this year. It will also be hoped that 1.8MHz will provide a little more in the way of DX this season, because very little to speak of was available last term.

Moving onto contests, Dave Lawley, G4BUO, is the new HFCC Chairman, and he along with the rest of the Committee really hope that more listeners will be encouraged to participate in this season's round of contests. There have never been too many entries to these contests, but the current decline in participation is in urgent need of some fresh blood. I have said many times in the past that entering a contest will only improve a listener's outlook on the amateur scene, but the number of people entering still does not inspire any of us with confidence that the decline has been arrested. As a way of attracting greater participation, the Committee are currently looking at a new set of rules for listener contests. They should appear soon and everyone hopes that they will help encourage a few more listeners to try their hand at contests. While on the subject of contests, the VHFCC opened all of their contests this year to listeners, but participation is, so I understand, still poor.

Why is it that listeners in the British Isles are not supporting these events? If YOU have a theory, write and let me know and I will see that both the HFCC and VHFCC get your comments.

HF CHALLENGE

MY INITIATIVE for the last few years to stimulate interest in contest activity at about this time of the year has been to organise an "HF Challenge". This runs during the weekends of the CQ World-wide DX Contest at the end of this and next month. I am always quite pleased with the number of entries received for this event, and I hope that this year's event will be no different. For those newer members who fancy trying their hand, and for the more established among us who support it every year, the rules are reproduced below.

This is the seventh year of the Challenge, the idea of which is to attract SWLs to listen to the bands during either leg of these big DX

contests, and provide me with a log of what they have heard. There are always in excess of 100 different countries to be heard during these contest weekends and it will be good this year to have a separate challenge to see who logs the most countries over the 24 hours. This will be open to any SWL or amateur on a heard basis.

Now for the main rules. The SSB Challenge will be held on the weekend of 27 and 28 October. The CW Challenge will be held on 24 and 25 November. Both events run for 48 hours. The idea is to log as many countries as possible. Only one station from each DXCC country can be logged on each of the six bands. Entries may be single band or multi band, but not both. Each different country heard on each band will count for points, viz

- countries in the SWL's own continent count 1 point on 28, 21 and 14MHz, 2 points on 7 and 3.5MHz and 3 on 1.8MHz.
- countries outside the SWL's own continent count 3 points on 28, 21 and 14MHz, 5 on 7 and 3.5MHz, and 10 points on 1.8MHz.

The final score is calculated by - single band entries: total points should be added together and multiplied by the number of DXCC countries heard; - multiband entries: the total points from each band should be added together and multiplied by the total number of DXCC countries heard on each band.

Entries must either be on standard size log sheets and written legibly in ink, or on computer generated log sheets with 40 entries to a page. A multiplier check list showing the countries heard in alphabetical order MUST accompany each log.

Entries must show the full call sign of the station heard, the station being worked, and the time and signal strength of the station heard. To avoid 'dubious' loggings, there is a minimum acceptable report of 44 on SSB and 449 on CW. Logs should be sent to me at the above address. They should be postmarked no later than 20 November for the SSB leg, and 18 December for the CW leg. I hope the event will be well supported. If there are at least 20 logs for each "leg", there will be a prize.

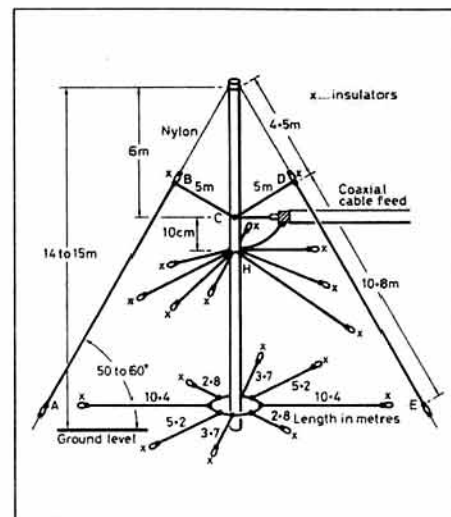
UM8MK "MDX" ANTENNA SYSTEM

WITH GRATEFUL THANKS to G3VLX who did the translation, here is an antenna from the Soviet Union which, I suspect, not many listeners have heard of. If anyone tries it out, let me know how it performs, but it looks a little unweildy and, as you will see, calls for a lot of patience and a few helpers to assist in the getting it in place.

The UM8MK is a dx antenna complete with matching. It has three components: the upper section which is centre fed by coax; the middle set of radials; and the counterpoise at the base. The upper section is M shaped, and the centre part of this acts as a halfwave dipole on 14MHz. The points B and D are 6m apart. The elements in the middle section are connected to the cable braid which is separated by 10cm. The elements point in the direction of the two outer legs of the M, and their lengths are cut to resonate on 28, 21, 14 and 7MHz. The actual lengths are 2.6, 3.55, 5.1 and 10.25m. The antenna is 16-18m, if 7MHz is to be included. It can be omitted and the antenna is reduced to 12m. Conversely, 3.5 and even 1.8MHz can be covered if the

dimensions are increased proportionately.

The counterpoise is not connected to the mast. A metal roof can be used as a counterpoise with wire radials in any number, distributed round the circle and parallel to the roof. The centre of the coax feeder is connected to the point C; the braid is bonded to the mast at point H in the middle. Tuning is by adjusting the lengths of the outer legs of the M, and the inner section. The middle set of radials should be adjusted at the same time, beginning with the lowest frequency band. It is desirable to isolate point H from the mast while adjustments are being made.



The mast (which should be metallic) does not have to be isolated [we presume this means from the ground].

THE GX PREFIX.

LISTENERS WILL know from the July *Radcom* that Clubs and Societies are able to use the special "GX" prefix (in England) to enable non-licensed people to pass greetings messages to other stations within the UK, USA, Canada and the Falkland Islands (full details, including prefixes for Wales, Scotland etc, are on p6 of July *RadCom*).

Doug Waterfield wrote with his account of his first time on the air. He used the Vale of Evesham Club station on 3 June to pass greetings to G3CPT on 7MHz. He wonders if he might have been the first SWL to take advantage of this facility. His opinion is that the special concession is an excellent step, and his Club has had correspondence from a number of SWLs who wish to know more. One in particular has said he will study the RAE as a direct result of this new concession. Have any other listeners taken advantage of the GX prefix yet. Write and let me know which stations you have spoken to.

FINALE

TO CLOSE, a reminder that the Society's annual 21/28MHz SSB Contest takes place on Sunday 14 October, and the 21MHz CW contest is on 21 October. Also during the month is Jamboree on the Air - on 20/21 - when there is a good opportunity for non-licensed people to pass greetings messages using the special prefixes.

News and other items (including shack photographs please) for the December issue, should be received here no later than 9 October.

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HF NFD Report - continued from page 11

PHOTOGRAPH G3JNB



Thames Valley ARTS, G3TVS/P with the right sort of transport for a field day. Is that a loaded whip on the left of the engine? L to r GODAS, G3GHS, G3JIP, G3ENI, G3LHN, G3OGP, and G3LQP.

PHOTOGRAPH G3RVM



Racal Amateur Radio Club; G3RAC/P. L to r (seated) G4CXT, G3PGM, G3YGR, (standing) G4FRE, G1JAJ, G3TZO.

PHOTOGRAPH G8WAS



G4HRC/P in the field.

It is no coincidence that despite the differing locations, Triple A being just outside London close to the M25/M3 junction and Marple located some 180 miles North on the Yorks/Lancs border near Todmorden, the two groups had almost identical scores on three bands (1.8, 7 and 28MHz), were within 1.5% of each other on combined 3.5 and 21MHz scores, and only differed on high scoring 14MHz by an amount which gave Triple A the edge this year.

ANALYSIS

An analysis of the 363 operator's callsigns listed provides some interesting information. There were 177 G3 and before. That is, licences issued up to 1971. 124 G4+3 licensed between 1971 to 1984, and 62 G0s licensed from 1985 onwards. It is encouraging to note that there are plenty of G4+3s to move over into the top places with a good reserve of G0s to follow.

What is, perhaps, slightly disappointing is that only 2 G0 callsigns were among 70 operators listed in the top 20 Open section entries. One hopes that this is not an indication of the lack of competitive spirit in the newer generation of Amateur Radio operators, because it is just this spirit which drives the hobby, whether it be contesting, DXing or any of the other many facets. Maybe the younger element is missing.

LOG KEEPING

The presentation of logs has improved considerably over the last few years and the HF Contests committee welcome this. It always seems such a waste that after so much effort is expended in organising and operating a Field Day station, points are lost through poor administration after the event.

Abbreviated logging is perfectly acceptable in order to save time and effort. A four-digit time need not be recorded for each contact provided that the hour is written for the first and last contact on each page, and for each change of hour or band. Similarly, a note on the band cover sheet saying "Assume all reports are 599 unless otherwise stated" would alleviate having to write the report for each contact. In fact, this helps to highlight non-599 reports. It is also accepted practice to

correct transcription errors. That is, callsigns known to have either been copied wrongly or to have been written down incorrectly. For example, G0AAA logged on one band with a high score would indicate a possible portable station and it should be easy to check through the other band logs to find G0AAA/P. The original error could then be rectified.

Computer logging eases the problems and several pieces of software are now available. K1EA's CT is a sophisticated real-time system mainly for use with the big CQ and ARRL contests, although it can be adapted for other events.

G3ULT/P used a new program developed by G3WGV, one of the operators. LOG is again a real-time system but specifically written for RSGB HF and VHF contests. The quality of logs produced was excellent.

LOG is also the name of a program compiled by Duncan Monro, not licensed but the son of G4KGG. The documentation provided with the software is very professional and duplicate checks are carried out as callsigns are entered.

Duncan has also submitted a suggested standard for the Data Interchange of Contest Log Information and this will be most useful for future HFCC consideration. Several groups have enquired whether submission of logs on diskette is acceptable and whilst it is not at present, we are beginning to investigate the possibilities.

RULE CHANGES

I requested comments on the proposed change to the scoring system to allow a multiplier to be used. There was a most emphatic "NO" to any major change in the existing rules and apologies are in order for ruffling so many feathers. It just goes to show how popular Field Day is.

IN CONCLUSION

Time and space has once again limited the contents of this report. Writing about computer logging did little to ease the pain of re-composing and re-keying two thirds of it, having erased the initial article by accident without

NATIONAL FIELD DAY 1990 - RESULTS

RESTRICTED SECTION

Psn	Call	Group	QSOs	1.8	3.5	7	14	21	28	Total
1	G0AAA/P	THREE A'S CG	1044	1112	611	794	884	452	766	4619
2	G3VMW/P	MARPLE CC	1034	1132	505	811	844	543	752	4587
3	G3GRS/P	GRAVESEND RS	958	1100	634	855	722	382	632	4325
4	G5BK/P	CHELTHAM ARS	964	712	572	715	974	290	806	4069
5	GW8GT/P	RED DRAGON CG	997	880	510	819	926	252	616	4003
6	G4FRS/P	FARNBOROUGH & DRS	727	740	476	783	503	189	502	3193
7	G3TMA/P	LINCOLNSHIRE POACHERS CG	741	856	304	751	605	192	436	3144
8	G6UQ/P	STOCKPORT RS	660	968	399	437	480	269	536	3089
9	G3GLL/P	TOLLESBURY CG	711	704	454	602	510	389	320	2979
10	G3WSC/P	CRAWLEY ARC	647	792	521	823	376	100	330	2942
11	G4BRA/P	BRACKNELL ARC	696	606	436	872	408	226	310	2858
12	G4FOX/P	MELTON MOWBRAY ARS	594	876	265	548	340	275	518	2822
13	G3ZME/P	TELFORD & DARS	639	584	356	783	522	142	404	2791
14	G3TRF/P	MAIDSTONE YMCA ARS	599	664	318	528	484	229	566	2789
15	G4ADM/P	SUTTON & CHEAM RS	646	812	419	682	392	154	296	2755
16	G4AYM/P	GLOUCESTER ARS	603	782	281	686	440	195	326	2710
17	GM3BSQ/P	ABERDEEN ARS 'A'	660	624	409	589	727	248	68	2665
18	G0FDX/P	CENTRAL LANCS ARC	550	766	275	433	357	267	480	2578
19	G3TVS/P	THAMES VALLEY ARS	565	670	326	400	574	196	380	2546
20	G5LKP/P	REIGATE ATS	595	472	212	458	625	310	434	2511
21	G4CRA/P	COLCHESTER RA	582	458	404	840	331	104	356	2493
22	G3CAR/P	CHILTERN ARC	511	898	222	544	376	22	350	2412
23	G3FVA/P	SOUTH MANCHESTER RC	574	528	397	508	546	67	348	2394
24	GW4CC/P	SWANSEA ARS	537	658	327	398	490	149	336	2358
25	G3DIT/P	SOUTH HANTS TS	592	316	456	740	513	214	74	2313
26	GM3ULG/P	GLENROTHES & DARC 'B'	487	860	408	266	508	35	224	2301
27	G4ARN/P	NORFOLK ARC	568	296	221	716	484	179	336	2232
28	G3RSC/P	ROYAL SUTTON COLDFIELD RS	587	424	765	372	184	440	2185	2185
29	G0CEL/P	TORBAY ARS 'B'	558	338	195	775	500	150	176	2134
30	GM3NIG/P	WINDY YETT CG	504	554	323	545	471	201	2094	2094
31	G8GG/P	BLACKPOOL & FYLDE ARG	423	574	399	382	178	205	332	2070
32	G0FBB/P	WINDMILL CG	443	478	280	552	158	98	408	1974
33	G4HRC/P	HAVERING RC	507	456	36	806	583	79	92	1888
34	G4WSM/P	WESTON SUPER MARE RC	450	376	254	604	370	192	312	1822
35	G3WKS/P	WEST KENT ARS	435	290	644	389	187	145	12	1746
36	G4FUH/P	SCUNTHORPE ARC 'B'	495	428	694	467	145	12	1746	1746
37	G4C0U/P	STUMBLE CG	499	340	608	433	197	162	1740	1679
38	G4ECT/P	CHESHUNT & DARC	532	291	626	443	307	12	1614	1576
39	G4SJM/P	RIPON & DARS	367	264	209	421	199	203	318	1466
40	G4PGW/P	NORTH DEVON BINDER TWINE CG	309	566	88	450	153	95	224	1302
41	G4BLI/P	PLYMOUTH RC 'B'	415	335	306	485	256	84	1466	1297
42	G3CMH/P	YEOVIL ARC	317	456	80	490	274	2	290	1268
43	G4JS/P	DARWEN ARC	334	309	344	223	131	290	1251	1143
44	G3HJ/P	VERULAM 'C'	291	216	99	431	108	82	332	827
45	GM3VEY/P	ABERDEEN ARS 'B'	359	146	715	212	130	48	742	567
46	G3GXI/P	ECCLES & DARS	351		1143					
47	G0BRC/P	BREDHURST RATS	280		827					
48	G8CA/P	AXE VALE ARC	170	176	24	339	147	56		
49	G4GZQ/P	G4GZQ CG	114			146	123	298		

OPEN SECTION

Psn	Call	Group	QSOs	1.8	3.5	7	14	21	28	Total
1	G3VER/P	VERULAM 'A'	1032	984	607	952	698	468	774	4483
2	G4ALE/P	ADDISCOMBE ARC	1017	930	380	821	1064	406	526	4127
3	G3RAC/P	RACAL ARG	995	894	379	812	946	530	554	4115
4	G3NJA/P	TORBAY ARS 'A'	991	780	568	743	1027	428	476	4022
5	G4FNL/P	DOWNS CG	930	888	471	626	940	451	442	3818
6	G5LO/P	OXFORD & DARS	906	866	368	602	1009	417	502	3764
7	G3ULT/P	READING & DARC	822	926	531	602	621	293	724	3697
8	G3PRC/P	PLYMOUTH RC 'A'	899	810	430	868	742	429	392	3671
9	G3ZRS/P	HULL CG	874	902	361	705	835	351	508	3662
10	G3WAS/P	LICHFIELD ARS	805	836	513	687	563	411	560	3570
11	G3SFG/P	SOUTHGATE ARC 'A'	860	850	392	700	696	409	512	3559
12	G3TBC/P	EAST NOTTS CG	790	1000	448	588	530	383	558	3507
13	G3UJV/P	VERULAM 'B'	720	970	488	811	321	150	648	3388
14	G3PDL/P	SCUNTHORPE ARC 'A'	818	862	382	493	692	484	432	3345
15	G3XRT/P	ILFORD RSGB GROUP	663	762	291	822	490	204	370	2939
16	G3ASR/P	EDGWARE & DRS	664	808	491	622	433	209	360	2923
17	G3CNX/P	GRIMSBY ARS	645	710	478	675	445	137	410	2855
18	GM0ADX/P	KILMARNOCK & LOUDON ARC	672	720	360	665	615	266	182	2808
19	G3YRC/P	GREAT YARMOUTH & DARC	570	800	295	676	385	136	482	2774
20	G3KUE/P	PRESTON ARS	605	864	466	590	471	61	296	2748
21	G4GCT/P	NORTH BRISTOL ARC	681	420	407	789	665	127	314	2722
22	G0MWT/P	CHELMSFORD ARS	613	776	252	784	504	28	268	2612
23	G3NWR/P	WIRRAL ARS	602	528	205	861	598	116	106	2414
24	G4BP/P	SCARBOROUGH ARS	506	734	201	644	399	145	282	2405
25	G4VRS/P	AYLESBURY VALE RS	494	806	315	459	350	144	288	2362
26	G3VGG/P	BROMSGROVE & DARC	590	356	333	587	574	28	472	2350
27	G3UES/P	ECHELDFORD ARS	516	104	673	466	91	146	680	2160
28	GM3ZRC/P	GREENOCK & DARC	520	276	262	600	513	100	376	2127
29	G5RS/P	GUILDFORD & DRS	539			802	684	172	456	2114
30	G4ATH/P	THORNTON CLEVELYS ARC	482	496	185	696	299	141	288	2105
31	G2LW/P	CRYSTAL PALACE & DRC	462	572	221	511	333	170	286	2093
32	G3SDC/P	LEICESTER POLY 'A'	673				2070			2070
33	G3NFC/P	BURTON & DRS	439	396	289	446	394	105	364	1994
34	G4AHG/P	SHIREHAMPTON ARC	422	820		1061		11		1892
35	GM4TMS/P	STIRLING & DARS	400	400	8	420	325	264	394	1811
36	G3WXX/P	MAIDENHEAD & DARC 'A'	282	970	134	94	54	53	472	1777
37	G6LX/P	SURREY RCC (CROYDON)	524				1678			1678
38	G4RSE/P	SEARS CG	415	324	177	356	279	211	270	1617
39	G3RII/P	LEICESTER POLY 'B'	486			1561				1561
40	G4EKT/P	HORNSEA ARC	344	460	42	548	184	69	256	1559
41	G3BSN/P	CLIFTON ARS 'B'	425			1398				1398
42	G5UM/P	LEICESTER RS 'A'	421			1255				1255
43	G3WGC/P	WELWYN HATFIELD ARC	344			1194				1194
44	G6AJ/P	BARNESLEY & DARC	310		28	734	346	4		1112
45	G3GHN/P	CLIFTON ARS 'A'	166					508		508
46	G3LRS/P	LEICESTER RS 'B'	163		441					441

back-up or hard copy. What a way to learn!

Once again my thanks to all those who gave words of encouragement, they are always appreciated. Band adjudicators were G4IQM, G3MCX, G3FKM, G3HCT, G3LET, G3KDB and G4JKS. Special thanks to G3UFY for collating checked scores and producing the final tabulations.

Field Day 91 is just a few months away, see you there.

COMMENTS FROM VHF CONTESTS COMMITTEE CHAIRMAN

OK so old windbag is spouting off again, but this time I think that I have got good reason.

My wife (G0ESO) and I have recently been doing some work on VHF Field Day entries and it appears that some contestants think that rules are to be bent if not ignored altogether. My intention is to ensure that everybody who enters a contest has just as much chance to win as the next person, in that I will endeavour to enforce the rules equally on all stations big and small, contestants who are members of VHFCC are always reminded of this and I have stated at committee meetings that VHFCC members have to be 'squeaky clean'. I was inspected myself during VHF Field Day.

The sort of things that I will not tolerate are blatant breaking of rules, such as:

Setting up of stations prior to 24 hours before contest start time. A disqualification offence.

Non registration of station. Disqualified.

Failure to meet posting deadline, two stations will be disqualified for this, one of them would have been in a high position, what a waste of effort!

Registering for one section and entering another, was this in error or a ploy, or is it that they just did not read the rules.

It is obvious that many organisers did not read the rules, and their groups will suffer the consequences.

Some computer printed logs were still left as continuous listing, this is bad enough but they could have at least got the pages to line up with the perforations. They will either lose points or maybe face disqualification for the band in question, a committee decision.

Some groups did not use a summary sheet, a disqualifying error.

Other groups did not even use a cover sheet for each band, also a disqualifying offence. (The station who sent in his cover sheets by separate letter is OK, entry accepted).

After more than seven hours working through the night sorting the entries into order, band, section, marking entries with serious errors, it becomes difficult to correct all the minor errors let alone the more serious ones. In general the entries were OK, but about 20% had minor errors, 10% serious errors that have or could cause disqualification.

Please gentlemen and XYLs after contesting for 24 hours wouldn't it be more satisfying to know that the entry had been submitted correctly, than to find that all your weekend had been to no avail. A full breakdown will be made after adjudication which takes place in the beginning of September.

G4DEZ

[Obviously the VHFCC Chairman has strong views on this subject. Members with similarly strong views on the use of disqualification are invited to write directly to Bryn Llewellyn, G4DEZ, 110 South Avenue, Southend, Essex, SS2 4HU. — Ed.]

RULES

LF CUMULATIVE CONTESTS 1991 RULES

1. General:

The principal aim of these events is to offer newcomers to contesting an opportunity to "get their feet wet". Old Sweats taking part (who are more than welcome, of course!) are asked to bear this in mind should they run across an operator who lacks their own confidence, experience and expertise. There are five sessions on each band, the best three of which will count. Each band is regarded as a separate contest, and entrants must operate from the same location for every session on a particular band.

2. Dates and Times:

1.8MHz - Mon 7 Jan, Tue 15 Jan, Wed 23 Jan, Thu 31 Jan, Fri 8 Feb. All sessions 2000 - 2200GMT.

3.5MHz - Sun 6 Jan, Sat 12 Jan, Sun 20 Jan, Sat 26 Jan, Sun 3 Feb. All sessions 1600 - 1800GMT.

7MHz - Sat 5 Jan, Sun 13 Jan, Sat 19 Jan, Sun 27 Jan, Sat 2 Feb. All sessions 1000 - 1200GMT.

3. Frequencies and Mode:

All contacts to be made between the limits 1835-1865, 3520-3550 and 7015-7040kHz, CW only.

4. Eligible entrants:

All entrants must be fully paid-up members of RSGB. Single-operator entries only will be accepted.

5. Contest Exchange:

Send RST + Serial Number, commencing with 001 for each session. Stations may be contacted world-wide, and may be worked once in each session for points. No points will be lost if a serial number cannot be obtained from non-participating stations.

6. Scoring:

Each completed contact scores 3 points. The total score for each contest is the sum of the best three sessions on that band. Duplicate contacts during any session must be clearly marked and not claimed for points. Any unmarked duplicate contact for which points have been claimed will be penalised 33 points.

7. Logs:

Use of RSGB HF Contest Log and Cover (Declaration) Sheets is preferred. Only one cover sheet is required for each band. (Samples of Log- and Cover-sheets have been printed in various RSGB publications, and may be copied for individual use. Larger quantities may be purchased from HQ. Anyone in difficulty is invited to write to G3UFY, QTHR, or any other HFCC member.) Computer-produced logs are welcomed if formatted to the above standard.

8. Address for Entries:

HF Contests Committee c/o G3MCX, 86 Peckham Road, London, SE15 5LQ.

9. Closing Date for Logs:

All entries must be postmarked no later than 25 February 1991.

10. Awards: Remember that each band is a separate contest! A Certificate of Merit will be awarded to the station with the highest score from the best three sessions on each band. Additionally, a Certificate of Merit will be awarded to the entrant having the highest aggregate score from all three contests combined.

The adjudicator would welcome checklogs from entrants (for their non-scoring sessions) and from SWLs and non-participants.

RESULTS

70 MHZ FIXED STATION CONTEST MARCH 1990

Lack of publicity in the form of specific rules, apart from a brief mention in Jan 1990 issue of *Radcom* did not help this contest, nor, combining it with the last 70MHz cumulative session. Apologies from all at the VFCC for the omissions and error. The entries were well down from the previous year, just like general activity on the VHF bands. Trying to put more contests in the years calendar obviously does not work. Radio conditions were modest with deep QSB and a noisy band. South of England stations G4RFR and G3NAQ managed CW contacts with GM4AFF for respectable distance QSOs. The latter station having 45 Watts of CW to a 7 El yagi. There were several stations out/p but obviously could not enter the contest. G8EIK/P checklog proved to be useful, thanks. Stations from G, GW, GM, GJ, GI were active. Congratulations to the Flight Refuelling ARS, G4RFR, in winning the open section and G3NAQ, the single operator section. Certificates also go to the runners up.

G8HHI

OTHER / MULTI OPERATOR SECTION.

POS	CALLSIGN	PTS	QSO's	MULT	LOC	BEST DX	KM
1	G4RFR	2398	74	43	IO90AS	GM4AFF	695
2	G4ZAP	12913	72	37	IO93DC	GJ1TJP	432
3	G4LNV	2970	33	22	IO91MK	G0EHV	391

SINGLE OPERATOR SECTION

1	G3NAQ	9207	49	33	IO91HL	GM4AFF	654
2	G3UKV	7650	49	30	IO82RR	GM4AFF	477
3	GM4AFF	1474	12	8	IO87VA	G4RFR	695
4	G4NKS	1035	17	15	IO81XU	G8ECI	225

432 MHZ FM CONTEST 1990

What a change from last year when only one station entered, we gave this contest another chance and it was worthwhile, although still not an overwhelming response. Conditions were average. Congratulations to GWOMGR/P and G4NVA/P. Note G1ATZ please use standard size forms in future, your little ones are quite sweet, but next time . . .

G4DEZ.

POS	CALLSIGN	PTS	QSO's	LOC	BEST DX	KM
1	GWOMGR/P	254	58	IO83JA	G1HWY	309
2	G4NVA/P	218	47	IO93EH	G1RPA	303
3	G1ATZ/P	97	41	IO93AD	GW6YDA/M	155
4	G5UM	67	21	IO92MP	GW6GXV/P	185
5	G4WYJ	43	21	IO91VL	GWOMGR/P	279
6	G0GZI	43	19	IO93AF	GW7GXV/P	134
7	G6FPX/P	29	19	IO83PI	GOMDO/P	92
8	G6WDO	22	8	IO91UR	G4NVA/P	22
9	G8DDY	5	5	IO90JP		37

Thanks for checklog G0CLP/P.

432 MHZ CW CONTEST

Very poor activity on this contest, and complaints about length of contest, time, poor activity and conditions. I may well be able to do something about the length and the time, VFCC will review those for next year, but over activity and conditions I am afraid that I really have no control! Congratulations to the winners and the runner up and to all those who persevered.

G4DEZ

POS	CALLSIGN	PTS	QSO's	LOC	BEST DX	KM
1	GW4MGR/P	288	36	IO83JA	PE1ALA	537
2	G0CLP/P	163	21	IO93AG	PA0WWM	494
3	G4BVP	96	12	IO82TD	PA0WWM	466
4	G4WKN	86	16	IO92OG	F6HSL	248
5	G4ERG	79	9	IO93SR	PE1ALA	375
6	G3ILO	32	6	IO81VQ	G4PIQ	224

CONTESTS CALENDAR
RSGB HF CONTESTS

30 Sept	DF National Final
4 Oct	2nd 28MHz Cumulative (Sep 90)
12 Oct	2nd 28MHz Cumulative (Sep 90)
14 Oct	21/28MHz Phone Contest (May 90)
21 Oct	21MHz CW Contest (May 90)
10 Nov	Club Calls Contest (Aug 90)
17 Nov	2nd 1.8MHz Contest (Sep 90) 1991
5 Jan	7MHz LF Cumulative (Oct 90)
6 Jan	3.5MHz LF Cumulative (Oct 90)
7 Jan	1.8MHz LF Cumulative (Oct 90)
12 Jan	3.5MHz LF Cumulative
13 Jan	7MHz LF Cumulative
15 Jan	1.8MHz LF Cumulative
19 Jan	7MHz LF Cumulative
20 Jan	3.5MHz LF Cumulative
23 Jan	1.8MHz LF Cumulative
26 Jan	3.5MHz LF Cumulative
27 Jan	7MHz LF Cumulative
31 Jan	1.8MHz LF Cumulative
2 Feb	7MHz LF Cumulative
3 Feb	3.5MHz LF Cumulative
8 Feb	1.8MHz LF Cumulative
23-24 Feb	7MHz CW Contest (Sep 90)

RSGB VHF CONTESTS

30 Sep	50MHz CW (Jun 90)
5 Oct	144MHz CW Cumulative
6,7 Oct	432MHz - 24GHz SWL & IARU (Aug 90)
7 Oct	10GHz Cumulatives (Jul 90)
9 Oct	1.3 & 2.3GHz Cumulatives (Aug 90)
17 Oct	432MHz Cumulatives (Aug 90)
21 Oct	70MHz CW (Aug 90)
25 Oct	1.3 & 2.3GHz Cumulatives
26 Oct	144MHz CW Cumulative
2 Nov	432MHz Cumulatives
3,4 Nov	144MHz CW 8-hr Marconi/RSGB (Aug 90)
10 Nov	1.3 & 2.3GHz Cumulatives
11 Nov	144MHz CW Cumulative
2 Dec	144MHz AFS/Fixed/SWL (Aug 90)
4 Dec	432MHz Cumulatives

There will be an SWL section in every VHF contest even if not mentioned in rules. Dates of publication of rules in *RadCom* are shown in parentheses.

SUMMER 1.8MHZ CONTEST

A comment from one entrant that - "a lot of Europeans - where were the G's?" does not seem to have been borne out by the very considerable increase in the number of UK and overseas stations who sent in entries this year. It was suggested that an earlier start and finish would be a good idea. Many feel that this is a friendly and enjoyable event but also that there seems to be a relative absence of G4 and G0 entries. How about more interest from the newer licensees next year?

G3FKM.

U.K. SECTION

Pos	Callsign	Score	Antenna
1	G3TBK	656	1/2 wave dipole at 75ft
2	G0NAA	642	Inverted-V at 85ft
3	G4HTD	622	1/2 wave dipole at 60ft
4	G3WGV	573	250ft doublet at 60ft
5	G4RFR	571	1/2 wave dipole at 55ft
6	G0IVZ	545	Butternut vertical
7	G4OGB	501	264ft doublet at 50ft
8	G3VYI	476	132ft c.f. at 35ft
9	G2MJ	470	260ft doublet at 40ft
10	G3YAJ	469	1/2 wave dipole
11	G4FRE	466	HF6V Butternut
12	G3JJG	457	1/4 wave inverted-vee
13	G2AFV	452	1/4 wave inverted vee
14	G3YLC	446	220ft c.f. at 45ft
15	G0JNZ	442	1/2 wave dipole
16	GM3NCS	436	Folded dipole at 47ft
17	G0IDE	424	40m loop
18	GM3UM	415	136ft end fed Zepp
19	GW3JI	412	Centre fed 150ft
20	G3MCX	407	264ft centre fed
21	G5MY	401	1/4 wave
22	G3OXC	396	Non-resonant dipole
23	G4ZCB	394	L.w. with counterpoise
24	G3JSR	349	132ft long wire
25	G3BPM	344	300ft long wire
26	G3KKQ/P	343	G5RV at 20ft
27	G3LIK	335	W3DZZ strapped
28	G3HKO	332	(Not stated)
29	G3GMS	313	60ft end fed at 30ft
30	G0CGB	292	50m doublet
31	G3GMM	265	1.8MHz inverted-vee
32	G4UZN	245	Long wire
33	G3ZRZ	214	Modified G5RV
34	GW3GWX	208	Half wave
35	G3ZBU	205	180ft end fed at 20ft
36	G4BUO	204	130ft inverted vee
37	G3ZGC	145	132ft wire
38	G3ILO	78	3.5MHz dipole

OVERSEAS SECTION

Pos	Callsign	Score	Antenna
1	E19FK	302	Inverted vee dipole
2	OK1KYY	284	2X41M corner dipole
3	YL2MB	232	Vertical dipole
4	ON4KLG	224	Long wire at 30ft
5	OH1TN	218	Vertical
6	OK3TWJ	217	Inverted vee
7	PA3AMA	175	Doublet
8	UV3DRU	165	Full wave at 50m
9	UC2RZ	141	Full wave
10	LA2UA	129	Long wire (80m)
11	ON4HX	126	Dipole
12	H89NL	116	(Not specified)
13	OM2BPG	65	40m long wire
14	UC2WCJ	48	Half wave sloper
15	UV3AFB	45	Full wave
16	RW6AF	43	Dipole
17	UB4IBF	24	Inverted vee
18	Y22PE	16	20m long wire

Check logs were received from G0AFH, GW4KVJ, UZ3DWX, Y39-15-B, Y39-16-B, and Y52-15-B to whom goes the HFCC's thanks.

continued from page 22

SWL

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

IT'S A TOSS OF THE COIN to decide where to begin this month. My trusty reporters tell me that HF has been good. 144MHz has produced some Sporadic-E, tropo and MS, and 50MHz has had a few good days too.

144MHZ:

MICK TOMS, BRS31976, provided a goodly list of DX which I had missed due to holidays in July. He caught a shortish Sporadic-E opening on 14 July, logging IW0BCF (JN61), IW8BZN (JN70), IW8BPA (JN70), IOUZF and IW0QLV (JN63). Following that, the 15th gave him some tropo to GM4IPK (IP90), HB9MY (JN47), OZ1KSW (JO56) and LA9JFA (JO59). The 21st provided a good tropo opening to the East when he logged SP1HLE (JO73), several Y2s, SP3RBF, SP2DDV (JO93) and OK5A. Mick remarks that the weekend of 14/15 July was one of the best of the year. The Es on the Saturday was late in the evening, the first stations heard were at 1940 and the last at 2020. He understands that ISO and 9H were also audible, but not at his QTH. GM4IPK was not too strong but had a monster pile up. Conditions were good throughout the day with HB9MY at 0847, EI6ARB/P at 1128, EJ3GE (Dalkey Island) at 1228 and Scandinavians from 2100. After that came the excitement of the Aurora on the 28th when he heard GM0BQM/P at 2305, followed by other GMS, GIs and OK2BXE/P, OZ5BU, OK1KQH/P, OZ1FM and LA8RV. Back to tropo, where he was pleased to be in the right place at the right time to log LA5JEA in JO18.

Moving on still further, Mick enjoyed himself with this year's Perseids Meteor Shower around 12 August. Activity started on the 3rd when he heard YU2CBE. This was followed by a new country in the shape of the Five Bells Group operating from Iceland on 4/5 August (IP03). His 40th country on 144MHz. However, the real excitement came around lunch time on the 12th when, suddenly, many signals were audible via Meteor Scatter from Scandinavia, a direction where many squares needed to be coloured in! He heard SM2CEW (KP15), LA0HY, SK3LH (JP93), SM5FRH (JO88),

SM7FWZ (JO77), OH1AF, SM7BOU, LA1K (JP53), SM2EKR (KP03), LA1JU, AND OH5LK (KP30). Other goodies heard were ES2RJ (KO29), SP2NCJ, ES2WX, HG3DX, HG7BT, OK2ZZ, HG2NP (JN97) and SP9EWU (JO90).

To add my own personal account, I was also pleased to have been "tipped off" that this year's peak was expected to be about lunch time on the 12th. My log also reads like 14MHz when it is wide open to Europe. I heard many of the Scandinavian stations which Mick heard, to boost the squares tally by six, but others heard included LA3BO (JO59), LA9ZV, EI8EF (JO54), OH2BZY (KP20), SM4HFI (JP70), SM0ERR (JO89), LA1JU, OE3OBC, YU1EV, IK1MTZ, I4YNO, 15JUX, HB9SKD, OE8HWQ, OK3LQ, G4PIQ/TF and HG5PT. If any reader can provide the squares of the following stations: OH1AF, LA1JU, HG3DX, HG7BT, HG5PT, SP2NCJ, SM7BOU, and ES2WX, we would both be most pleased.

1990 HF Table

Station	DXCC	28	21	14	7	3.5	1.8	Total
BRS25429	259	176	191	228	172	110	51	928
BRS8841	255	184	203	207	137	107	49	887
BRS25209	-	74	104	118	126	83	43	548
BRS1086	158	67	105	125	91	43	37	468
BRS25243	165	66	68	79	120	96	34	463
G1VDW	131	38	83	87	40	20	1	269
BRS32525	116	56	34	64	36	23	-	213
BRS40292	-	29	17	31	33	24	8	142
BRS92755	75	-	-	75	-	-	-	75

I still need more support for this table. How about an entry from YOU!

432MHZ

MICK PROVIDED me with something to say about this band for the first time for a very long time. He caught a good tropo opening on 2 August when he heard LA8AK (JO38), OZ1KLU (JO46), LA1YCA (JO38), LA9RAA (JO28), LA3DV (JO48), LA3VW (JO48), SM6OEQ (JO58), SM4KYN (JO79), AND LA9JFA (JO59).

70MHZ

THIS MONTH, we even have a mention of this band too. Mick logged GJ7DGJ/P (IN89), GD4IOM/P (IO74) AND GI4ONL (IO74) on 8 July.

50MHZ

FINALLY IN THE VHF spectrum, time for David Whitaker to update us on this band. He caught a few good openings on 11, 14, 15, 17, 20, 23, 25, 28 and 31 July and 1, 2, 4, 11 and 12 August. To put some detail on that, he heard 9H's, OH's, F, IT9 and ISO in a rather widespread opening on 17

July. The 25th produced PE1LAU/MM (JN12), IK1EGC (JN35), F/PA0IXN/MM and V51KC (JG77GI), while the 28th gave him some OEs, DLs, LAs and GMs via Aurora. From North of the Border he found GM0HBF, GM3UKV/P (Jura - 1075), GM0BPPY, GS0MVZ (the GM equivalent of GX - see my other column on page 57) and GM4CXP. The 31st gave him a new country in the shape of YO2IS (KN05) heard at 1819. The 2nd saw another widespread opening when David logged IK1LBW, SV1AB, OH2BC, DF1NP, OE8PTK, IS0AGY, FC1JUC and OZ4EM. The 12th added TF to the log - he was 57/9 in Harrogate - and IT9TVF (JM68). David's squares tally for this year on the band was 72 in 34 countries.

Your scribe was on holiday in July so the log is bare. 50MHz in August produced IK3PDA (JN65) on the 1st. The 2nd provided PE1LAU/MM (JN11), SM6HYG (JO58), SM0CHH/6 (JO57), OH0BNP - Aaland IS (KP00), SM7CMV (JO75),

countries (not me, I was on holiday!). The main ones being the expedition to 7O and T19. DL8CM/ZS1 from Penguin Is was also quite rare. He counts for a new island for the IOTA chasers, but there is just a hope that DXCC credit will be given, too! Let us take our customary look at what our reporters heard, starting with 28MHz. The band had been suffering a bit (like us humans in this heatwave of ours!), but there had been the occasional good opening, mainly to Africa. ZS8MI had been heard, together with the 7O8AA expedition. Other call signs noted were N3CRH/TJ, TK/PA3EBT/P, TR8JLD, DL8CM/ZS1, 5V7RF and 7Q7LA.

21MHz provided TI9US and the 7O8, but this appeared to have been carrying most of the DX during the time under review as most reporters mentioned a good many exotic call signs.

14MHz had provided some good DX, too, as you would expect. TI9CF, 3C1EA, 5U7NU and 7O8AA were mentioned. Other highlights noted were A43KM/0, FG4FF, KA3HMS/KH3, J39CO, DL8CM/ZS1, 4K4/EK9JG (Zapadnyy Kamennyy Is), 5H0C (Rosario Is) and 5Z4BI.

As you would expect for this time of year, the LF bands have not produced too many DX signals, but for those who are really keen on monitoring those frequencies there is always something of interest. 7MHz also came up with DL8CM/ZS1, as well as C56/ON7EH, FT5XA, PJ2/PA3CWQ, VP5JM, XT2BX, Y11BGD, ZD8BOB, 7O8AA who was very QRV on 7065KHz between 2000 and 2200, and 9V1OK; while 3.5MHz, although plagued with static crashes at this time of the year provided FR5DX, YC6KOS and 7P8DX. Robert Small BRS8841, Reg Akehurst BRS25209 and David Whitaker BRS25429 all mentioned 18MHz in their reports. Between them they heard DU1KK, FG5ED, FM5EJ, OA4CAN, OD5QX, S79MX, TA2/VE3NSK, TI5GLF, TI9CF, V29A, VP2EHF, VP5/W2AH, Z21CF, ZC4CZ and 5T5FA.

FINALE

MY REPORTERS seem to have done me proud this month with an enormous amount of detail about what has been on the various bands. I hope that even more listeners will write and let me know what they have been hearing on the bands, because that is what this column is all about. My deadline for the December issue is Monday 9 October, so please make sure I have your news in time.

HF REVIEW

AS I SAID in my opening remarks, the HF bands had been good, too. There was, of course, a brief spell when the Aurora, already mentioned, wiped the bands out completely. That apart, my contributors could not grumble. There were several expeditions to give everyone new

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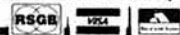
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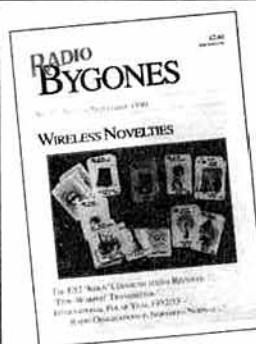
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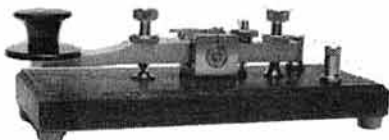
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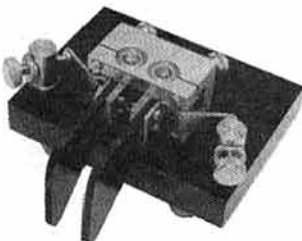
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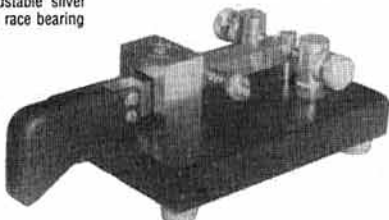
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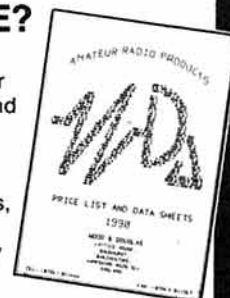
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Conditions of acceptance are published on the Members' Ad order form inserted into the wrapper with every issue of *Radio Communication* posted to members. This form must be used when placing an advertisement; and please note that FOR SALE, WANTED and EXCHANGE advertisements must not be mixed on the same form. A new, more flexible, pricing scheme has been introduced. Details are on the form. 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.

FOR SALE

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- 2M standard C5800 all-mode tcr, boxed, complete: £350 plus p+p. No offers. (Aldershot) 0252 25076 after 6pm or w/e.
- 3 bed semi det house, grge, 2 WCs, CH. Full aerial planning permission. Quite large outside shack. (Northwich) 0606 45584.
- 3 new 813, 2 new 4CX250B bases & chimney: £900.00. Swap TA33, G3MGW QTHR. (Brighton) 0206 302382.
- 4CX250B 2m linear 200W o/p: £1400.00. FT101E, good clean cond: £2500.00. G4WHX QTHR. (Holyhead, Gwynedd) 0407 764316 before 10am after 9.30pm.
- 530S Trio HF TX/RX, perfect cond: £550.00. Icom IC4SE 70cm FM 10W o/p, perfect cond: £190.00. G4LJZ. (Wells, Somerset) 0749 77250.
- 6146B: £484. General chemistry book: £10. LEO 6WPM 2.50 807: £164. Motorcycle helmet: £10. Valve boxes: £224. Gas burner: £2. (Barking) 081-594 8675.
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- 700CM h/p TR3600 c/w 12V adaptor, nicads, chgr: £150. Also TW4100 2m/70cm mobile: £350. John. (W Midlands) 0675 466083.
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- AUTO ant tuner, Icom AT150. Exc. cond: £1350.00. M-band HF vert ant plus radials: £450.00. G0GZJ QTHR. (Basingstoke) 0256 22591.
- AVO valve tester Mk2 with manual. Offers over: £10 please. G3PCA QTHR. (Ilford, Essex).

- BAROGRAPH by FCC England. Price now £495. As new with charts: £355. G3VXZ QTHR. (Maidenhead) 0628 27350.
- BEARCAT 200XLT scanner 29-956MHz. Cost £229, boxed, mint: £150. Kenwood Trio 2m 25W mobile TR7625, 144-146MHz. Also remote keypad, dig display. Good cond: £110 or swap both for FT101B etc. Chris G8FHN. (Chatham, Kent) 0634 849112.
- BEREAVEMENT causes sale of complete rig comprising Yaesu FT101/277, FR101D, FV101, Daiwa active filter AF606K, Joymatch, Asahi ME11N swr, Hi-mount HK704, Datong Morse tutor, Capco AMA3 magnetic loop ant, 13.8 PSU: Offers. View Kent or London, Taylor. 06272 853.
- BNOS 100W 2m linear, LPM144-3-100 with preamp, pwr meter. New, boxed with data: £150 incl carr. G1VCY QTHR. (Bentley, Essex) 0268 753508.
- BOURNEMOUTH QTH for sale. Queens Park, only yds from site of pre-war BBC 6BM, highest point in the area, 4 bed det house of some character, built around 1930. Well modernised, really exc. cond throughout. Fitted kitchen diner, 2 lounges, cloakroom, fully tiled bathroom, gas CH, wide drive, detached garage, nice gdns, plot size 120x40ft. Quiet area in both senses. Near golf course, shops, schools, short drive to sea. OIRO: £109,950. G8JUL QTHR. 0202 531867 eve.
- CAPCO aerial switching unit, model AS305. Latest 6-position relay switched model. Brand new, cost £64.95. Accept: £37. 0624 22342 eve.
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- COLLINS 7551 RX: £255. Eddystone 940 with spkr. mint: £150. Racal 1218 dig readout, G.C.R.X. filters. Mint: £395. G4LW QTHR. (Trowbridge) 0225 753166.
- COMPLETE HF station, TS130S HF tcr, AT130 ATU, DFC230 freq. controller, P530 PSU. Butternut HF6V ant. Orig. boxes, manuals etc: £700 or will exch for PC compatible with hard disk and colour monitor. G4FZA. (Milton Keynes) 0908 510570.
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- DATONG active ant AD3070 outdoor/indoor with PSU, control box, stainless steel ant: £40. Yaesu PA100 pwr unit FT775, believe can be used for other Yaesu rigs, new, boxed: £100. Mono monitor 13in tube, 14x13.25x15.25in. No burns: £20. Joystick ant with Joymatch 111B ATU: £20. Aerial tuning unit type 126 approx 5in sq by 10in deep. Roller coaster approx 55 turns by 2 3/8in dia, turns counter ammeter wartime model case. Needs repainting by insides VGC: £30. Starphone 433mhz stalled 433.375/434.975 repeater and 433.775 simplex. Approx 3W out. Lots of CCT gen QTHR: £35. (Towcester) 0327 52309.
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- DSB2 minisynth modules (Circuit), Homebrew DFM, all for 20m, built, tested: £40. 16le 2m yagi: £20. Chris, G4IOK QTHR. (Widney) 0993 704867.
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- FT101E with CW filter, mic, spkr, phones, h/book: £300. Mi-mount key HK704: £12. Books: RSGB H/book 3rd ed, ARRL H/book 28th ed, Radio Techniques 4th ed, Radio Data 5th ed, Remington TV Interference, Amateur World Atlas. The lot: £12. All items carr. paid. 031-556 3281.
- FT1012D, new cond, lam/fmc, new bands: £425 + carr. Scarab RTTY MPTU + l/fce tapes, inst: £50 + post. G6MHE QTHR. (Glasgow) 041-440 0223.
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- FT901DE, mint, FTV901 2m boxed, Daiwa auto ATU: £550. (Leicester) 0530 243669.
- FTONE exc. cond: £800. IC290H, exc. cond: £300. G3DKO QTHR. (Kings Lynn) 0760 23897.
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- HEATHERLITE Explorer HF linear amp, Eimac 2k3-500 valves: £750. Yaesu FT102 SSB 6-pole xtal filter, new in box: £20. Alan, G4YYD QTHR. (Bury, Lancs) 061-797 7893.
- HEATHKIT 10.18u scope: £40. Lionel Corp J36 bug: £35. Carr. extra. G3AUZ QTHR. 0909 473893.
- HEAVY duty telescopic tower by Hygain USA. 13ft stub mast, thrust bearing, top section same size and bottom section P60 not a toy: £450.00. Also 14MHz 3ele yagi by Wilson USA: £1000.00. G4XEX QTHR. (Stoke-on-Trent) 0538 754553.
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● HF 225 with FM and keypad: £375. Spectrum +3 and J&P Quark: £140. Kenwood 140S: £225. G2CKI QTHR. (Evesham) 0386 881155.

● HF linear 2x 813 separate EHT PSU milspec components, matching cabinets, tested, unused, trapped vert 10-15-20-30. Swr 1.2:1 throughout. Offers. GOGGI QTHR. (Kirkby-in-Furness) 0229 89635.

● HF5B Butternut 5-band compact butterfly beam, weight 19lbs: £135. G4MET QTHR. (Hereford) 0432 355297.

● HI-POWER 144MHz linear amp using a pair of 4CX250B valves, fully metered c/w PSU. Offers around £280. Yaesu FT290R, slightly scratched c/w chrg, s/case and 70W linear: £210. Tonna tele-scope galvanised mast with boxed and unused rotor. Only: £100. Rascal RA17 gen. cvr HF rcvr, exc. cond: £8000. (Wolverhampton) 0902 771909.

● HL2K hi-pwr amp: £95000. R2000 + VHF: £500. SEM noise bridge: £25. HFLPF filter: £10. Dual-band vert: £20. FT23, mic, spare batt: £190. 1/2 size GSRV + trap kit: £15. PCCGA card: £15. Mike, G3PQA not QTHR. (Fremington, N.Devon) 0271 24285.

● HOUSE move. FT101E, CW filter, spare valves, desk mic: £300. FT101 Mk2, FM, repeater shifts, toneburst, G3LLI DBM. New valves: £295. Both VGC. KW Vespa Mk2, spare PA Shure mic, perf. exc: £85. Swan 350, HF rcvr, manual, orig. packing, mic, exc: £175. Hammarlund HQ120 RX 540kHz-31MHz, perfect order: £65. Sharp MZ80K with WP, Machine Language, 3x games, manuals, tapes, printer: £100. FDK750E 2m multimode, m/mount, scanning mic, manual: £19500. G4JXK QTHR. (Fareham) 0329 230737.

● HP calculators, HP41CX, card reader, games, circuit analysis, advanced functions, maths and stats pacis: £160. HP1L Thinkjet printer: £90. HP28C: £60. Donald, GM10IN QTHR. (Edinburgh area) 0383 414283.

● HP41 calculator, card reader xfunctions quadmem plus s/ware and manuals. Also Tandy 100 disk drive and s/ware: Offers. G3ZLX QTHR. 0908 644244.

● HRO rcvr c/w org. PSU. 6 coils. Some bandspread: £48. Carr. paid. Also freq and voltage stabilised supply 240V/50Hz or 110V/60Hz in and either freq or voltage out. Ideal for running US equip. Ex-marine com unit: £50 carr. paid. (Haverfordwest) 0348 881346.

● HT transformers, 1730V CT 180mA 20lf, 1076V CT 525mA, 600V CT 600mA, 1400V CT 175mA 20lf, all 240V tapped up, commercial printed ratings, all: £100ea. Buyer must collect. G2HBQ. (Filteworth, Poulborough) 079882 626.

● ICOM 251E, Mutek, good cond: £400. BNOS LPM-100-100 linear: £100. May split or: £475 the pair. Terry, G6MND QTHR. (Biggleswade) 0767 316431.

● ICOM 255E 2m mobile: £140. Drae 6A PSU: £40. Yaesu FT727R: £325. AST Rampage for AT 2meg EEMS, populated: £500. Yaesu MH188 mic: £10. Yaesu E980 cable: £8. Himound HK702 key: £10. Advance sig gen: £110. (B4 0-70mc). XT 5.25 d/b black front: £40. Star NL10/C64 cable, manual: £10. Trio AT230: £135. (Evesham) 0386 74494 after Sept 23rd.

● ICOM 290D multimode, BNOS 12 PSU with 800 beam, mobile whip, rotor: £420. Buyer collects. G3CSE QTHR. (Welwyn Garden City) 0707 328831.

● ICOM 2KL linear with PS: £83000. Yaesu FTONE, all extras: £110000. (Radcliffe) 061-723 2607 not QTHR.

● ICOM 751A HF rcvr, mint cond: Offers. Might p/ exch. Looking for Kenwood TS790E or TR851E WHY. Malcolm GOHOG. (Ruislip) 0895 676919.

● ICOM 751A rcvr. Recent purchase. Never been used. Cost £1500. Accept: £1100. Dr. Adair. (Douglas, IOM) 0624 22342.

● ICOM IC32E dual-band h/h. Extended RF cov. 138-174MHz. 420-460MHz c/w 2x BP3 nicads and BP4 batt case: £250. Minolta Dynax 3000 camera body, 2mths old: £120000. Mark G6PMN. 071-236 8861 day 071-358 1287 eve.

● ICOM IC475H 70cm all mode base station, 75W, 500Hz CW filter, high stability xtal unit: £890. ICOM90E 70cm/10m mobile: £600. IC45E 70cm h/h, case, spkr/mic: £190. IC04E 70cm h/h, case, spkr/mic: £170. AOR AR2002 scanner 25-550MHz, 800-1300MHz, PSU, telescopic aerial: £300. All one. Bruce, G4WVX not QTHR. (Bucks) 0628 664415 anytime.

● ICOM IC725, mic. V. little used only on 20 and 80m: £55000. GAUXG not QTHR. (Wokingham) 0734 734263 eve.

● ICOM IC7R70 RX with FM unit and CW filter: £350. AR2002: £325. Both exc. cond. boxed. Andrew, G8AXO QTHR. (Leiston) 0728 830462.

● ICOM R7000 with remote control and HF board installed. Little used: £725. Richard G4RHL. (Durham) 091-384 1840 day 091-584 6435 eve.

● JRC TX/RX superb: £695. Daiwa 30A PSU: £85. Zele Gem quad: £125. 44ft Alltron tower: £350. Yaesu 2000W PEP meter: £50. Shure 444D mic: £45. Yaesu lowpass filter 2KW: £20. Faulty K400A rotor: £50. G4SGV QTHR. (Redditch) 0527 545304.

● JVC GX59E video camera: £150. Icom IC02E h/h. Used: £160. FT290 Mk1, 10W Yaesu linear, m/mount etc: £250. MM 137MHz cvr: £20. G3LIV RTTY/AMTOR terminal unit with BBC programs: £30. 14ft and kitchen caravan: £300. Full details Chris, G4MXX QTHR. (St. Austell) 0726 850576.

● KR2RW 70cm linear, 2.2kW PSU: £325. Will split.

PSU's 13.8V/30A: £55. 13.8V/5A: £19. 70cm pwr splitters: £25. 2V 5AH lead acid rechargeable batts, 6 for: £9. Drums 256KX1 50N8, 8 for: £6.50. G4CRF not QTHR. (Aylesbury) 0296 714888.

● KENWOOD 9000 rcvr, little used. PS20 PSU, 7/8 whip aerial. New hand mic. Adonis head band V-type: £30500. Complete course of Morse records 1&2 with HMV portable record player: £20. Buyer collects. G2DGA. (Hungarton, Leicester) 053750 310.

● KENWOOD TS120S, VFO120: £400. Yaesu ATU FC102: £150. Kenwood filter YK88CN: £25. G4YRR QTHR. (Stoke-on-Trent) 0782 395017.

● KENWOOD TS430S and PS430 PSU, incl AM and narrow SSB filters: £72000. 60ft trailer-mounted heavy duty tower, similar Versatower. Takes large HF/VHF beams. Ideal field days, contest groups. May help circumvent planning problems? With head unit, cables, trailer lights, brand new tyres (worth £100). Genuine reason for sale; emigrating: £70000. Steve, G4JVG QTHR. (Reading) 0734 722538 eve-w/e.

● KENWOOD TS430S with YK88A AM filter, YK88C CW filter, YK88S SSB filter, FM430 FM unit, PS430 PSU: £700. GW8GPX QTHR. (Monmouth) 0600 2498.

● KENWOOD TS440S auto ATU built-in. Also MC60A desktop mic, PS430, SP430, built-in SSB narrow filter. All boxed as new. Not yet 6mths old. Transport for sale. Cost £1620 with receipt. First: £1250. Also 2-section lattice tilt tower, 40ft. Not yet assembled. Brand new with head bearing and all bolts: £500. Dave G1LBE. (Walsall) 0922 24329.

● KENWOOD TS530S, SSB filter, MC35S, 10m ant: £495. Kenwood TR751E + PSU: £475. GOMXH QTHR. (Bolton) 0204 852410.

● KENWOOD TS711E with VSC: £640. BNOS LPM 144-25-160: £180. Rotator MR750E, 2 motors: £180. Hi-mount brass key, HK802: £60. All above boxed and one. (Nottingham) 0509 852085.

● KENWOOD TS830S in exc. cond: £650. NEC (Tandy 100) laptop computer, ideal packet: £120. May p/exch TS830S for a good cond TS130S or IC730 plus cash. GM4UJZ QTHR. (Edinburgh) 031-331 2755.

● KENWOOD TS900 c/w PSU Super Rig: £50000. No time wasters please. Trio TS130V HF mobile rcvr: £330. Martin G3ZZS. (Plymouth) 0752 707550.

● KLM KT34A 4ele beam, as new: £295. Jaybeam 160e 2m beam: £25. As new. G3PUK QTHR. 061-553 3213.

● KW2000B matching PS, manual, dir diag, Shure 201 mic. Buyer collects and inspects: £210. G3UJE. (Portsmouth) 0705 377528.

● KW2000B PSU, manual plus spare valves: £140. Yaesu YD148 dual impedance desk mic: £25. Wood & Douglas 2m 30W linear and preamp, built from kit, suit FT290 or similar: £25. G0LWG not QTHR. (Grimsby) 0472 352842 after 6pm or w/e.

● LCL CB rcvr converted 10m FM. Circuit squelch board, AMSAT preamp c/w manual, mic, boxed. VGC: £40. Faulty 70W amp: Free. G3WPO Antennalab dig RF wattmeter, RadCom Aug 83. Peak/RMS, FWD/REV, VSWR. Construction complete, cased, unused, needs wiring. Use ext dig voltmeter indicator: £35. Books "Radio & TV Servicing" hard backs, 7vols 1953-59. Nostalgic, all for: £7. All plus post. G3ISD QTHR. (Sittingbourne) 0795 477431.

● LEGALLY CONVERTED 10m multimode exc. CB. VGC. £80 G0KSB (Telford) 0952 243839.

● LET'S be sensible. FT101B: £150. KW1000 HF amp: £200. Drae s/can rcvr: £150. KW monitor-scope: £50. FT7 HF TX 10W: £150. Matching PA FL110 100W plus: £75. Daiwa auto ant tuner 200W: £65. G4CXB QTHR. (Iver) 0753 652933.

● LUXURY upper ground floor flat. Quiet aspect, 20yds from beautiful River Blythe. Butternut HFV ant on roof, debugged and working. QTH Solihull, W.Midlands. G0NBO. 021-704 9689.

● MATCHING h/holds TR2600 (2m), TR3600E (70cm) with prof built base-stand, P/U and 70cm linear 10W Trio spkr/mic SM30, nicads, chrgs. Very neat, flexible unit. Exc. cond: £350 for the complete station. Also Trio 2600/3600E accs D26 DC/DC cvr: £10. BT3 dry batt case: £5. MS1 mobile stand, chrg and P/U: £20. Accs free if complete station bought. Diablo 630ECS daisy-wheel printer, cable, manual: £125. Rithay's sheffielder for Diablo, manual: £75. Take both: £150 plus carr. costs. Good cond. (Warrington) 0925 73600.

● METEOSAT weather sat station. UMW frame store. 1.5m dish. Dartcom 1.7/137 cvr. 6ch scanning rcvr. Buyer collects: £260. G4KWH QTHR. (Bedford) 0234 56139.

● MICRODOT II. RTTY/CW terminal. Mains powered, TX/RX, fully self-contained unit, built-in 4in green screen monitor, Qwerty keyboard and all switching. As new, boxed, insds, connecting leads: £195. Oscar 2m 7/8 wave mobile ant & coax, boxed: £8. G4WABT. (Llandudno) 0492 78107.

● MINISCRIIBE 40MB 40MS hard disk, controller, cables, insds. Unused, packing still sealed: £165. 4CX250 4m PA easy mods to 6/2 incl blowers. PSU part built, all components: £50. Old Thunders record deck with heavy cast platter: £40. Offers, p/x WHY? (Bridgend) 0656 665225.

● NEW Era Microreaver MkII Morse decoder. New, unused, boxed: £125000. (London, W9) 071-625 9238.

● PANASONIC DR49 RX, LWMW/VHF/FM, plus 8 SW bands, 150kHz-30MHz, digital display, with h/book. S/manual: £150 or may p/exch base scanner or PRO2004/5. AR2001/2 etc. Buyer collects or pays carr. Ian G7GVN. (Millom, Cumbria) 0229 77305 after 5pm.

● PC compatible laptop computer Tandy model 1400L T, 2x 3.5in disk drives, with new nicads and carry bag: £680. FT290R 2m multimode: £210. FT709 70cm h/h: £145. FT203 2m h/h: £110. Mutek

6m tvr 28MHz input: £120. M/M 70MHz 100W linear with preamp: £95. Sectional mast, approx 45ft, in carry boxes: £75. Mesh dish 6ft dia: £45. 23cm dipole dishes for dish: £45. 432MHz 21ele tonna, VGC: £26. 70MHz 6ele beam, well used: £9. Star NL10 printer with 3 spare ribbons: £95. Dressler ARA30 QTHR, as new: £95. John, G4BVE QTHR. (Cheshire) 0606 48880.

● PLESSEY 155G solid state 30-band V-powerful rcvr, built like tank: £275. (Southall, Middx) 081-571 5759.

● PRO2021 prog scanner 200ch. Almost new, 68-512MHz: £15000. (Warrington) 0925 73800.

● PYE MX296 432MHz 40ch FM mobile with CTCSS and Selcal. As new: £85. Uther tape recorder 4400, report stereo IC multispeed 4tr c/w accs. Hardly used: £160. 1GHz RF voltmeter, v.sensitive. Marconi TF2604, as new: £40. (Northampton) 0604 862803.

● QRT sale of 2m equip incl 50W amp/preamp: £45. Leson desk mic: £25. Rotator, brkts and approx 60ft UR67 cable: £42. 9ele tonna ant: £16. Sele yagi ant: £12. Colinear ant: £18. All items in Vb. Will accept: £135 for the lot or reasonable offers considered. Steve, G1OXY QTHR. (Abingdon) 0235 531169.

● QSY to 6m for some real DX! Complete station, all in mint boxed cond, comprising Yaesu FT690 MkII, 15W linear, 5ele tonna. Cost over £500 in Feb: £350 the lot or would consider swap for wind-up tilt down mast. Maryn G1FOF. (Wimbledon) 071-735 0511 day 081-543 5357 eve.

● RADCOMS 1967, 1969-77, 1980-88. Some bound vols: £8000. Buyer collects or could deliver. G3YUW QTHR. (Delamere) 0606 888277.

● RADIO and Television Servicing 1967-68, 68-69, 69-70: £50ea or £12 all 3 plus post. Sony colour camera FM41640P semi-pro, with case, accs, service manual, extension cable. VGC: £220. G6AQC QTHR. (Oxford) 0865 243634 after 7pm.

● RADIO Shack dot matrix printer, as new. Ideal data modes: £60. RX400 telecopier, 4-speeds, clean cond: £35. 100m 8-core screened as RS367-476: £25. 100m 12-core as RS367-612: £30. Both rated 1A RMS/core. Mitsubishi cathode ray tube type ST1419-LBW2 14in, new. Offers. All items post extra at cost. G0ARF QTHR. (Leominster) 05447 350.

● ROTATOR CDE heavy duty on base mounting. Buyer collects only. G3BDH QTHR. (Ilford) 081-554 8012.

● SEM ORM Eliminator: £40, exc. cond. Springline reverb amp attractively boxed, Maplin PCB, int PSU: £25. Homebrew PI network ATU: £10. M/M 28MHz-144MHz rcvr, virtually unused: £75. All items plus post or collect. Mark. (Gillingham, Kent) 0634 30822.

● SHACK clearance. Labgear LG50, Heathkit RA1, Maplin RF sig gen. Make me an offer. Buyer collects. G4BZT QTHR. (Chester) 0244 351357.

● SHACK clearance. RASCAL RA17L: £175. Marconi TF144H sig gen: £80. TF104B VVM: £50. DFM 250MHz: £45. H/B 160m TX: £35. H/B 80/20 cvr: £50. 2m Cambridge: £30. 10.7MHz multimode IF board: £25. Swr/pwr meter: £20. LCR bridge: £15. Xtal calibrator: £20. Solatron scope, faulty: £10. Pye A200 70MHz linears: £200ea. ERD pwr meter: £10. 25A PSU: £25. 5A dual O/P PSU: £10. Dozens of components, valves, boxes etc: £20 or: £600 the lot. G4UFG QTHR. (Walsall) 0922 33979.

● SHORT wave rcvr. Tandy model DX300 10-30MHz cont. Dig display. Exc. cond. Good starter RX: £80. Dave G3ZOL. (Reading) 0734 352777.

● SILENT key G3HRO sale. FT757GXII: £900. FT757HD: £175. FL2100 linear amp: £450. FC301 ATU: £100. IC2E: £100. Atlas 180 HF rcvr 1.8-14megs: £250. FT101E, VGC: £300. FT23R 2m FM: £250. Buyer collects. G4IPF QTHR. (Bromley) 081-462 3209.

● SINCLAIR portable scope SC110 c/w nicads, chrg and X10 probe. Offered at under 1/2 price: £95. (St. Helens) 0744 51814.

● SM220 Kenwood station monitor with BS5 pan adaptor, pan gratulate, manual, leads. Little used, mint cond: £285. Will deliver within 50 miles or carr. extra. GWAZXG QTHR. (Bridgend) 0656 653585.

● SMC connectors, new, free plugs, bulkhead cable jacks: 60p. Panel sockets, PCB jacks: £50p. 12in plug-plug leads: 1.1. G8NEY. (Corsham) 0225 810138.

● SOLD FT901. Spares for sale. Valves new. RCA 6146B: £100ea. Genuine NEC 12BY7A: £15ea. FT901 service manual plus set of service extender boards: £25. AEA computer patch with RS232 port: £30. All plus p+p. G3OZA QTHR. (Corsham) 0249 712986.

● SPECTRUM 48k plus Datalocorder. Both boxed, as new with RTTY/TX/RX, SSTV TX/RX. Plus CW/AMTOR/RTTY/SSTV RX progs, filter: £80. CAD scanner cvr tune 100-160MHz to RX 0-60MHz. Brand new: £30. Amstrad 10m FM: £30. G6MBVF QTHR. (nr. Lockerbie) 05763 494.

● SRX30 rcvr. Offers. CP6128 mono many expansion bits: Sensible offers. G4RGA QTHR. (Taunton) 0823 664911.

● Standard C500, chrg, nicad pack: £250. Homebrew HF ant tuner: £25. 081-886 0126 day.

● TEKTRONIX 535A with type-LA plug-in: £100. Types E/R/L plug-ins: £30ea. P6010, P6011, and P6006 probes: £25ea. Solatron CD1400 scope with CX1448 plug-in: £80. CX1443 plug-in: £20. CD1400 with 2x CX1441 for spares: £40. Teleguide ServiceScope S51E: £30. HF freq meter 536A: £30. Eddystone 880/4 with spares: £50. Pye Westminster: £25. 8080 dev system comprises: CPV, RAM, I/O, Prom, Prom prog and extender card: £100. Lots of precision and standard components available incl cables, resistors, caps, relays, pots, semis and other equip. All prices ono. Jamie. (Stonehouse) 0453 824123.

● TEN-TEC Argonaut 515, audio filter, AC PSU: £325. Ten-Tec ATU/swr: £50. Kenwood Goldline. T599S, R599S, DG5 dig readout, 2m/4m cvtrs, 500Hz filter, matching VLF. Super HF twns: £375. 4CX250B valves (ITT), new, boxed: £50ea. Navy Morse key, large: £20. Rascal 5MHz xtal oven: £50ea. Rascal RA218 15B adaptor: £30. RA137A VLF adaptor: £40. Rascal 32MHz counter: £35. G3MBN QTHR. (Bath) 0225 810621.

● TEN-TEC Argosy II rcvr with matching PSU: £495. Icom 245E 2m multimode: £200. Icom 24G 2m FM: £100. Trio R2000 gen. cov RX: £375. Yaesu FTV107R tvr 2m and 70cm: £250. Dig readout module for FRG7: £25. G0MHQ QTHR. (Cambs) 0733 230088.

● TEST equip, Thandar portable 10MHz scope incl probe, chrg and case. Little used: £165. Fluke 75 multi-meter with rubber case and leads: £70. Philips PM5503 PAL TV pattern gen. RF/composite. Xchats, bars, greyscale etc: £60. G4JPK not QTHR. (Shepperton) 0932 788174.

● TEST gear clearance. Levell TG150DAF sig gen sin/sq: £20. Tech TM3A AC mVmeter: £15. Lyons pulse gen MP51: £25. Tech T20D RF sig gen: £20. Gould timer counter TC311 DC-10MHz: 6-digit: £25. Feedback TWG504 function gen sin/sq/triangle, ext sweep: £35. Amtron AF wattmeter 1.5/15W ranges: £10. Sabtronics 3.5LED bench multimeter with data hold probe: £12. Avo CT537 transistor/diode tester, suitcase type: £10. All with manuals, carr. extra. Resistance capacitance substitution boxes: £12ea £20 both. Avo valve characteristic meter Mk4, VGC, full connection table: £15. Buyer collects. (Merseyside) 051-426 3704.

● TOWER, winch up lattice, 3-section 12m high, head unit with bearing, 10ft 2in alloy pole, KC400RC rotor, 3ele T2335P tribander, 10m 1/2wave vert. All coax, all cable, buyer collects and will assist in dismantle: £50000. GOANC. 071-247 6097.

● TR2500 as new: £125. TR3500: £120. Mobile hold, incl chrg and PSU: £30. ST2 base unit: £35. Spare batts etc. G4TZB. (Manchester) 061-643 6116.

● TR9000 Trio with Mirage USA 30W amp H/B reg pack vert and halo ants, mobile fittings: £350. TR2600A 144MHz h/held 2x nicad packs, 120VAC chrg/240/120 transformer, Kenwood: £150. All had little use. Owner lives abroad. GW3JL. (Clwyd) 07456 89903.

● TRIO 599 HF rcvr. Fitted 2m and 6m vxtr modules. Good cond: £120000. Alan G1EBH. (Basilton) 0268 545573 after 6pm.

● TRIO R1000, VGC plus suitable ATU: £18000. Buyer collects. G3JJA QTHR. (Crews) 0270 69708.

● TRIO TH21E 2m portable with chrg, 2 rubber duck ants, s/case, operators & w/shop manuals: £100 + Carr. QTHR. (Barry) 0446 781261.

● TRIO TR2400 h/held 2m cvr h/c nicads, chrg, and orig. packing. One owner since new. Immac: £80. Ted, G6OGV QTHR. (Peterborough) 0733 370748 day 0733 66471 after 6pm.

● TRIO TS120V rcvr: £280. Kenwood AT130 ATU: £80. Yaesu FP80A PSU: £30. Kenwood MC500 mic: £30. Buyer collects, open to offers. (Cardiff) 0222 798340 after 6pm but not between 29 Sept and 7 Oct.

● TRIO TS830A c/w CW filter, mic, service manual, spare valves. Offered: £650. G4MYX QTHR. (Tadcaster, Yorks) 0937 832061.

● TS440S, ATU440, filters, warranty until 21-11-90. Mint, boxed. Prefer v/w collect: £900. Save £382. G3AXQ. (Wilsch) 0945 63555 1-2pm 6-7pm anyday.

● TS530S rcvr c/w filters 1.8kc and 500c/s. Digital VFO230 with mems and cross band wkg facility: £650. G3PTN QTHR. (Leeds) 0532 654644.

● TS530S, mint cond, orig. packing, manual: £400. FT690Mk1: £180. Strumeh Versatower c/w winch, ground post, 60ft: £275. G5YEK QTHR. (Penryn) 0326 73480.

● TS830S HF TX/RX, plus AT230 ATU, matched pair spare finals, integral PS: £850. G4OCH QTHR. (Brownhills) 0543 360372.

● TS940S fitted ATU. Low med. New and unused: £1495. (Leamington Spa) 0926 651772.

● UHF Europa, fitted RBO, toneburst, preamp, with mic: £45. UHF Europa unmodified: £25. PF2, fitted RBO, RB14, SU8, preamp: £20. PF2, SU8: £30. Pye 8-way chrg for PF2s: £20. FT202 chrg/PSU: £10. (Walsall) 0922 473492.

● VERSATOWER BP30 + rotator. GWO, buyer collect Bridgwater. Sota 100W 2m base amp. Pace Nightingale model. Various 2m/70cm base/mobile aerials. Other bits available. Offers considered for all above. Brian G4ETN. (Paulton) 0761 416288 after 6pm.

● VERSATOWER P40, head unit, auto-brake winches CDE rotator TH33JNR, 3ele beam: £600. FT2700 dual-band FM with duplexer and ant: £325. Uniden 2830 with 100W linear: £285. PRO2004 25-1300MHz scanner, no mods with rotary disc: £250. LCL 10m FM: £30. Hygain 18AVT 5-band vert ant: £85. JRC JT5125 superior HF rig, CW filter, matching spkr unit, hardly used: £800. Trio AT230: £135. (Letchworth) 0462 674437.

● WESTERN DX penetrator 3ele triband beam. Reasonable cond: £90. G4ZYO QTHR. 0670 811950.

● WM2000 printer 140cps, 9-pin head, bi-directional, logic seeking: £350vno. Ideal for packet. Buyer collects. G4PBE QTHR. (Bedford) 0234 64504.

● WS No. 19 MkIII complete station. TC512 TX/RX and PSU. WS No. 52 RX. Eddystone EB35 comms. RX. Pye h/held TX/RX 160MHz. PFI TX/RX and nightcall. Rascal TX/RX 1338. (New Malden) 081-949 2317.

● WW2 TX by STC for fleet air arm. 1.5-9.0MHz, VFO, xtal, sidetone, twin 807 PA, battery/mains powerpack, fully metered. KOF Vanguard TX kit 1.8-

MHz. Geloso VFO, 807 or 6146 PA, 19" lettered panel and cabinet. Nice club project. BC221-M meter as new. 2kW auto-tx by Healybeard, 2x120V p.a. 415-0-415V, 300mA powerpack, 17" chassis. Numerous HT and LT tx's. 0.5, 3.0 and 3.5A thermocouple hotwire meters, 19 set meters, 19" panels and chassis. Offers. Mensie, 14 Oakcroft Road, Loutham.

● YAESU FT757GX HF cvr c/w m/mount. Full SSB/AM/CW/FM modes and manuals. Little used, VGC. Reluctant sale. £5250.00. QRO HF linear amp Redifon 6139 1.5kW cont rating c/w manuals. V.hi quality. V.reliant sale, good home only: £550. No offers. G.WOGGW. (Bangor) 0248 600766.

● YAESU FT757GX HF cvr, FC757AT aut ant tuner. FC700 PSU. SP102 spkr, YM38 base mic and hand mic. All like new. Boxed: £775. G.OIKO QTHR. (NW London) 081-904 3282.

● YAESU FL2100B linear: £475. Yaesu FL101 TX: £200. Both v.lw mileage. Yaesu FRG8800: £500. New cond. GAFOF QTHR. (Hunstanton) 0485 532836.

● YAESU FL2100Z 1.2kW PEP linear, perfect, with operating manual: £450. FRB757 relay box: £8. Sinclair ZX Spectrum, with Timex printer: £65. Carr at 20, Strev, G.O.LRI QTHR. (Cheltenham) 0242 680248.

● YAESU FLDX400, FRDX400: £240pr. Nascorn 1: £12. Tandberg r-to-r tape deck 3041X: £15. Tektronix 545A scope: £100. G4AZO QTHR. (Woking) 0483 721649.

● YAESU FRG7700 little used. Inmac cond as new, boxed with manual: £250. Phil. (Scarborough) 0723 864499.

● YAESU FRG8800 RX, as new under guarantee: £525. FR17700 ATU: £35. Redifon GR410T SSB TRX with matching PSU: £90. Minolta 7000 autolens outfit incl databack, ER case, zoom lenses 28-70mm, 35-70mm, 70-210mm, flash, as new: £450. GINAX QTHR. (Plymouth) 0752 775375.

● YAESU FT101 HF SSB/AM/CW cvr. Looks brand new, mint, 80-10m: £265. 70ffers. GOFDV QTHR. (Dunstable) 0582 606173.

● YAESU FT101ZD AM fitted narrow CW filter. Inmac cond, boxed with manuals, c/w FC902 ATU. Best offer over: £550. secures. Marconi sig.gens FT144G, TF801: £30 the pair. G4MVS QTHR. (Sutton, Surrey) 081-844 8249.

● YAESU FT200 HF cvr covers 80-10m: £150. Hallcrafters S27 VHF cvr 27-144MHz: Offers. GOFDA QTHR. (Bognor Regis) 0243 586838.

● YAESU FT200, recently overhauled, new PA valves etc, c/w mains PSU and spkr: £245. G3UGL QTHR. 0234 750050.

● YAESU FT212RH 2m mobile, 45W, 6mths old. Multiple facilities: £200 below list £250. G3XFN. (Sutton Coldfield) 021-353 3364.

● YAESU FT224 2m FM 15ch. Ideal mobile rig: £50. G4MWN. (Milton Mowbray) 64678.

● YAESU FT225R 2m m/mode base, VGC, c/w leads, manual: £400.00. Chris. G7EYS QTHR. (Portsmouth) 0705 262383.

● YAESU FT225RD, Mutek board, mint cond: £500. Yaesu FT780R, good cond: £200. Tokyo HL160V linear: £150. KR500 elevation rotator: £95. Heathkit PEP pwr meter: £25. Mutek GMFA 144E masthead preamp, still boxed: £100. Weltz pwr meter 30-500MHz: £25. 9ele tonnas: £15. 21ele tonnas: £20. 4-way pwr splitter 70cm: £35. 4-way pwr splitter 2m: £35. Datong speech processor: £15. Gordon G8TPR not QTHR. (Harrow) 081-864 8261 anytime or 0831 354357 day Mon-Fri.

● YAESU FT290R Mutek F/E, nicads, chgr, c/w case, boxed, 35W linear, 5/8wave mobile ant, 5XY beam: £300.00. Or p/lexch HF rig WHY. G7ELJ QTHR. (Suffolk) 0449 781277 eve.

● YAESU FT290R, as new, never been used: £250. G3ZFZ QTHR. 0229 474147.

● YAESU FT480 2m 10W multimode: £230. MMT432/144 tvtr multimode 10W: £100. 2m 30W MML30 linear amp: £50. MTV435 ATU 10W TX: £100. MMC435 cvr ATU: £20. Pyle Lynx camera: £20. R Weston G0LIB QTHR. (Radstock, Bath) 0761 32857.

● YAESU FT707 100W, FP707 PSU, FC707 ATU: £550. G0HYT. (Sunbury-on-Thames) 0932 786395.

● YAESU FT707 HF cvr, 80-10m incl WARC with FM board: £350. Dave G0NL. (Stalybridge) 061-303 0409.

● YAESU FT73R 70cm h/h with FNB11 batt pack, 18mths old: £200. G1DRG QTHR. (York) 0904 421392.

● YAESU FT757GX II, unused: £710. KW1000 HF linear: £400. Mint YS60 swr/PEP meter, new: £65. HF5 vert, new: £45. Datong speech processor: £45. All items c/w h/bbooks, boxed. Mint cond. G4NG. QRT, GW3XCR not QTHR. (Swansea) 0792 816088.

● YAESU FT757GXII, FP757HD unused. Boxed with all manuals: £850.00. G1DDH QTHR. (Richmond, Yorks) 0748 850231.

● YAESU FT75B, with PSU, HF mobile, 50W. All bands. Working but laty, hence: £125. GONGG. (Stanford-le-Hope) 0375 670841.

● YAESU FT77 all options + FV707DM, both inmac: £430. TET HB35C tribander 5ele: £140. Versatower P40: £150. G0AYD. 09856 274.

● YAESU FT790 with 30W linear: £300. 70cm masthead preamp: £70. FT290R with 25W linear, extras: £300. Yaesu m/mount and powered base mount: Offers. 2m 25W linear: £60. Tono 435 thre'line pwr meter VHF/UHF: £80. Tonna 2m/70cm 9/1ele: £45. 2m 2ele ZL, amazing performance: £50. 2m cvr: £20. Weather satellite cvr 136-138 to 144-146: £45. BBC computer Teletext adaptor: £50. Sideways ROM board: £20. Modern 300/300 1200/75: £85. Various KEF spkr B139 etc. Offers. G8DOI. (Portsmouth) 0705 413430.

● YAESU FT902DM AM/FM filters, recent alignment, valves: £570. Carr.extra. 2m station. CTE h/ held matching 30W linear Hansen swr bridge, Jaybeam vert ant coax, inmac: £190. Daiwa NS680P pwr/swr meter, inmac: £95. Diamond D707 500kHz-1.5MHz active ant complete with PSU approx 20dB gain throughout, inmac: £70. Reason for sale, going QRT. John, G4YDM QTHR. (Washington) 091-416 2606.

● YAESU FT902DM HF cvr c/w SP901 matching spkr. VGC, brand new spare PA/driver valves, DC pwr lead, service manual: £575. Buyer collects or pays/arranges carr. G0DLF. (Northampton) 0604 831061.

● YAESU FT902DM: £450. FC902 ATU: £150. SP102 ex spkr: £35. Yaesu MD1 desk mic: £40. Squeeze electronic keyer: £50. G0EBS QTHR. (Tonbridge) 0732 351313.

● YAESU gear, orig.boxes, FRG7700 with ATU and VHF cvr: £270. Humphries G0LIE, 3 Abingdon Dr, Caversham Pk, Reading, RG4 0RU.

● YAESU noise cancelling mic: £20. Adonis AM503G compressor mic: £30. Dressler 2m masthead preamp with i/fac: £50. Model V200 GAAS. ZYXWV QTHR. (Halesowen) 0384 65614.

● YAESU FT902DM HF cvr c/w SP901 matching spkr. VGC, brand new spare PA/driver valves, DC pwr lead, service manual: £575. Buyer collects or pays/arranges carr. G0DLF. (Northampton) 0604 831061.

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Please state cond. G3DCE QTHR. (Weymouth) 0305 761156.

● BEG, buy, borrow manual, cir diag Drake SSR1 rcvr. Can copy, will pay post. G3AZW QTHR. (Trowbridge) 0225 752655.

● BIRD Thru-line modules and accs. Cushcraft HF and VHF aerials. Maybe p/lexch some of LP collection? 0467 25365 after 6pm.

● Celebration 6.5Xin elliptical spkr - fitted: reel-to-reels? Mark. (Gillingham, Kent) 0634 30822.

● COLLINS 5753 or 7533B rcvr. No mods, no drillings, in GWO. Your price paid. G0GGI QTHR. (Kirkby-in-Furness, Cumbria) 0229 89635.

● Dressler ARA30/1500 aerials. G8DOI. (Portsmouth) 0705 413430.

● EARLY wireless sets wanted. Also horn speakers, xtal sets, valves, clandestine radios. Any cond, will collect. Jim G4ERU, 5 Luther Rd, Winton, Bournemouth, Dorset. 0202 510400.

● ELECTRONIQUES gen.cov F/E Qokpax. Manuals to buy or copy for R210 and SE Labs SM111 scope. Tony. (Worcester) 0905 641759.

● ERA Microreader, Yaesu FC901, SP901 and YD148 mic. Also Yaesu YO901 multiscopes and similar scope monitor. Dave G7HWW. (Norwich) 0603 745512.

● EXTERNAL aerial leads to fit Motorola MX300 series. 2 leads req'd. Also batts to fit same. Tom, G4MIXZ QTHR. (Montrose) 0674 76503.

● FC757 auto ATU. G4YRR QTHR. (Stoke-on-Trent) 0782 395017.

● FC757AT inmac. Will pay £225. Steve, G0LRI QTHR.

● FILTERS for FT201 types XF90C and XF90B. Also VFO FV201 and pwr FTV650B. G4BZI QTHR. (Chester) 0244 351357.

● FT757DX HF linear amp 2100Z or 922 or similar. MFJ989C tuner or similar. 0704 880345.

● G1FAZ urgently seeks 5 Crookes Radiometers. Glass encapsulated device utilising solar/light heat source to rotate set of vanes. Usually/once sold in some shops/stores, but now it seems, extinct. Can you help me please? Chris Williams. (Birmingham) 021-236 8831 x2137 day 021-471 1860 eve-w/e.

● GRUNDIG reel-to-reel tape recorders particularly TK9 and TK12. Also horn loudspeakers and pre-1932 radios, incl xtal sets. Copies of Grundig tape recorder books and manuals. Mike G8CTJ. (Hincinck) 0455 250570 anytime.

● HELP to stop my KR600RC rotator monitor from going round in circles. Postage refunded. G4YZH QTHR. (Scunthorpe) 0724 732226.

● HP pwr heads L86A series, any considered. HP182T or 140T or 180T main frame. Plug-ins 8558B or 8559. HP leads connect HP342c meter to above heads mic attenuators. Mixers. Directional couplers. Microwave 1-18GHz preferably 10-18GHz SMA. Consider 20-24GHz 40-47GHz waveguide. Scope plug-ins 1821A and 1801A. Marconi FT 6055C 6056B 6058B, or 6158A 6155A 6156B. TF2337A distortion meter. TF2304 modulation meter. SMA cables flexible and semi-rigid transitions N WC16 SMA WC16. G3BNL QTHR. (Brackley) 0280 703512.

● ICOM 720A plus FM. Must be 1st class cond. Absolutely no faults. Ready to ship due to time wasters. G4UAX QTHR. (Banbury) 0295 250169.

● ICOM IC271E or similar. Hornsea ARC. Jeff. 0964 533331.

● ICOM IC9000 or AOR3000 comm rcvr. J.House, 4 Elizabeth Way, Kenilworth, Warks, CV8 1OP. 0926 54556 anytime.

● KENWOOD G3000 or Yaesu FRG8800 rcvr. Realistic price. G2CGX. (Luton) 0582 25519.

● KENWOOD SP940 spkr, HS5 phones. Morse key Edystone Sideswiper. Must be mint cond. Tony, G4KHT QTHR. (Hull) 0482 843457.

● KENWOOD TM721 2nd bander or standard 5200 50W version. Details of price and cond to Ray, G1YRS QTHR. (Bristol) 04545 2768.

● KENWOOD TS830S. Good price paid for rig in pristine cond and guaranteed in perfect WO. G0FDN. (Walthamstow) 081-521 1648.

● MORSE reader/sender tonna. Coadmaster. WHY? Please write. Am phone deaf. G2LV, Tower Park, South Molton, EX36 4EP. 07695 2495.

● NICAD batt pack NP6 or NP9 for Belcom LS202E. G4BLQ QTHR. 0484 431354.

● PAIR old low impedance diaphragm type phones. Must be split headband with narrow diameter ear-piece support rods. Old RAF type ideal. MTCE info on Grundig Satellit 1400 comms rcvr. Valved

comms rcvr with AM/SSB/FM capability. Near to QTH please, cannot travel far. G0JQV QTHR. 0530 243615.

● PRINTER for Commodore 64 up to £80. G1JGE QTHR. (Birtley) 4100305.

● PYE P5012 service manual to purchase or loan. G3KZU QTHR. (Oxford) 0865 63000.

● R1155N in GWO with PU etc. Also Pye MF5FM high band in spares cond (good coils. Bors, G7EML not QTHR. (Leeds) 0532 584903.

● RACAL linear amp TA940A or similar. Also Racal 1772 RX cond immaterial. WHY? G6XNC QTHR. (Bromley) 081-462 4461.

● SEM Transmatch. Prefer with Ezitune Mk2/3. G3CDC QTHR. (Notts) 0777 871062.

● TOKYO Hi-power HL160V. G6NWF not QTHR. (Birmingham) 021-471 3243.

● TRANSMITTER FL101 to complete 101 line-up. Must be in GWO. John, G7ELX QTHR. (Leeds) 0532 569294.

● TRIO ST2 base/chgr to suit TR2500 h/h. Also masthead preamp for 2m. Peter G7FWP. (Keighley) 0535 600500.

● VALVE radio 1920s xtal set, morse keys, sander. Early phone equip. Your price or see each ad. Also reqd Codar TX/RX. Must be good cond R1000 HWB. G4WJB. (Peterborough) 0733 43021.

● VLF unit for RA17. G4RGA QTHR. (Taunton) 0823 664911.

● WWII spy sets, also later models wanted or exch for German WWII equip. Write G.Huetter, Box 2129, D-8990 Lindau, W.Germany. 010 49 4223 2856.

● YAESU analogue clock. Must be in mint cond. G3AXK QTHR. (Ramsgate, Thanet) 0843 593546.

● YAESU FRG7(CR). Service and operating manuals to purchase or loan for copy. All expenses paid. G3XHM. (Rye, IOW) 0983 66607.

● YAESU FT730R UHF, Icom IC24G VHF cvr. Must in good cond c/w h/bbook. Mike Watson, G8CPH QTHR. (Ipswich) 0473 831448.

● YAESU FV102DM ext VFO wanted to complete line-up. Must be exc.cond. Will pay good price. G0HIW. (Devon) 05986 445.

EXCHANGE

● 10M mobiles, 40ch. Also multimode 120ch. Amp to suit both, approx 80W. Exch for best scanner or 2m/70m TX offered WHY. Neil G4SEN. (Congleton) 0260 275192.

● CAMERA gear, Nikon 35mm or medium format. Bronica, Mamiya, Rollei etc WHY? Have Kenwood 530S TX, VFO240, FC902 ATU, AMD Hemeq HM307 scope. Yaesu VHF TX 290R, ICR7000 RX with HF and remote controller, mint. Amstrad PC1512 30meg hard disk, colour monitor and DMP3000 printer. All boxed, manuals and in exc.cond. G4TWD. (Canterbury) 0227 463316 eve.

● DRAKE R4C, MS4, Shure 526T, Icom 1050 linear swr meter. Full mods. Metal lathe. IC24G, IC245E multimode. See wanted advert. G4WJB. (Peterborough) 0733 43021.

● FDK700EX 2m FM mobile 25-1W scan tone offsets etc. Exch for mint FT203R, TH21E, IC2E or similar h/h. Top controls only. (Brightlingsea) 020630 5851.

● FERRANTI AF3C and AF3 transformer wanted. Exch or good price offered. Litherland G4IMT. (Chippendale, Bath) 0225 891254.

● FT727R dual-band h/h, VGC, all accs for 2m multimode. G1JGE QTHR. (Birtley) 4100305.

● G4MH minibeam with fittings, small rotator all in good order, for 10/15/20m quality vert ant. Norman, G0IRK QTHR. (Surrey) 081-390 2650.

● TRIO R2000 RX 100kHz 30MHz fitted VHF cvr 118MHz 175MHz for FT290 or 2m TX/RX h/h. G7AAS QTHR. (London) 081-749 8530.

● TS830S inmac, CW filter, deluxe knob, mic, manual, boxed. Value £695. For IBM AT computer system. G0GUL QTHR. (Coventry) 0203 450476.



continued from page 55

A piece of equipment which complies with BS 6527 'B' limits could produce interference at certain VHF frequencies with a field strength of up to 30dBµV/m (31.6µV/m) at a distance of 10m. If this is a narrowband emission such as a clock harmonic which falls within a VHF amateur band, it would be a far from insignificant signal! On the 144MHz band, for example, a half wave dipole would give an open circuit EMF of 21µV in such a field, or about 10µV into 75Ω. This represents a power level of -88dBm at the receiver input (whether 50 or 75Ω). The 1990 IARU Region 1 conference (see June 90 *RadCom* p11) has defined S9 as -93dBm for 144MHz and above,

so -88dBm at the receiver input represents an S9 + 5dB signal! On 50MHz, the EMF from a half wave dipole would be 2.88 times larger (see *EMC Matters* April 90) and the interference signal power at the receiver input could be -79dBm.



SATELLITES

continued from page 53

at its best. It fulfilled several of the most important objects of amateur radio, viz., to demonstrate to the professional community that radio amateurs can contribute to the development of state of the art technology and techniques; to provide training by direct participation in order that radio amateurs can

acquire new skills and to stimulate the interest of young people in a worthwhile activity directed at encouraging them to pursue a technological career

CLUB NEWS

DEADLINE - Items for inclusion in the December 1990 issue must be sent to HQ marked "Club News - DIARY", to be received by 18 October latest. If news is received by the published deadline, it will 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.

ABERDEEN

■ Aberdeen ARS - 5, junk sale; 12, mini-lectures; 19, beginner's night; 26, talk "Novice Licence". Details 0224 780519.

AVON

■ Bristol RSGB Group - 29, AGM. Details Bristol 513573.
■ Gordano AR Group - 24, A/V Show, Quantocks & Mendips. Details 0272 853849.
■ South Bristol ARC - 3, computer and audio bring and buy; 10, ATV activity; 17, Home Brew bring and Display; 24, 2m CW activity evening. Details Whitchurch 832222.

BEDFORDSHIRE

■ Bedford & DARC - 2, talk "Etching"; 9, social; 16, talk "Double Sideband"; 23, AGM. Details 0234 26B443.
■ Dunstable Downs - 5, Constructors Contest; 19, Q & A evening; 2 Nov, junk sale. Details G1NWZ, QTHR.
■ Bedford & DARS - 11, talk "What's on 80?"; 18, junk sale; 1 Nov, talk "The New Oscars". Details 0767 80043.

BUCKINGHAMSHIRE

■ Aylesbury Vale RS - 3, Construction contest; 17, talk "EME Techniques on VHF and UHF"; 31, quiz at Chesham Club. Details 0280 817496.

CHESHIRE

■ Warrington ARC - 2, beginners night. Details 0928 715070.
■ Woodford (RATEC) - 1, talk "UFO Update"; 15, talk "IC Fabrication"; 29, talk "VHF Power Amplifiers". Details G4SFU, QTHR.

CLWYD

■ Delyn Radio Club - 9, Demo by equipment manufacturer; 23 Cheese & wine evening. Details 0244 819618.

CORNWALL

■ Cornish RAC - 9, Constructors workshop, Perranwell Village Hall.

CUMBRIA

■ Eden Valley RS - 25, talk "Satellite Communications". Details Culgaith 260.

DERBYSHIRE

■ Derby & DARS - 3, junk sale; 10, visit by Birketts of Lincoln; 17, talk "Small scale combined heat and power - making your own electricity"; 31, Halloween Cheese and wine. Details 0773 852475.

DEVON

■ Axe Vale ARC - 5, AGM; 2 Nov, talk "Trip to USA". Details G0GHH, QTHR.
■ Exeter ARS - 8, AGM. Details 0392 78710.

ESSEX

■ Chelmsford ARS - 2, AGM. Details 0245 260831.
■ Colchester Radio Amateurs - 11, AGM; 25, talk "The RSGB Morse Test". Details 0206 851189.

GREATER LONDON

■ Acton, Brentford & Chiswick RC - 16, VHF operating night.
■ Coulsdon ATS - 8, quiz v Sutton & Cheam RS. Details 081-684 0610.
■ Crystal Palace & DRC - 20, talk "Test Equipment and Filters". Details G3FZL, QTHR.
■ Edgware & DARS - 11, talk "Which Contest?"; 25, talk "Packet Radio". Details 081-205 1023.
■ Sutton & Cheam RS - 8, inter-club quiz v Coulsdon Club; 18, junk sale. Details G0BVW, QTHR.

GREATER MANCHESTER

■ Eccles & DARS - 2, talk "Sheffield Today". Details 061-773 7899.
■ South Manchester RC - 5, Contest preparation; 12, talk "Mass Spectrometer"; 26, talk "Cheshire Association Emergency Services". Details 061-969 1964.

HAMPSHIRE

■ Basingstoke ARC - 21, foxhunt. Details 0483 69440.
■ Horndean & DARC - 4, AGM. Details 0705 483676.

■ Itchen Valley RC - 12, talk "EMC"; 26, talk "Power Generation - past, present and future". Details 0703 736784.
■ Three Counties ARC - 24, talk "Techno-Thriller Writing". Details 0428 723415.

HEREFORD & WORCESTER

■ Bromsgrove ARS - 9, constructors fair; 23, talk "Microphones". Details 0527 503024.
■ Bromsgrove & DARC - 12, talk "Simple R.F. Measurements". Details 0527 33173.
■ Vale of Evesham RAC - 4, talk "Reliability". Details 0386 860202.

HERTFORDSHIRE

■ Cheshunt & DARC - 3, talk "Packet Radio" by Mike Dennison, G3XDV from RSGB HQ; 31, junk sale. Details 0992 464795.
■ Stevenage - 2, talk "Ham Radio Texas Style"; 9, talk "2m Wavemeters, HF Dummy Load, Low Pass Filters"; 16, talk "Satellites". Details 0438 724991.
■ Verulam ARC - 23, talk "GB2SM". Details 0923 262180.
■ Welwyn-Hatfield ARC - 5 Nov, Construction contest. Details 0707 324958.

HUMBERSIDE

■ Goole R&ES - 5, Visit from RSGB Council member; 12, junk sale; 19, visit to Leeds Weather Centre; 26, visit to local repeater site; 2 Nov, discussion "Contest Linear Design". Details Goole 769968.

ISLE OF WIGHT

■ Binstead ARS - surplus equipment auction first Monday each month; quiz night third Monday each month.

KENT

■ Bromley & DARS - 16, talk "Linear Amplifiers". Details 081-462 2689.
■ Maidstone YMCA ARS - 19, talk "PMR". Details 0622 676776.

LANCASHIRE

■ Fylde ARS - 11, talk "Clandestine Radio"; 8 Nov, equipment sale. Details 0772 635464.
■ Preston ARS - 4, talk "Kent Morse Keys"; 18, talk "Radio Test Equipment".

LEICESTERSHIRE

■ Leicester RS - 15, lecture, subject TBA; 22, preparations for Leicester Show; 29, RSGB Video. Details 0533 878561.

LINCOLNSHIRE

■ Lincoln SWC - 10, talk "HF Antennas and Feeder Systems" by Louis Varney, G5RV. Details G4SLG, QTHR.

LOTHIANS

■ Lothians Radio Society - 10, new member's night; 24, visit to Torness Power Station. Details GM4DTH, QTHR.
■ Telegraph RC - New club meets Longriggend each Tuesday 7.45pm. Details GM4LDU, QTHR.

NORFOLK

■ Fakenham ARC - 2, Moonbounce; 14, 6m activity station; 16, talk "Amateur Television". Details G8FTF, QTHR.
■ Norfolk ARC - 3, talk with Zonal Council member John Greenwell, G3AEZ; 7 Oct, Project Year at Hewett School; 10, talk "Science for All"; 24, talk "Towards a Cleaner Oscillator"; 31, debate "Who needs contests in amateur radio?"; Details 0362 850591.

NOTTINGHAMSHIRE

■ ARC of Nottingham - 4, activity; 11, construction evening; 18, foxhunt on foot; 25, talk "Satellites"; 1 Nov, talk "Using Oscilloscopes". Details 0602 733740.
■ GFT ARC - Now back after recent burglary. Meetings Thursdays, 8pm. Details 0602 226321.
■ Mansfield ARS - 4, talk "The History of Computers". Details 0623 755288.

POWYS

■ South Powys Radio Club - 2, AGM, plus talk "Panel Marking Techniques". Details 0874 84266.

SHROPSHIRE

■ Telford & DARS - 3, 50MHz night; 10, visit to Madley; 24, packet demo and talk on "Cycle 22"; 31, electronic egg race. Details Telford 616166.
■ Trowbridge & DARC - 5, talk "Mysteries of Wire Antennas". Details 0380 830383.

SOMERSET

■ Mid Somerset ARC - 5, fox hunt; 19, talk "Studio and Theatre Lighting". Details 0749 345975.
■ West Somerset ARC - 2, quiz night. Details 0884 31197.
■ Yeovil ARC - 4, talk "Design and use of an Absorption Wavemeter"; 11, bring and buy sale; 18, talk "Simple Radio Controls". Details 0935 28341.

SOUTH GLAMORGAN

■ Cardiff RSGB Group - 8, AGM. Details 0446 773212.

STAFFORDSHIRE

■ Stafford & DARS - 16, quiz; 23, JOTA debriefing; 30, construction evening. Details 0785 662350.

SUFFOLK

■ Felixstowe DARS - 1, talk "Do you know how fast its going?"; Details 0473 642595.
■ Ipswich RC - 10, Museum & JOTA planning; 31, talk "Solid State Devices". Details 0473 42072.

SURREY

■ Dorking & DARS - 15 to 20, Mole Valley Festival. Details 0306 77236.
■ Sutton & Cheam RS - 8, inter-club quiz; 18, junk sale. Details 081-644 9945.
■ Surrey Radio Contact Club - 1, surplus equipment sale. Details 081-647 9301.
■ Wimbledon & DARS - 12, surplus equipment sale; 26, AGM. Details 081-330 2703.

TAYSIDE

■ Dundee ARC - 9, AGM; 16, talk "Propagation"; 30, talk "Military Affiliate Radio System". Details GM4FSB, QTHR.

WARWICKSHIRE

■ Mid Warwickshire ARS - 9, talk and demo "Amateur Radio Computing"; 23, talk "Homebrew". Details Kenilworth 513073.
■ Stratford-Upon-Avon RS - 8, talk "Electrical Safety"; 22, talk "Region 1 and WARC'92". Details 0608 82495.

WEST MIDLANDS

■ Coventry ARS - 5, AGM; 19, talk "Packet Radio". Details 0203 523629.
■ Midland ARS - 16, AGM. Details 021 443 5157.
■ Solihull ARS - 18, AGM. Details 021-783 2996.
■ Stourbridge - 15, talk "Sound Recording". Details G0HTJ, QTHR.
■ Wolverhampton ARS - 9, JOTA pre-planning; 23, junk sale; 30, AGM. Details G4WAS, G6AKN, G4RVK, QTHR.

WEST YORKSHIRE

■ Keighley ARS - 9, Q & A evening; 30, junk sale. Details Bradford 496222.
■ Pontefract & DARS - 6, Raynet - Went Valley Hike; 11, talk "Phasing Transmitter"; 18, talk "Austrian Amateur Radio". Details 0977 792654.
■ Spen Valley ARS - 4, surplus sale; 18, ten pin bowling. Details 0274 875038.
■ Todmorden & DARS - 1, talk "Guess where I've been"; 15, video "Summits Burning". Details Halifax 882038.
■ White Rose RS - 3, auction; 17, talk "Interference Suppression". Details Leeds 435948.

WILTSHIRE

■ Trowbridge & DARC - 3, talk "BBC Wiltshire Sound and Data Systems". Details 0380 830383.

MOBILE RALLIES

This is a list of all rallies, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Rally News - DIARY'.

7 OCTOBER

■ Armagh & Dungannon DARC Annual Rally - Drumsill House Hotel, Moy Road, Armagh. Doors open 12 noon. Details from T.E. Hall, G10MSJ, tel: 0861 523454.
■ Blackwood AR Rally - Oakdale Community College, Blackwood, Gwent, NP2 0DT. Details from B. Matthews, GW0JWF.
■ Great Lumley Radio Rally - Community Centre, Great Lumley, Nr. Chester-le-Street, Co. Durham. Doors open 11 a.m. (10.30 for disabled visitors). Trading Stalls. Refreshments. Entrance fee 50p. Details from Barry, G1JDP, tel: 091 388 5936.
■ South Devon RC. Sixth Annual Ham Radio Computer Exhibition and Rally - Hillhead Campsite on the Dartmouth Road in Brixham. Doors open 10 a.m. Trade Stands. AR supplies. Bring & Buy. Raffle. Refreshments. Unlimited parking. Overnight camping. Car boot sale (weather permitting). Talk-in on S22 by G7FDC and G4SSD. SES GB4CPU. Details from 0803 5222116.

14 OCTOBER

■ ELHOEX Hamfest - Hornsea Floral Hall. Details from Jeff, G4IGY, tel: 0964 533331.

20/21 OCTOBER

■ 4th North Wales Radio Rally - Aberconway Centre, Llandudno. Doors open 11 a.m. on both days. Entrance fee £1, OAP's 50p, children under 14 free. 64 exhibitors and 163 stalls. Large bring & buy on the ground floor.

Details from B. Mee, GW7EXH, Anncoth, Hylas Lane, Rhuddlan, Clwyd, LL18 5AG, tel: 0745 591704.
21 OCTOBER
■ Blackmore Vale ARS Grand Sale. Charlton Musgrove Village Hall, near Wincanton, Somerset. 11am to 5pm. Talk in on S22. Details from Norman, G4YXX, tel: 0963 23389.

11 NOVEMBER

■ MARS Birmingham Mini Mobile Rally - Stockland Green Leisure Centre, Erdington, Birmingham. Details from Norman, G8BHE, tel: 021 422 9787.

17 NOVEMBER

■ Carrickfergus ARG Rally, Downside Community School, Downside Road, Carrickfergus, from mid-day to 4pm. Details 09603 66109.

18 NOVEMBER

■ Bridgend & DARC Annual Rally - Bridgend Recreational Centre. Details from Don, GW3RVG, tel: 0656 860434 after 5pm.
■ West Manchester RC Winter Rally at Bolton Sports and Exhibition Centre, Bolton. Details from Dave, G1IOO, tel: 0204 24104 (evenings only).

25 NOVEMBER

■ Bishop Auckland Radio Rally - Sunny Dale Leisure Centre, Shildon, Bishop Auckland, Co Durham. Details from Ernie, G4TYF, tel: 0388 607500.

20 JANUARY 1991

■ Oldham ARC Rally - Queen Elizabeth Hall, Civic Centre, Oldham. Details from Kathy, G4ZEP, tel: 061 624 7354.

9 DECEMBER

■ Leeds & DARS Christmas Rally, Civic Hall, Dawson's Corner, Pudsey. From 10.45am. Details 0532 585801.
■ Verulam Christmas Rally - Hatfield Polytechnic. 11am - 5pm. Details from Steve, tel: 0923 249456.

27 JANUARY 1991

■ University of Lancaster ARS & Central Lancs ARC. The Lancaster Rally - Lancaster University. Details from Sue Griffin, G10HH, tel: 0524 64239 or Mike Sherlock, G4ZYN, tel: 0257 452287.

3 MARCH 1991

■ Welsh Mobile Rally - Barry Leisure Centre, off Holton Road, Barry. Details from Ceri, GW0JCB, tel: 0446 721304.

24 MARCH 1991

■ Pontefract & DARS Components Fair, Carleton Community Centre, Carleton, Pontefract. Details 0977 615549.

31 MARCH 1991

■ Centre of England Easter Amateur Radio Rally - Motorcycle Museum, Bickenhill, nr NEC Birmingham. Details from Frank Martin, G4UMF, tel: 0952 598173.

14 APRIL 1991

■ Trafford Rally "The Great Northern Rally" - G-Mex, The Greater Manchester Exhibition and Events Centre, City Centre, Manchester. Details from Graham Oldfield, G1UJK, tel: 061 748 9804.

9 JUNE 1991

■ 22nd Elvaston Castle Mobile Radio Rally - Elvaston Castle Country Park, near Derby. Details from John, G4PZY, tel: 0332 767994 - Trade enquiries to Peter, G3WUF, tel: 0332 700265 (evenings).

30 JUNE 1991

■ Longleat Amateur Radio Rally. Longleat House, near Warminster, Wiltshire. More details from Shaun, G8VPG, tel: 0225 873098.

29 SEPTEMBER 1991

■ Harlow AR&E Mobile Rally - Harlow Sports Centre. Details from - weekdays: Alf, G7FNY on 0279 418392; evenings & weekends: Mike, G7BNF on 0279 722569.

OTHER EVENTS

13 OCTOBER

■ RNARS Annual General Meeting - HMS Mercury, 2.30pm, followed by 30th Anniversary Dinner, Royal Sailors Home Club, Portsmouth. Information from G3JFF, QTHR, tel: 0705 593994.

26/27 OCTOBER

■ Leicester AR Show - Granby Halls, Leicester. Same format as last year with the two halls. Details from Frank, G4PDZ, tel: 0533 553293 or 871086.
■ RAF ARS Annual General Meeting - RAF Cosford. Further information from Warrant Officer M.J. Street; tel: Altrington 2393, extn 2472.

GB CALLS

The list below shows all special event stations listed for operation during this month and up to 8 November. It was taken from the HQ computer on 6 September. These call signs are valid for use from the date given but the period of operation may vary from 1-28 days.

27 SEPTEMBER

GB2UB U.O. Birmingham G0HVN
Guild of STDTs

28 SEPTEMBER

GB0BHS Beacon Hill Camp Site G4LKW
GB2COV Coventry Scout G4VVM
Training Centre
GB6ESC Wellington Country G1ZOV
Park
GB6GM Grounds of Moels Hall G6SX
GB0MDS Rosehill Park G4YZJ
GB2PG Abbotsford Nursing G0MHQF
Home

29 SEPTEMBER

GB0GFM The Scout HQ, Lower G3MGW
Recreation

1 OCTOBER

GB0CSR Civil Service Recreation G3XWX
Centr. G0LRI
GB5JL Brunel University G4KGM
GB2VSG Scout Hut, The Bay

6 OCTOBER

GB8CA "Leslyn" Milliken G0MORT
Park Road G0DHZ
GB0CDU Fort Cumberland G4IHO
GB4DOD Duron Brakelings G3LUC
GB0THS Timothy Hackworth G4LPX
GB4XXX Wernol Caravan Park

10 OCTOBER

GB4CPU Hill Head Camping G0CDB
GB7SST Ian Fraser House G3SEJ

12 OCTOBER

GB1CC Cottenham Race G8XSO
Course

14 OCTOBER

GB0GW CEFN BRYN GW0KPD

15 OCTOBER

GB4AWV Bangor Leisure G14OPH
Centre

17 OCTOBER

GB2AGS Hatfield Woodhouse G3KPU
Village

20 OCTOBER

GB2IRC Ipswich Museum G4IFF

3 NOVEMBER

GB8CA "Leslyn" Milliken Park G0MORT
Road G0DHZ
GB0CDL Lumps Fort G4MPG
GB2WMP North Birmingham

8 NOVEMBER

GB0WQD Grappenhall Youth & G3NFB
Community

JAMBOREE ON THE AIR 1990

This list of JOTA stations was, of necessity, compiled some weeks in advance of the event. For a complete list of JOTA stations send a large (A4 or larger) stamped addressed envelope to RSGB Headquarters, marked "JOTA LIST". JOTA is on 20/21 October.

GB0AND Ashington & G0FBH
Newbiggen Dist.
GB0BJS Burton Joyce Scouts, G6ZRV
GB0BSM Baden Powells Mob, G0LAG
GB0BSJ Benged Scout
GB0BSS Jamboree, G0JGV
Bolton-Le-Sand Scouts, G0NEL
GB0BST Bromsgrove Sixth Troop, G0IHT
GB0BTS Bourne Mouth Town G4WCK
Scouts, City Of Bradford
GB0CBS Scouts, G0ACX
GB0CSC Crawfordsburn Scouts, G14MDD
GB0DSR Dartmoor Scout Radio, G4UTX
GB0EKS Ekington Scout Group, G3RPQ
GB0FDS Farmborough District G0HNA
Scouts, Fifteenth Edware
GB0FES Scouts, G4UEM
GB0FFS First Fenny Scouts, G0EYZ
GB0FWW 1ST Wreham, G0FOO
GB0GD Wretton Scouts, G4YGU
Gravesham District,

GB0GSB Brightlingsea Scout G4EUW
Group, Horsham District
GB0HDS Scouts, G4LKW
GB0HSG Haverhill Scout Group, G3WQF
GB0KET Kettering District G4VKX
Scouts,
GB0MAS Machynlleth Air G3SON
Scouts, GW3SON
GB0MSJ Mexborough St John's, G4SDE
GB0MSW Merseyside Sefton G0MJG
West, G8VF
GB0MWW Middlewood Worsley, G0NWL
GB0NCS New Costessey Scouts, G4PMG
GB0OWH Chesham Road, G4LVR
GB0SGC Scout Groups Of G0LJD
Crewe, G0IZF
GB0SKS Strood Kent Scouts, G0AXU
GB0SOS S'bridge Oldswinford G4CFS
Scouts, G0IFM
GB0SP Saint Pauls, G0IBN
GB0SS Somerton Scouts, G7BPR
GB0SSS Stoney Stator Scouts, G1FMH
GB0TSG Tollesbury Scout Group, G1FCH
GB1BPM Baden Powells Mob, G7HCP
GB1FES Fifteenth Edware G6ZTD
Scouts, G8RMM
GB1NCS New Costessey Scouts, G8XSO
GB1PGS Pennine Group Scouts, G1EFL
GB1PSB Potton Scout Group, G4MLH
GB1SP 1st Southoe & G6INK
Buckden Scts, G3DDD
GB1SSA Skreens Park, G03IBU
Sunderland Scout G4GWF
Assoc., Blackburn Division
GB1SSA Sunderland Scout G0GSN
Assoc., G3VOA
GB1TV Triton Vandyck, G4ULD
GB20SG Orkney Scout Group, G0AGH
GB2ASG Astley Scouts and Guides, G0KNU
GB2BDS Blackburn Division G4YCA
Scouts, G3SBM
GB2BEL Belchamps Scout, G13YRL
GB2BG Berrylands Group, G4LVO
GB2BSG Blakedown Scout G0KDB
Group, East Birmingham
GB2CHI Chichester Scouts, G4B8T
GB2COS Chester Oldfield G4B8T
Scouts,
GB2CST Chalgrove Scout G4B8T
Group, St. Nicolas Scouts,
GB2CT Droitwich Scouts, G4B8T
GB2DS Denmead Scout G4B8T
Group,
GB2DSG East Birmingham
GB2EBS Scouts,

GB2FBS First Bugle Scouts, G4MXB
GB2FIN Finchamstead Scouts, G0EER
GB2FSS Faringdon & G0LCB
Scouts, G4TEU
GB2FTS First Timperley Scouts, G0JQZ
GB2GHS Glen Hills Scouts, GU0BG
GB2GU Guernsey, G4UDR
GB2HDS Halifax District Scouts, G3TAY
GB2HS Hertfordshire Scouts, G0HTM
GB2ILA Int. Listeners Assoc., GW4OXB
GB2JAM Jamboree At The G4UDR
Museum, 2nd Keith Cubs
GB2KCS Scouts, GM4YVR
GB2KIM 1st Kimbolton Group, G3XNB
GB2LGS Lickley Scout Group, G4QJS
GB2MRS Manx Scout Radio, G4OEL
GB2NFE New Forest East, G4SFB
GB2NWL North West London, G3TLU
GB2NWS North Wilts Scouts, G0GKH
GB2OS Osbalwick Scouts, G4KCT
GB2PGS Pennine Group Scouts, G0GSU
GB2PSG Potton Scout Group, G0AVZ
GB2RUB Rubery Scouts, G4IVJ
GB2SIB Scouts In Bisley, G0DBS
GB2SID Sidmouth, G3AQM
GB2SOM Scouts Of Mulbarton, G4VCE
GB2SPX Spixworth Scouts, G3VPT
GB2SSS Saint Saviours Scouts, G0JOP
GB2STR Stratton Scouts, G4EVE
GB2SWS Squirrel Wood Scouts, G3UWR
GB2UPG Upperby & P'teril G3MNL
Bank Gds, Watton At Stone
GB2WAS Scouts, G4FRV
GB2WCS West Craven Scouts, G3RRR
GB2WES West End Scouts, G4ORF
GB2WLS West Lancashire G4UOI
Scouts, G4MPG
GB2WMP West Midlands Police, G4SPV
GB2WP Weston Park, G3YBO
GB2WS Wingerworth Scouts, G4XBT
GB2WSG Wymondham Scouts G3YRL
& Guides, St. Colmans Scouts,
GB2YRL Avon Scout Communi- G4FFI/G0GZW
cations, G0MJQ
GB4BS Bodmin Scouts, G0NFA
GB4BSG Bentley Scout Group, G4IHO
GB4BUX Buxton, G0GQC
GB4BUS Boughton Village G0AHI
Scouts, Chelsfield Girl Guides, G0MIX
GB4CGB Cheshire Scouts, G0HOX
GB4CHV Chinnook Hercules G0BMG
Victor, Clapham Scout Group, GM4FLP
GB4CSG Dundee Area Scouts,

GB4DDS Dartmouth District G0JAA
Scouts, Devizes Scouts, G0JVF
GB4DS Eighth Alton Club, G0JMI
GB4EAC Evesham Scouts, G3UEY
GB4EVE First Bishopham Scouts, G3GU
GB4FBS First Coulsdon Scouts, G6HC
GB4FCS First Marske, Redcar, G4OLK
GB4FNM Fleetwood Scouts, G0LRK
GB4FS Follins Scout Camp, G0NDG
GB4FSS First Stotfold Scouts, G4UKE
GB4FTS First Tiddington G0CCH
Scouts, Gwersylt Scout
GB4GSG Gwersylt Scout G3WHF
Group, Godfrey Village
GB4GVS Godfrey Village G4ZVA
Scouts, Haywards Heath
GB4HEX Hextable Scouts, G0NQB
GB4HXH Awards, G4WXX
GB4IS Ipplepen Scouts, G4FCN
GB4JOA Jamboree On Air, GW0BKJ
GB4JSS Jota Southport Scout, G6SX
GB4KLS King's Lynn Scouts, G0MQL
GB4KSG Kilton Scout Group, G4YQC
GB4MCS Metherton Club Scouts, G4MUY
GB4NCS North Corwelly G4YMYJ
Scouts, 91st Leicester Scouts, G3SIX
GB4NLS Old Deer Scouts, G3PIP
GB4ODS Parkwood Gillingham G4EGH
GB4PGS Scouts, Rainbow Brownies
GB4RBG Guides, G4XED
GB4SM South Manchester, G3WFW
GB4SSS Sleaford Scouts, G3RGO
GB4SSS St. Stevens Scouts, G4IEJ
GB4STB Sandy Scout Camp, G4MEO
Scout Troop Of G4YZJ
Brampton, Sulh'stead & Ufton
GB4SUN Nervet, G3KPV
GB4THT Third Hanworth Troop, G0GPT
GB4WDS Wheatley District G0LUO
Scouts, Weara Scout Group, G4DII
GB4WST Cheshire County G1NWA
GB6CHE Scouts, G0JEW
GB6RS Rugby Scouts, G4FOH
GB6TS Tarporley Scouts, G4ZPE
GB8BS Bincacre Scouts, G0CEN
GB8CS Clevedon Scouts, G0DSN
GB8FJ Fakenham Jamboree, G4SXX
GB8JAM Jamboree, Middlewood Worsley, G7ELA
GB8MWW Radio Scouts, G4YKA
GB8RS Skeg Sea Scouts, G1ONN
GB8SSS Willenhall Scouts, G0KRK



Eastbourne and District Scout Amateur Radio Group recently opened their new shack. L to R: Tony, G3ZQB, John Fogg, G3PHZ, Geoff, G4YJW, and operating the rig, Nick, G7GSC.

EASTBOURNE SCOUTS

Eastbourne and District Scout Amateur Radio Group's new shack was opened by John Fogg, G3PHZ, Scout Headquarters' Chief Public Relations Officer. An address was read out from the Chief Scout, W. Garth Morrison: "I was delighted to learn that the new amateur radio station at Bushy Wood is being opened on Monday 23 April 1990."

"Amateur Radio has an important role to play in the Scout training programme. It increases international awareness by helping Scouts from all round the world to communicate with each other. It also offers young people an opportunity to learn about modern technology."

"I am sure that the new facilities will be of great value not only to Scouts in Eastbourne and District, but also to the many visitors to the campsite."

Jamboree On The Air

20/21 October 1990

The Radio Society of Great Britain wishes all participating groups a successful JOTA.

the last...

EAST RIDING

I notice, with some regret, your new conditions concerning the more frequent use of 'county' names during contests. We who live in the bogus county of Humberside are not happy about repeating this loathsome and hated name hour after hour. Our true county name is the East Riding of Yorkshire, and has been for the last one thousand years, and you do not help our cause in getting it reinstated by perpetuating the disgusting name of Humberside.

In 1974 many other bogus county names sprung up which were seized upon by such as yourselves with consequences that have caused much resentment. I wonder you haven't noticed that your true address is in Middlesex.

I certainly will not take part in any future contests that insist on our club using HBS instead of E.Y.S., so please let us have our free counties back, the pre-1974 areas were much easier and simpler anyway.

Edward Ball, G4UZO

ADMIRALTY SCRAP

I think G3MNO (*The Last Word*, July 90) was not looking very hard for Government surplus in the days just after the war. Did he not hear of 'The Admiralty Scrap Scheme' organised by the RSGB? A party of us from the local Club went to the nearest centre, Glossop in our case, and there you had a choice of literally hundreds of components and valves, morse keys and even brand-new and boxed B28/CR100 Receivers, all at 55 shillings per cwt. We bought a B28 and a set of spare valves for just over £3.00 which included a 10 shilling "back hander" for the two chaps in charge of the stores.

A visit to the nearest Government surplus store in Sheffield provided type 1154 transmitters at £4.00 each. One of these provided the parts for the PA and the bits for the crystal oscillator, and doublers had been purchased earlier at Glossop. The only component lacking was the crystal and G2BH had a plentiful supply of old quartz spectacle lenses,

which he had not only donated but provided the necessary instructions to get them down to 3505 and 7028kc/s. My first station went on the air for less than £10.00, less than two weeks' wages, and clocked up 74 countries in the first year's probation on CW. Multiply this amount by 16.6, as G3MNO says, to bring it in line with today's prices and the answer is around £150.00 which would not buy much now.

Oh! For the good old days.

W D Heath, G3ABS

BAD TO VERSE

As I sat in my shack Sunday morning,
At peace with the world and at rest,
From my speaker without any warning
Came those dreaded words "CQ TEST".

The ether so recently peaceful
A bedlam of sound now becomes,
A jumble of letters and figures
As the boys are doing their sums.

Can this signal so weak here in Salop
Be really S9 to the mob,
Or has my receiver a problem,
I'd better try turning the knob.

Well it seems the whole spectrum's
affected,
From 80 through 20 to 10,
So I'll switch off my rig till tomorrow
And hope peace reigns once again.

Arthur Smith G4OKL

LF CHALLENGE

I am very pleased to read in September *Radio Communication* that there is planned a resurgence of interest in the world below 100kHz. How nice to hear these frequencies filled with CW after so many years.

How many of us, I wonder, will dust off that old rotary spark gap rig that hides on the top of the cupboard.

What will newcomers need? A modified disco amplifier and 5 miles of electric fence? Or a plug in the back of the hifi?

It will be a problem for all, as the last real VLF rig I saw used PA valves carried

on a luggage trolley, a lattice mast as wide as a church steeple and twice the height, with a curtain antenna corrected for varying wind loading by a bank of strain gauge controlled electric motors. Surely, chaps, there must be an easier way, lets see if we can find one.

Allan L Taylor, G3JMO

UNISEX FEES

With reference to the RAE and Morse classes which are now becoming available again this coming autumn, it should be noted that concessions on fees cannot now quote the term 'OAPs' because it discriminates between men and women. Using this criterion, men can only get concessions at age 65 whereas women can get them at 60 - this is discriminatory. Educational establishments must now state 'Over 60' or 'Senior Citizens'.

The law was changed in a test case fully reported in *The Times* of 15 June. It appears that Mr James and his wife from Eastleigh, Hampshire, both aged 61, went to their local council swimming baths - he was charged 75p but his wife was let in free because concessions were only given to those drawing a State pension. He took the council to court and lost. He went to the appeal court and lost again. He finally took the case to the House of Lords - and won. What this means is that no body can discriminate between men and women, for example for education, entrance fees for parks or museums, or for membership of clubs or societies.

HM Holmden, G4KCC

NON-MEMBER QSLs

I have read with interest letters from Mr Dick (*Last Word* Aug 90) and Mr Allen (Sep 90). My main interest is the use of the QSL Bureau to non-members. How many of us have sent QSL cards and have not had one returned, this could be due to the fact of the station being a non-member.

One needs to look at this situation very carefully and no doubt the RSGB will do so on our behalf. It only needs a licenced amateur bright spark, to start up a world wide QSL bureau for a modest yearly subscription, and in doing so, may leave our Society in a difficult position. On the other hand, it may pay the RSGB to take up this type of operation whereby it collects some revenue from non-members, which better than nothing at

Please note that the views expressed in 'Last Word' are not necessarily those of the RSGB.

We reserve the right to edit letters and regret that we can no longer acknowledge them individually but will pass them on to the relevant department.

all. Whether it be run on a commercial or contracted out basis has got to be decided upon by our Society, for if anything went sadly wrong with this type of system, who would we blame! Think what it would be like if we didn't have an RSGB H.Q. for free advice, plus all the other day to day operations that take place within our Society and as for our monthly magazine, no magazine can possibly suit everybody.

MB Marsden, RS85477

FLAG WAVING

I was horrified and mortified, when I received the September issue of *Radio Communication* to see on the front cover the Union Flag, put below that of the USSR. The implication is obvious to anyone possessing the most rudimentary knowledge of flag etiquette: Great Britain is inferior to the U.S.S.R. If any Naval Personnel had been present, I feel sure they would have insisted on the flags being worn at an equal height, on a yard. Is it too late for an apology to the Crown and MoD (Navy)?

WAG Kerr, G7FTJ

[Short of running the picture upside down or sideways, there is little we could have done to have changed the order of the flags after the photo was taken! However, since the flagpole was at Sredniy Island in the USSR, presumably the flags were correctly positioned - Ed]

FRUSTRATION

In August's *RadCom* I placed an advert for a PK232 or KAM all-mode. I was very pleased with the response by experienced amateurs wanting to get rid of their equipment. What saddened me, and it may be a major cause for the lack of take up of amateur radio by youngsters, was that in a number of cases the owners were giving up with frustration at not being able to get the gear up and running.

The instruction manuals are written at too sophisticated a level of technical jargon and there is no common agreement about wiring plugs to leads. For example, a microphone plug for a Yaesu FT 290 will not match the equivalent Icom or Trio rig. Computers are wired differently from one another. I could go on, as indeed I have so on my local repeater. Handbooks for packet radio, AMTOR, or what have you, should be written in simple English, using short sentences. Illustrations should be so labelled as to minimise confusion. The KISS principle doesn't just apply to designing equipment but also describing how to make it work.

So to those of you out there busy designing new black box toys for me to buy, please assume I think you are deserving of the Nobel Prize for electronics, but how about trying for the Literature prize as well?

A.Harada G4INX

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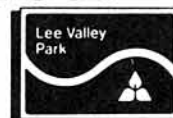
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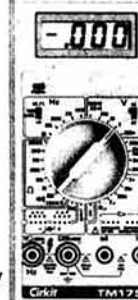


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The proposed introductory price will be

£650

Hi! Standard have produced this wonderful new dual band, 144/432 MHz, 50 Watt hi tech design, and it takes me two days to suss out where the on/off switch is! I have to be honest, I now have the handbook, and it's almost English too, so I might attempt to take it off the repeater channel!!

No, seriously, it is one of the most sophisticated pieces of equipment I have played with for some time, it has everything that the now renowned C528 has plus a few extras. I have managed to get some info (not issued by the manufacturer) which, from the keypad will give you receive between 800 MHz and 1000 MHz, plus, again, keypad programming, listen AM for airband! Haven't had time to try these out yet, only got sample two days ago. I don't think I have to remind you that we are the sole authorised importer for all Standard products, including their commercial and marine products, so I won't.

We will be at the Leicester Show, so come over and see us. PS. I still drink Campari and lemonade... hint, hint!

Norman

C528 Dual Band Hand Held

STANDARD

Standard have done it again! You all know how popular the C500 is, well now here is their latest dual bander — the C528 (not to be confused with the Japanese only version, the C520).

The European version has all the facilities that you want in a base station, let alone a hand held!

FEATURES

- ★ Direct 13.8V in for 5 Watts out.
- ★ VHF 2.5W, UHF 2W with CNB151 NiCad pack.
- ★ Dual displays.
- ★ Power save function.
- ★ Multiple memories.
- ★ Priority channel.
- ★ Tone squelch (option).
- ★ Programmable offsets.
- ★ Coded paging function.
- ★ Various scanning modes.
- ★ Programmable step sizes.
- ★ 144-146 VHF, 430-440 UHF, 800-975 Rx only.
- ★ Separate Vol. & Squ. controls for each band.

- ★ Hand held
- ★ 2m & 70cm
- ★ 5 Watts output
- ★ Repeater function

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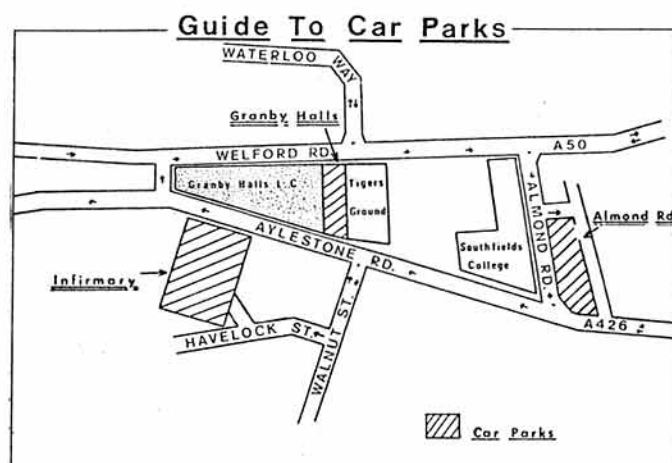
**NORMAN
G4THJ**

Leicester Electronics

Welcome to the 19th Leicester Amateur Radio & Electronics Exhibition

... which has now become the most successful and popular amateur radio show in the Midlands. This will be held at the usual venue, Granby Halls, Aylestone Road, Leicester on Friday 26 and Saturday 27 October next. Times of opening 10am to 6pm (disabled 9.30am). Admission charges are £1, OAP's/children 50p. Block bookings - more than twenty people 10% discount.

- **Extensive trade exhibition**
- **Large bring and buy stand**
- **Raffles**
- **Talk in on GB2GH on S22 and SU22.**



HISTORY OF THE SHOW

The show's birth was the culmination of six amateurs getting together to run a show for the benefit of local amateurs in their area. Three of the amateurs were members of the Leicester Repeater Group and three are members of the RSGB. One member of the original six resigned leaving the remaining five to carry on the organisation of the show as an annual event, thus founding the Leicester Amateur Radio Show Committee. Their Chairman is Mr JP Theodorson, G4MTP, Secretary Mr Frank Elliott, G4PDZ, Treasurer Mr GW Dover, G4AFJ, Mr T Wheeler G4NWS and Mr AS Lord, G1YEZ.

The proceeds from the show are divided on a pro rata basis among those clubs in the area who send stewards to help run the event, depending upon how much help they actually give.

WHERE TO STAY

If you are thinking of staying overnight during the show, arrangements have been made for special block bookings at the following hotels:

Grand Hotel, Granby Street, at a cost of £30 per person per night. Their telephone number is 0533 555599.

Alexandra Hotel, London Road, at £28 (single) and £40 (double or twin) inc English breakfast. Telephone 0533 703056 (G6HSF Andy).

Post House, Braunstone Lane, at £25 (single) and £19 per person per night for a twin or double room, inc breakfast, VAT etc. Telephone 0533 630500.

Belmont Hotel, De Montfort Street, where a special show price per person has been negotiated for TWO nights: bath, bed, breakfast and dinner £68. Telephone 0533 544773.

Please remember to mention, when booking, that it is part of the Leicester Amateur Radio Show block booking to qualify for these concessionary prices.



EASTERN COM

CAVENDISH HOUSE, HAPPIS



0692-

JAYBEAM - MICROWAVE MODULES - DAIWA - LOWE - CAP.CO - BNOS - DATONG - AKD -

VISIT US ON STAND S22 LEICE

ICOM HF			
IC-781	HF TRANSCEIVER BUILT IN ATU,SCOPE & PSU	4500.00	
IC-765	HF TRANSCEIVER BUILT IN ATU & PSU	2499.00	
IC-751A	HF TRANSCEIVER 12 VOLT	1500.00	
IC-735	HF TRANSCEIVER 12 VOLT	979.00	
IC-726	HF TRANSCEIVER WITH 6 METRE 12 VOLT	989.00	
IC-725	HF TRANSCEIVER 12 VOLT	759.00	

	ICOM 50MHZ	
IC-505	6M TRANSCEIVER SSB/CW 12 VOLT	529.00
IC-575E	6M/10M TRANSCEIVER SSB/FM/CW 10W WITH PSU	995.00
IC-575H	6M/10M TRANSCEIVER SSB/FM/CW 100W 12 VOLT	1199.00

ICOM 144MHZ			
IC-25E	2M FM HANDPORTABLE WITH NICAD CHARGER	.....	275.00
IC-25ET	2M FM HANDPORTABLE KEYPAD DTMF	.....	295.00
IC-2GE	2M FM HANDPORTABLE WITH NICAD CHARGER	.....	265.00
IC-228E	2M FM MOBILE 25W	.....	365.00
IC-228H	2M FM MOBILE 45W	.....	385.00
IC-290D	2M SSB/FM/CW 25W	.....	559.00
IC-275E	2M TRANSCEIVER SSB/FM/CW 25W PSU	.....	1069.00
IC-275H	2M TRANSCEIVER SSB/FM/CW 100W 12 VOLT	.....	1039.00

ICOM 430MHZ			
IC-45E	70CM FM HANDPORTABLE WITH NICAD CHARGER	.....	299.00
IC-45ET	70CM FM HANDPORTABLE KEYPAD DTMF	.....	299.00
IC-4GE	70CM FM HANDPORTABLE WITH NICAD CHARGER	.....	299.00
IC-448E	70CM FM MOBILE 25W	.....	429.00
IC-490E	70CM SSB,FM,CW 10W	.....	449.00
IC-475E	70CM TRANSCEIVER SSB,FM,CW 25W INT PSU	.....	1185.00
IC-475H	70CM TRANSCEIVER SSB,FM,CW 100W 12V	.....	1260.00

	ICOM 1.2GHz	
IC-12GE	23CM FM HANDPORTABLE INC NICAD CHARGER	365.00
IC-120E	23CM FM MOBILE 10W	520.00



IC-24ET

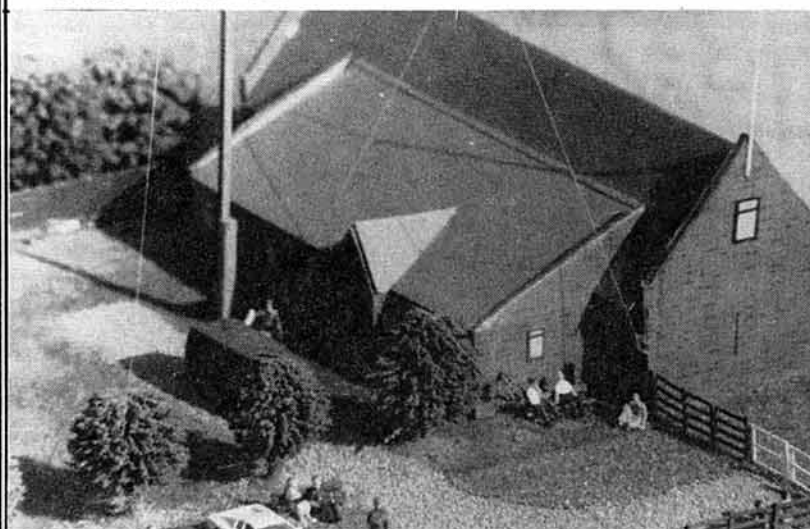
ICOM DUAL BAND	
IC-24ET	2M/70CM FM HANDPORTABLE INC NICAD CHARGER .....385.00
IC-3220E	2M/70CM FM MOBILE 25W NEW.....499.00
IC-2400E	2M/70CM FM MOBILE DUAL WATCH 45W/35W .....635.00
IC-2500E	70CM/23CM FM MOBILE 35W/10W .....675.00

IC-2000E	16CM/23.2CM FM MOBILE 5W/10W	678.00
ICOM MULTIBAND		
IC-970E	MULTIBAND ALL MODE TRANSCEIVER 12V	1995.00
IC-901E	MULTIBAND FM MOBILE 2M/70CM STD	799.00
IC-UX19	28MHZ UNIT	219.00
IC-UX59	50MHZ UNIT	249.00
IC-UX592	144MHZ SSB UNIT	379.00
IC-UX129	1.2GHz UNIT	399.00

ICOM RECEIVERS		
IC-R9000	100KHZ-2GHZ RECEIVER CRT DISPLAY.....	3995.00
IC-R7000	26-1000+1025-2000MHZ RECEIVER	989.00
IC-R100	WIDE BAND RECEIVER 500KHZ - 1.8GHZ	499.00
IC-R72E	GENERAL COVERAGE RECEIVER	645.00
IC-R71E	GENERAL COVERAGE RECEIVER	855.00
IC-R1	HANDPORTABLE RECEIVER	399.00

KENWOOD VHF UHF BASE STATION TRANSCEIVERS			
TS-711E	2M MULTIMODE TRANSCEIVER WITH DCS.....		898.00
SP-430	EXTERNAL SPEAKER	40.81	
VS-1	VOICE SYNTHESIZER	32.26	

TS-790E	DUAL BAND ALL MODE TRANSCEIVER 1296 OPTION	1495.00
PS-31	MATCHING PSU TS790	186.00
SP-31	EXTERNAL SPEAKER TS790	63.46
UT-10	23CM MODULE	379.51
VS-2	VOICE MODULE	32.26



NEW OFFICES & SHOWROOMS AT HAPPISBURGH

KENW ICO YAE

FROM STALHAM TAKE THE "WALCOTT,BACTON,HAPPISBURGH ROAD", AFTER 1 MILE TURN RIGHT SIGNED "HAPPISBURGH 2", WE ARE 1 MILE FURTHER. FROM CROMER TAKE THE STALHAM ROAD, DO NOT TURN TO HAPPISBURGH VILLAGE. TRAVEL ANOTHER 1 MILE THEN TAKE LEFT SIGNED "HAPPISBURGH 2". WE ARE 1 MILE FURTHER

MUNICATIONS

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PARKING
ACCESS
FACILITIES

RSGB - JUPITER - ICS - RSGB - ICOM - KENWOOD - YAESU - KEYS - ROTATORS - CABLE - PLUGS

STER AMATEUR RADIO SHOW

TR-761E	KENWOOD VHF/UHF MOBILE TRANSCEIVERS	
TR-851E	2M MULTIMODE MOBILE/FIXED TRANSCEIVER	599.00
VS-1	70CM MULTIMODE MOBILE/FIXED TRANSCEIVER	599.00
TM-231E	VOICE MODULE	32.26
TM-431E	2M COMPACT MOBILE TRANSCEIVER 50,10,5W	289.00
TM-531E	70CM COMPACT MOBILE TRANSCEIVER 35,15,5W	318.00
RC-10	23CM COMPACT MOBILE TRANSCEIVER 10,1W	385.00
RC-20	REMOTE HAND SET	169.00
F-20	REMOTE CONTROLLER	165.20
PG-4H	INTERFACE UNIT	162.43
PG-4J	INTERFACE CONNECTING CABLE	9.38
DRU-1	EXTENSION CABLE KIT	30.47
TM-701E	DIGITAL RECORDING SYSTEM 231,431	85.72
TM-731E	COMPACT 2M,70CM MOBILE TRANSCEIVER 25W	469.00
MB-11	DELUXE 144/430MHZ MOBILE TRANSCEIVER 50,35W	665.00
SP-50	MOBILE BRACKET TM731E	15.64
SP-41	MOBILE SPEAKER UNIT MOST MODELS	20.41
	MOBILE SPEAKER UNIT MOST MODELS	18.61

TS-950SD	KENWOOD HF	
TS-950S	DELUX HF TRANSCEIVER FROM KENWOOD WITH DSP	3199.00
DSP-10	STANDARD VERSION OF 950SD BOTH HAVE BUILT IN ATU	2499.00
SM-230	DIGITAL SIGNAL PROCESSOR UNIT	399.00
SP-2	MONITOR WITH PAN DISPLAY	773.00
SP-950	HIGH STABILITY TCXO	99.00
VS-1	EXTERNAL SPEAKER WITH SWITCHED FILTERS	87.55
	VOICE SYNTHESIZER MODULE	32.26

TS-940S	HF TRANSCEIVER GENERAL COVERAGE RECEIVE	1995.00
AT-940	AUTOMATIC ATU	244.88
SP-950	EXTERNAL SPEAKER WITH SWITCHED FILTERS	87.55
SO-1	TCXO UNIT	193.53
VS-1	VOICE SYNTHESIZER MODULE	32.26



FT
470R

TS-440S	HF TRANSCEIVER 160-10M	1138.00
AT-440	INTERNAL AUTOMATIC ATU	144.82
PS-50	MAINS PSU WITH COOLING FAN	222.49
VS-1	VOICE SYNTHESIZER MODULE	222.49

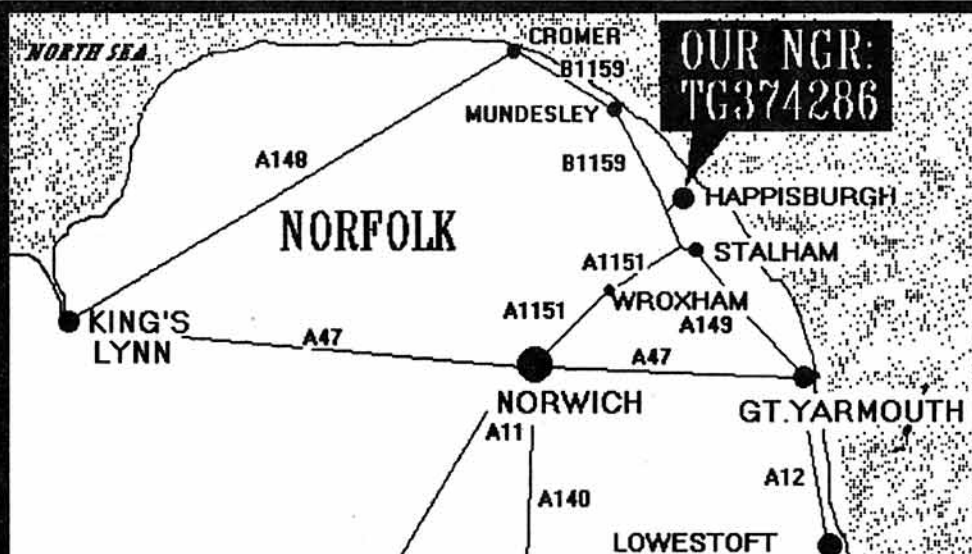
TS-140S	HF TRANSCEIVER 160-10M	862.00
TS-680S	HF TRANSCEIVER 160-10M WITH 6M	985.00
PS-430	MAINS PSU	173.78

FT1000	YAESU HF TRANSCEIVERS	
SP5	ALL MODE HF TRANSCEIVER DUAL RECEIVE	2995.00
DVS2	EXTERNAL SPEAKER WITH AUDIO FILTER	109.00
BPF1	DIGITAL VOICE STORAGE UNIT	149.00
YH77ST	SUB VFO FILTER UNIT	69.00
TCXO1	HEADPHONES STEREO/MONO FOR DUAL RECEIVE	34.00
MDIC8	TEMP COMPENSATED OSC UNIT	95.00
	BASE MICROPHONE	89.00

FT747GX	HF TRANSCEIVER GENERAL COVERAGE RX	659.00
D3000568	FM UNIT	39.99
D3000569	TXC OSCILLATOR UNIT	46.00
MMB38	MOBILE MOUNT	22.00
MMB42A	METAL CASES	66.00
OMT747	OWNERS MANUAL	2.50
TST747	TECHNICAL SUPPLEMENT	8.50
FT757GX	HF TRANSCEIVER GENERAL COVERAGE RX	969.00
MMB20	MOBILE MOUNT	25.00
FRB757	RELAY CONTROL UNIT	10.50
OMT757	OWNERS MANUAL	2.50
TST757	TECHNICAL SUPPLEMENT	8.50
FT767GX	HF TRANSCEIVER WITH VHF OPTIONS	1599.00
50/767	6M MODULE	179.00
144/767	2M MODULE	179.00
430/767	70CM MODULE	225.00

OOD
M
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OPEN TUES - SAT



New Products Available at the 1990 Leicester Show

We asked exhibitors to let us know what products would be launched or featured at Leicester. Here is what they told us...

Dewsbury Electronics Stand S4

The new Dewsbury Electronics 'Supa-Tuta Plus' is a morse tutor with a difference - it bites back. This is the trainer for the budding CW expert who is keen to upgrade his sending to absolute perfection. Plug in a straight key or your high speed paddle and send back the lesson you have been studying. Behold - an impartial and instant appraisal of your morse is displayed by an error code indicating 'poor - acceptable - good'. At £82.45 this has got to be a good investment for some of the contest operators we have heard recently. Try the 'Supa-Tuta Plus' and its companion 'Supa-Keya' and 'Supa-Tuna' at the show.



C.M. Howes Communications Stand E9a

A new transmitting kit is to be launched at the show. This is a power amplifier for the 10 and 15m amateur bands, to match the HTX 10/15m SSB/CW exciter introduced at the RSGB's 1990 Convention. This makes it possible to use C.M. Howes kits to build a complete transceiver to get on these two exciting bands. Prospective Novice Licence holders are likely to find this of special interest. The HP10 can be set up for 3W or 10W PEP output so it is just as suitable for Class A licensees who want to try their hand at home construction. The broad band amplifier is fully filtered and contains the essential interfacing circuitry such as delayed PTT, receiver muting etc. The HP10 kit will be selling at Leicester for £29.90.

Badger Boards Stand S57

The Badger team are busy upgrading their kits for the show. Complete with all accessories and boxes, these popular DiY packs can be completed without having to search the junk box for those extra items.

See also page 9 for a list of just some of the RadCom projects supported by Badger Boards.

Waters and Stanton Stand S15

It is special offer time at the Waters and Stanton Stand. Bargain hunters should look for the new Alinco transceivers on show for the first time, the Diamond range of antennas, power meters and accessories, and the outstandingly successful Jupiter handheld scanners - all at prices you are unlikely to refuse. The full and updated range of W&S Frequency Lists will also be ready for avid listeners.

ICOM UK Stand E2

ICOM will introduce their exciting new 23cm, all mode transceiver, the IC1275A/E. Offering coverage from 1240 - 1300 MHz, 10W of stable and continuous output, this rig has 99 memories with versatile scanning facilities and full CW break-in. This is sure to be a winner with the satellite fraternity. The new ICOM full colour glossy catalogue is also expected to be published in time for the show.

R.A. Kent (Engineers) Stand E14a

R.A. Kent intend to show, for the first time, their new morse tutor featuring five letter and figure standard or random groups. The tutor will also play back random groups for checking your copy. You just keep going until you get it right!

Lee Electronics Stand S53

The Standard C5608D will be making its debut at the Lee Electronics Stand. This powerful new 50W transceiver looks to be one of the most sophisticated dual banders this year. It offers crossband 2m/70cm repeater facilities and a host of mind bending features including the ability to programme all functions from the LCD keypad hand microphone, 20 memories, 2 scan modes, and programmable wide band receive up to 1000MHz. All this for an introductory price of £650.



Low Electronics Stand E12

Expect something of a fanfare when Lowe unveil the latest technology from Kenwood. Their ultra compact TH-77E dual band transceiver is a 'handy' with a difference. Packed into its tiny case is an extraordinary number of state of the art features, including selectable full duplex, cross band 2m/70cm operation with obvious applications for Raynet, dual band receive, dual display and UXU, the UHF dual watch function that allows dual frequency simultaneous reception. A remarkable scanning system appears to cover everything on both the main and sub-band. There is a variety of power options, independent AF and squelch controls and a 42 memory capability . . . and that's just for starters. It all comes

conveniently packaged down to a miniscule 58x140x30mm. This we've got to see!



S.E.M. Stand S55

Two new products are available from S.E.M. this year. The MkII QRM Eliminator is a completely redesigned version giving a broader null on the two phasing controls making operation of the unit much easier than the MkI, and complete wide band coverage from 100kHz to 60MHz. The Eliminator will completely phase out any local interference, no matter what

type, so long as it is generated within a few miles of your receiver - a local factory or your own computer! The HI-Q Aerial Matching Unit is produced especially for modern transceivers which have broad band aerial amplifiers. The Matching Unit has high selectivity to reject unwanted signals, preventing cross modulation and overload.

CapCo Electronics Stand S31

Leicester will witness a world first with the latest ingenious product from the all-British CapCo. Working in conjunction with Tony Wells, G7IGG, Tony Johnson of CapCo has designed and developed the software to provide total computer control of any and every transceiver that has integral serial port facilities. The system automatically controls the tuning of an associated CapCo magnetic loop antenna installation. Visitors can expect to see an exciting full demonstration at the show.

Arrow Radio Ltd Stand S33

The new Kenwoods are going to be centre stage on the Arrow stand. The limelight is being shared with what Arrow describe as the "Highest gain dual band base antenna in the world". From Comet this 7.9m long aerial, the GPX2010, offers 9.5dB gain on 2m and 13.2dB on 70cm for £142.95.

RayCom Communications Stand S36

Mindful of the approaching Novice Licence, Raycom have revealed that they hope to show an entirely new transceiver for the beginner and low budget operators. It is all top secret as we go to press but our guess is that this could be the rig to give the big boys a run for their money. Still in the pioneering spirit, Racom are planning to launch a brand new name in power supplies and amateur band linears, plus an intriguing new IF filter for the RI.

Dee Comm Amateur Radio Products Stand S60

Dee Comm are launching a new range of antennas at Leicester, including a five band mobile helical for 10, 12, 15, 17 and 20 metres, and a series of new fibreglass colinears and end fed half waves for 2m and 70cm. Also offered is a large range of stainless steel hardware which is often difficult to obtain in small quantities.

Lake Electronics Stand S6a

The latest 'complete to the last nut' kit from Lake will be on show at Leicester. A neat little 40m CW transceiver, the DTR7 is an ideal rig for portable, home or holiday operators. Covering 7 - 7.1MHz with 2W output, the rig features a Colpitts VFO, a half-wave output filter, adjustable sidetone and a sensitive direct conversion receiver with RIT and a 12dB switched attenuator. Power required is 12V. Housed in a 210 x 190 x 85mm black, PVC coated, case, the front and rear panels are already printed in

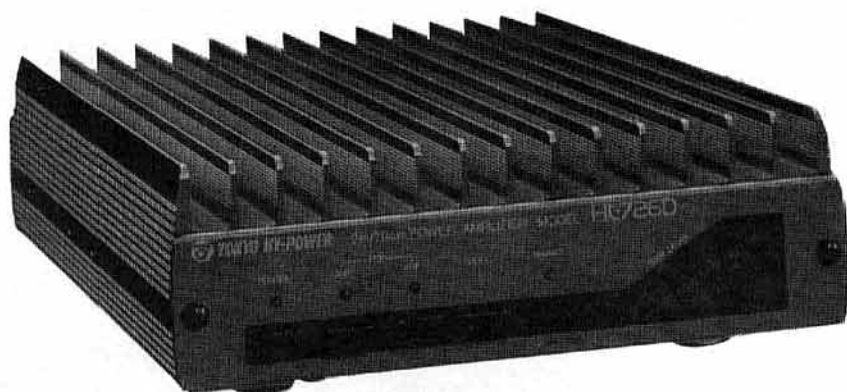
white. As with all Lake kits, construction is in an easy to build modular form, supported by a fully illustrated 30 page manual which includes full setting up instructions, including voltages and a trouble-shooting guide.

The complete DTR7 kit is priced at £84.50. A ready built and air tested transceiver can be supplied at £135. Further details and a catalogue of all Lake products can be obtained from Lake Electronics, 7 Middleton Close, Nuthall, Nottingham, NG16 1BX.



ARE Communications Stand S41

Completely new to the UK will be the Tokyo Hi-Power dual band 50W linear, Model HL-726D. The importers, ARE Communications, anticipate that, at £295, this versatile 144MHz and 430MHz amplifier will be much in demand among those using dual band rigs and antennas.



Grosvenor Software Stand S62

The G4BMK multi-mode software program for RTTY/AMTOR/CW and FAX/SSTV will be displayed in their latest versions at the Grosvenor Software stand.

AMDAT Stand E15

AMDAT is now able to supply the ideal item for every shack. The Junghans Rugby Clock provides an extremely accurate time display because it is locked to the Rugby timecode transmission. This makes it an invaluable addition to their satellite tracking systems. They will be available at the show at a special discount price. AMDAT also hopes to launch a major new product complementing their packet radio and satellite products.

Amateur Radio Communications Ltd Stand S10

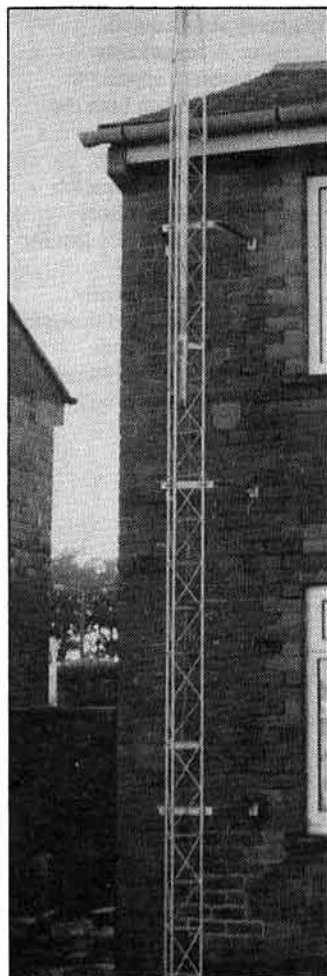
An interesting update of the Amiga Computer HF Log MkII will be on demo at the ARC stand, with just the possibility that a IBM PC compatible version will also be ready for the show. ARC will be displaying Standard's new C5608D 50W dual bander and, in association with SMC, will be offering FT747GX transceivers at an attractive £549.

G4ZPY Paddle Keys

An all brass (including the base) twin paddle key will be on display together with the other 28 types of key in the G4ZPY range.

Technical Software Stand E14b

"Amazing" is how TS's Richard Wilmot describes their FAX and weather satellite decoding software for the Spectrum computer. Using a standard Epson compatible dot matrix printer, full resolution charts, press photos and weather satellite can be printed out from any 48 or 128k Spectrum giving excellent grey shading, giving near photographic results. All of the standard FAX settings are supported as well as inverted scanning, essential for press photos. This looks like a really inexpensive way to equip yourself for these interesting modes.



South Midlands Communications Stand S8

Following the announcement in *Radio Communication* that permission should soon be forthcoming to operate mobile on 6m (Sept 90, p6), SMC are preparing 6m mobile whips for their exhibit. The OSCAR 6m

will be approximately 5ft long, come complete with a heavy duty spring and claw mount, and a coax cable already fitted. Capable of handling in excess of 100W, this new antenna will retail at £24.90. Stocks of the

FT650 announced recently have now arrived from Yaesu and will be on sale. This 100W multimode covers 10, 12 and 6m, with the receiver covering 24 to 56MHz. The basic price has now been set at £995.



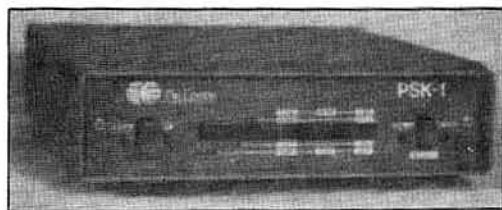
Tennamast (Scotland) Stand E15a

Rose, GM0NHH, and Norrie, GM4VHZ, will be on the stand to discuss customers' requirements and to meet friends, old and new. They are continually improving their masts, and extending the range available, and can now offer a range of slim-line masts up to 40ft, which can satisfy the majority of requirements. Fixed lattice masts at affordable prices have recently been added to the range.

Siskin Electronics Stand S44.

Siskin Electronics will be taking packet radio a stage further by demonstrating a variety of satellite tracking systems which will work with most popular home computers (in other words not just a PC!). They will also be exhibiting their own stand-alone tracking system which requires no computer at all! In addition to the existing terrestrial packet range, which will include the very latest EPROM updates for most popular TNCs and

multimodes, Siskin will also be offering the exciting PacComm DSP based PSK-1 satellite modem which caters for OSCAR 16 18, 19, and FO-20 plus reception of telemetry from OSCAR 13. Their NB-96 plug in modem will offer communications with Oscar 14 - UoSAT D. Other new products on display will be the exciting Kantronics "DATA ENGINE" and a memory expansion system for the popular TINY 2 series TNC.



Nevada Communications Stand S42

Nevada will feature the WB1, an improved and extended version of the popular Fairmate HP100E. The set has 1000 memory channels and covers the frequency range 1 - 650MHz plus 850 - 1300MHz. It comes with 10 search banks pre-programmed for the UK and includes a full set of accessories, including high capacity Ni-Cads, carry case, shoulder strap, belt clip, DC cable and earpiece. The WB1 will sell at £289.



RN Electronics Stand S58

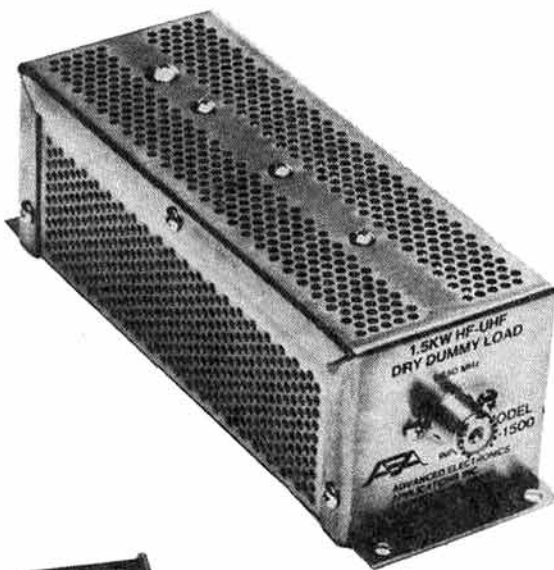
A series of new 6m and 4m transverters offering high performance at reasonable cost will be on show with RN Electronics, together with their latest amplifiers.

R & D Electronics Stand E6

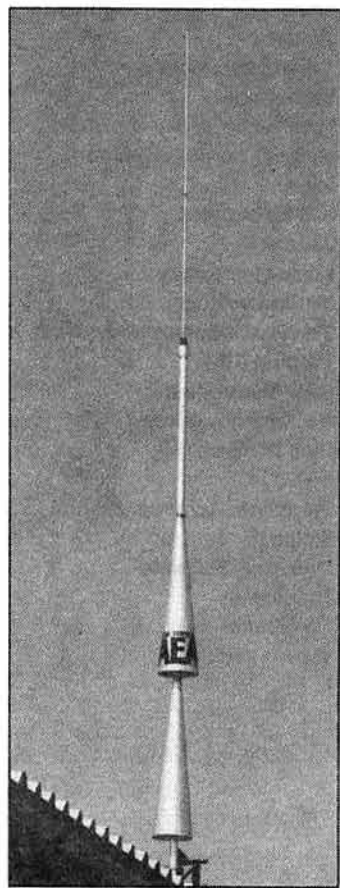
The increasingly popular range of R & D weather monitoring equipment is now to become available as individual modules, with or without cases, to enable enthusiasts to build up a weather station to suit their own requirements. The R & D stand will be offering such modules on the wind speed and direction units for only £139.

ICS Electronics Ltd Stand E7

A host of new products will adorn the ICS stand. The DL-1500 dummy load boasts a frequency range of DC - 650MHz and a short term power capability of 1500W. "Outstanding performance" is ICS's verdict on the IsoLoop HF Loop Antenna which covers 14 - 30MHz at 150W, is omnidirectional, has the gain of a dipole and is a remarkable 32 inches square. The MM-3 Morse machine has all the features needed in a memory keyer, including 2-99WPM speed selection, 20 lithium backed memories, comprehensive morse



training facilities and a QSO simulator which even lets you experience contest operation without an antenna! The AT-3000 is the high power version of the AT-300 antenna tuner. This is capable of handling well in excess of UK legal power so there is no likelihood of damaging it. ICS will also carry the range of IsoPole VHF and UHF base station omnidirectional antennas. These include decoupling cones to stop computer hash picked up on the coax.



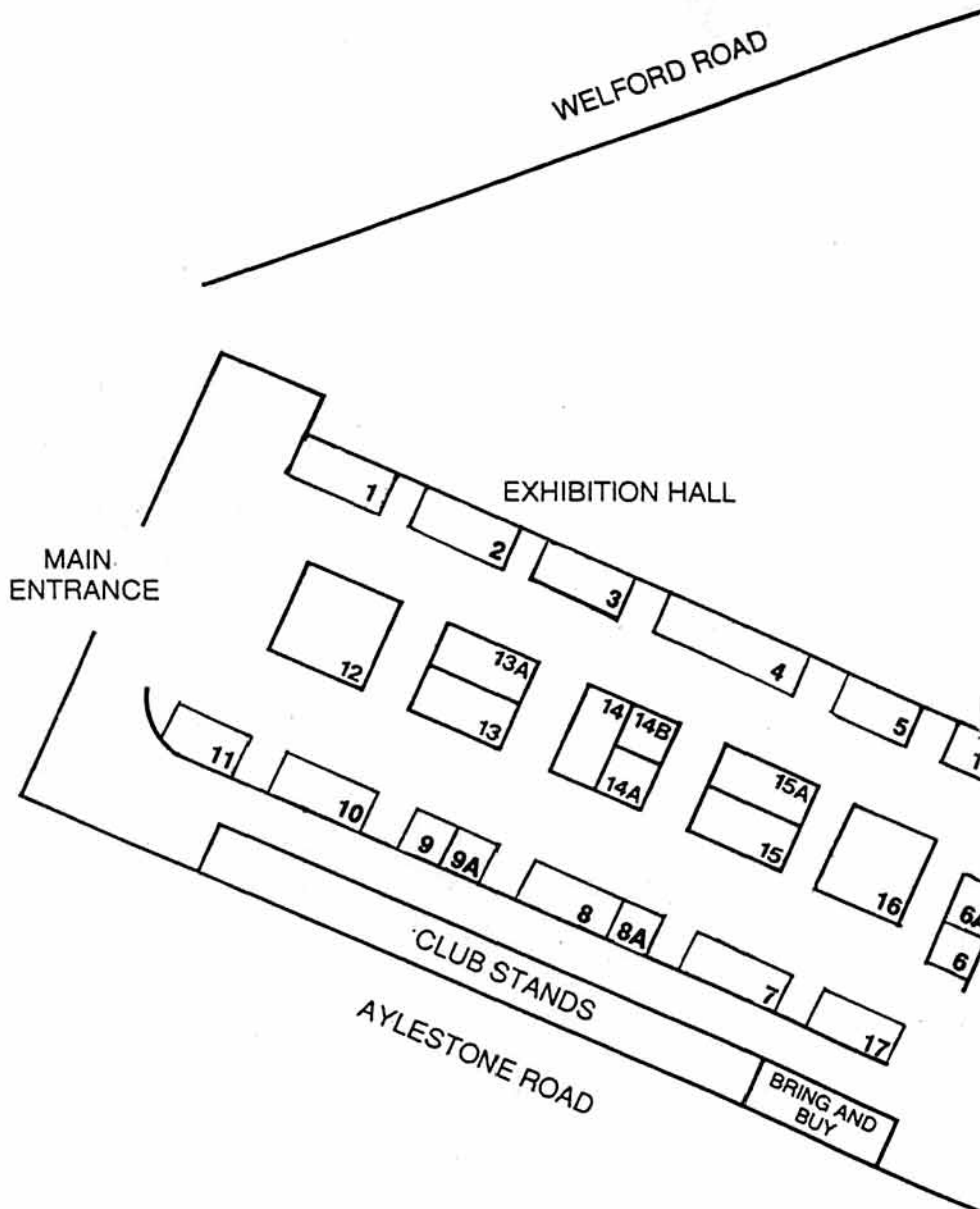
LEICESTER SHOW

The 1990 Leicester Amateur Radio Show will take place on Friday 26 and Saturday 27 October, at the Granby Halls, Aylestone Road, Leicester (just off Junction 21 of the M1). This year there will be more exhibitors attending, and the show promises to live up to it's excellent reputation of being THE most successful amateur radio show in the Midlands. Talk-in will be on S22 and SU22 on the special Leicester Show callsign GB2GH. Refreshments will be available from the cafeteria and bar. There are excellent facilities for the disabled.

EXHIBITION HALL

EXHIBITOR STAND NO

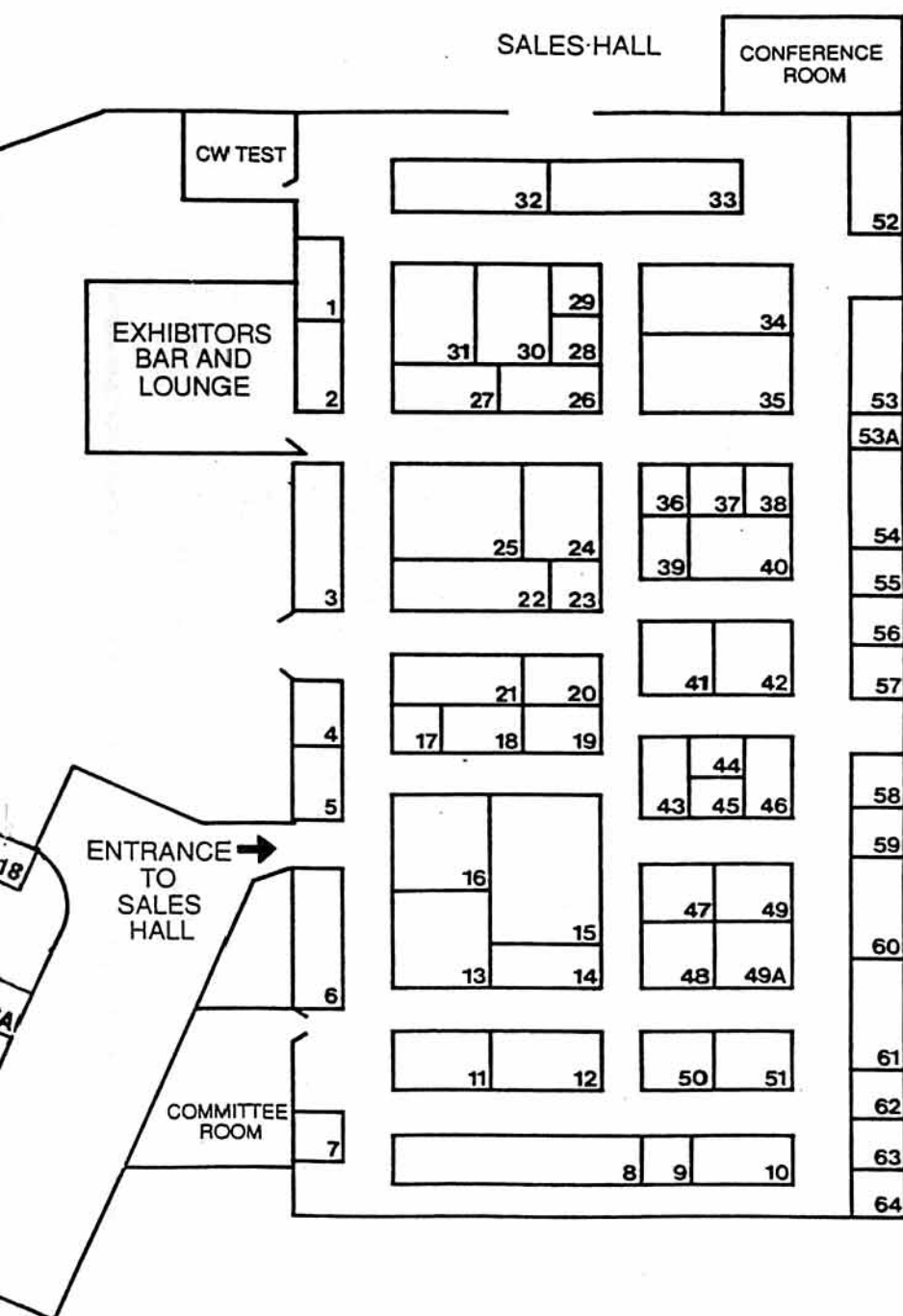
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SALES HALL

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2 mtr fibre glass encased colinear

A new product for 1990, this half wave over a halve wave colinear gives 4.5dB gain over a dipole, measures just 86" high and 1" diameter. No radials or tuning is required. The aerial is completely waterproof and incorporates a SO239 connector. Supplied with clamp for up to 2" masts. **£39.95 + £3.50 carr.**

70 cms fibre glass encased colinear

New for 1990, a triple half wave colinear giving 5 dB gain over a dipole measures just 60" tall and 1" diameter like its 2 mtr equivalent. Needs no radials and requires no tuning. Again this antenna is completely waterproof and incorporates an "N" type socket. Supplied with a mounting clamp for up to 2" diameter masts. **£39.95 + £3.50 carr.**

The above two antennas offer very little wind resistance and are ideal where there are severe climatic weather conditions or unsightly Yagi arrays are out of the question.

END FED HALF WAVES

Our new 2 mtr end fed half wave is similar in design to the above colinears, this antenna however is encased in a 1" diameter plastic tube measuring just 52" tall, an SO239 socket is enclosed in a 10" aluminium base which also takes the supplied mast clamp for up to 2" dia masts. **£12.95 + £3.50 carr.**

Our new 70 cms end fed half wave is of the same construction as the above 2 mtr version but only 31" high and has an "N" type socket at the base. It is completely weatherproof and is supplied with mast clamp. **£14.95 + £3.50 carr.**

The above two aeriels are perfect where space is limited and large aeriels cannot be used. No tuning or radials are needed.

Our new 4 mtr end fed half wave has a fibre glass and aluminium base section and a two piece radiating element. The overall height is 90" and is terminated with a SO239 socket supplied with mast clamp. **£17.95 + £3.50 carr.**

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The Siskin Tiny 2 Packet Radio TNC

Derived from the popular TNC-2 standard the TINY 2 is an ideal base building block for a comprehensive digital satellite ground station. A standard modem disconnect header allows connection to a wide variety of external modems such as the G3RUH FO-12/9600 boards and our own external modems. The "KISS" protocol required for successful ground station operation is also included together with a comprehensive battery backed Personal Message System for terrestrial applications. The Tiny 2 is supplied with all connectors and software for most popular home computers.

1200 baud version £129, 9600 baud version £219

The PacComm PSK-1 Microsat Modem

The PSK-1 modem simply connects to the internal modem disconnect header of most popular TNCs and offers the following features:

OSCAR 13 telemetry 400 baud reception. Access to packet radio BBSs of OSCAR 16 (PACSAT), OSCAR 19 (LUSAT) and FUJI-OSCAR 20. In addition reception of OSCAR 18 (WEBERSAT) is catered for but please note special software (available from AMSAT UK) is required for image processing.

The PSK-1 may easily be switched out of circuit for normal terrestrial packet communications. The modem may be controlled by front panel push buttons or via a computer terminal with simple terminal software using menu driven commands. A built in RS-232 (also configurable to TLL) provides output of OSCAR 13 telemetry, display/control of the modem functions and support for external tracking devices such as the Kansas City Tracker etc. The PSK-1 also controls the up/down microphone control compensating for doppler shift etc.

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on hand to answer queries, be they technical, *RadCom* or general. Take the opportunity of meeting RSGB staff and volunteers who will be happy to assist you.



COPING WITH CANCER

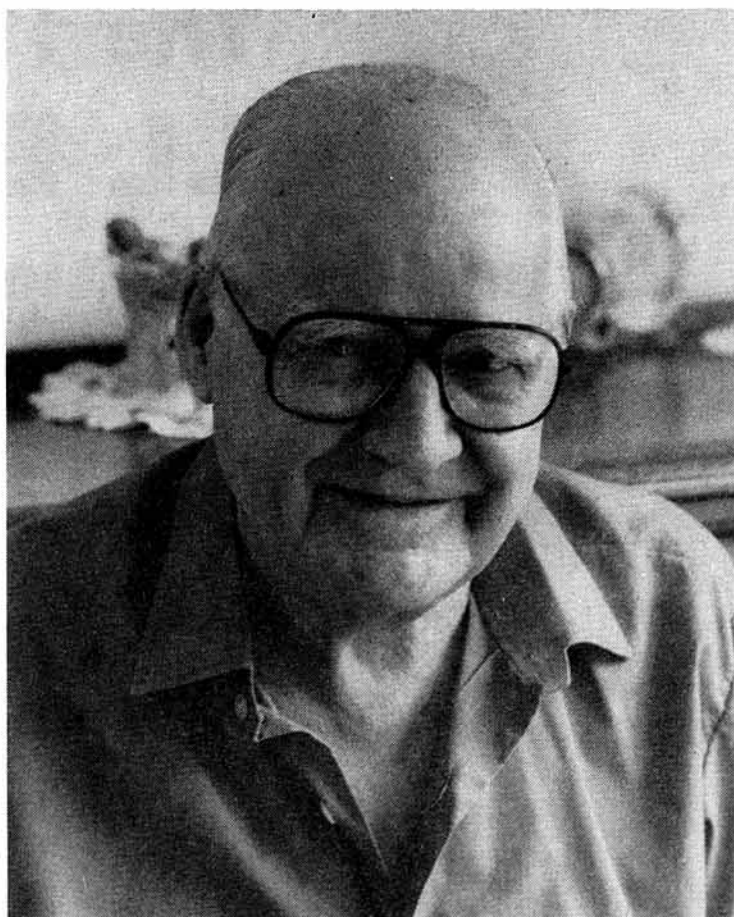
(Leicester Group)

An additional stand, and a variation from the norm, this year is to promote the 'Coping with Cancer' group in Leicester in honour of the late G4CPY Neville, who had always taken charge of the talk-in station at the Granby Halls.

The 'Coping with Cancer' Group exists to help people cope with the practical and emotional problems following a diagnosis of cancer. This service is for the sufferer and their families.

The group uses their own personal experiences of cancer, giving caring support - sharing can, in fact, lessen the FEAR which is often more of a problem than the illness itself.

The Group aims to provide a service which will improve the overall care of cancer patients in the community, especially those who are unaware of the many organisations and benefits available to them. Medical advice is not given, excepting for referrals and passing on information.



Help is at hand at all times, both for the sufferer and their family, by contacting Leicester 621112 or by calling at Spencer Chambers, 4 Market Place Leicester, LE1 5GF.

Most of the items being offered for sale on the 'Coping with Cancer' Stand will be goods made by the members of the group, items include soft toys, cushion covers, dried flower arrangements, patchwork quilts etc.

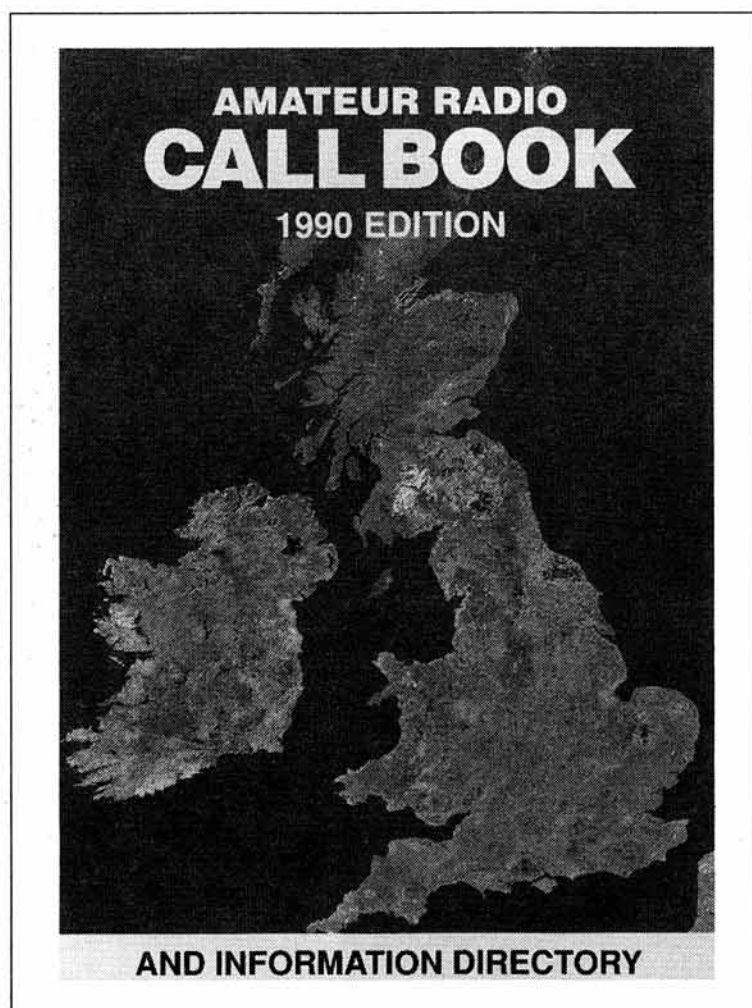
RAFFLE: There will be a raffle to raise money on behalf of the Group, and among the prizes is a traditional wooden rocking horse (valued at £800) and a beautiful patchwork quilt (valued at £500) both of which have been generously donated for this event.

The photographs are of G3FFC Arthur and his XYL Nora who have both benefitted from the assistance of the 'Coping with Cancer' Group.



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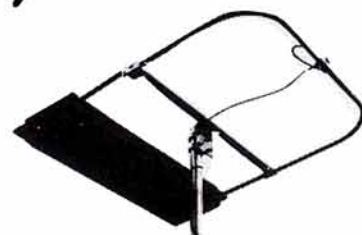
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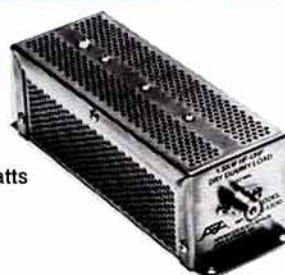
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