Radio Communication

The Journal of the Radio Society of Great Britain

January 1991

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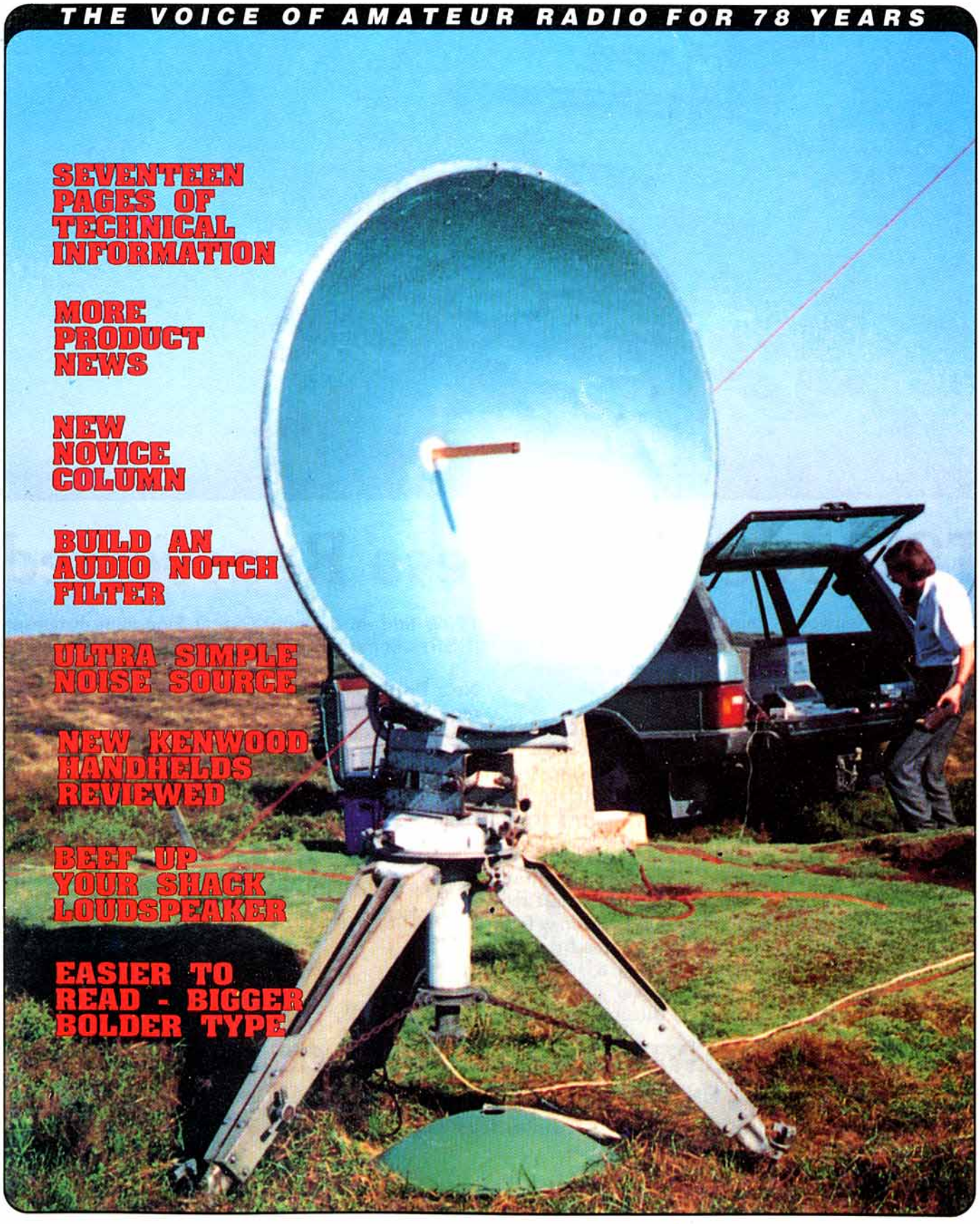
THE VOICE OF AMATEUR RADIO FOR 78 YEARS



SEVENTEEN PAGES OF TECHNICAL INFORMATION

MORE PRODUCT NEWS

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ULTRA SIMPLE NOISE SOURCE

NEW KENWOOD HANDHELDS REVIEWED

BEEF UP YOUR SHACK LOUDSPEAKER

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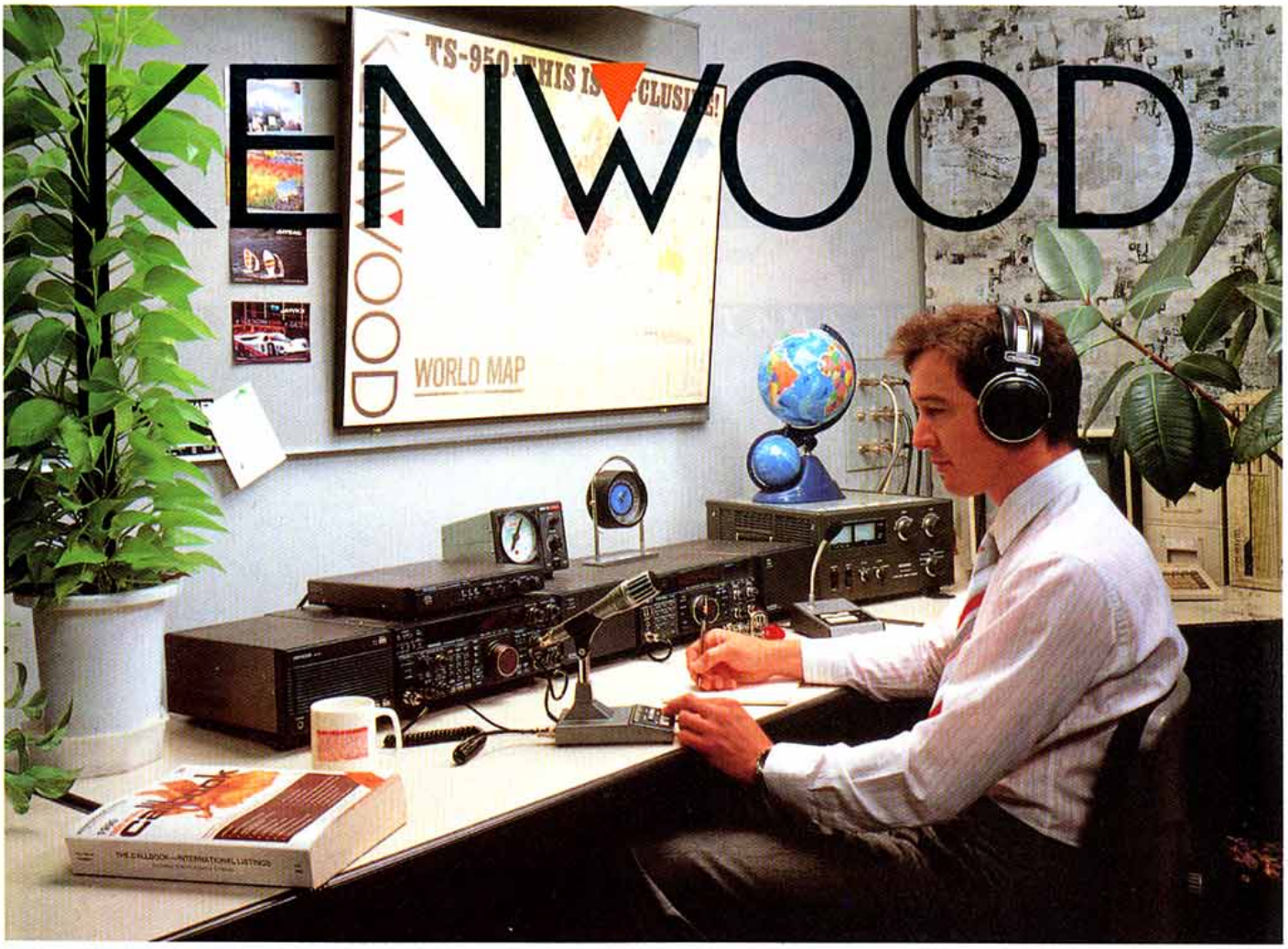

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Once again Kenwood stamp their authority on the HF transceiver market with the introduction of the latest in their ever popular "8" series transceivers, the TS-850S.

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New Product Information sheets are available on request, and of course the TS-850S will be on show at your nearest Kenwood Approved Dealer. We are happy to talk about and demonstrate why we sincerely believe that the TS-850S will satisfy your operating needs; whether these are keeping in touch with friends on 80 or chasing some rare DX on 20.

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

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Radio Communication

Just What the Reader Ordered

We've re-balanced your magazine to match what you told us you wanted in our survey. We've also put the type size up on most pages, including the Members' Ads. Full details of the changes are on page 7.

NEWS AND REPORTS

TECHNICAL FEATURES

COVER PICTURE:

GW8KQW/P operating during the 1990 RSGB 10GHz Cumulatives.

Photograph: G8KQW

REGULAR ARTICLES

RADIO SOCIETY OF GREAT BRITAIN

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

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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

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Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE
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Telephone: 0707 49855 - Members Hotline and book orders
0707 49805 - Subscriptions queries
0707 59260 - *Radio Communication* only
Secretary: David Evans, MSAE, CPL, G3OUF

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Frank Hall, GM8BZX
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T I Lundegard, G3GJW
A McKenzie, MBE, CEng, FIEE, FAES, G3OSS
F S G Rose, G2DRT

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Zone D: P E Chadwick, G3RZP
Zone E: C Trotman, GW4YKL
Zone F: TBA
Zone G: I D Suart, GM4AUP

HONORARY OFFICERS
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: Roy Clayton, G4SSH
HF manager: M Atherton, G3ZAY
Microwave manager: C W Suckling, G3WDG
Trophies manager: Mrs M H Claytonsmith, 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
Audio visual library co-ordinator: David Simmonds, G3JKB

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

ANNUAL SUBCRIPTION RATES
Once-off joining fee: £1.50
Corporate members: UK and overseas (Radio Communication by surface post): **£30.00**
UK associate member under 18: £12.75. Family member: £11.95
UK students over 18 and under 25: £19.20 (Applications should give applicant's age at last renewal date and include evidence of student status)
Affiliated club or society/registered group (UK): £30.00 (including Radio Communication): **£17.95** (excluding Radio Communication) (Subscriptions include VAT where applicable)

Membership application forms available from RSGB HQ

From the Secretary's Office

THE YEAR OF THE NOVICE

AMATEUR RADIO STATISTICS from all over the World lead us inevitably to several conclusions:-

a) growth in amateur radio has slowed down considerably in the last five years. In some countries the numbers of licensed amateurs is either static or going down.
b) the average age of radio amateurs is going up and, unless national Societies take action to reverse this trend amateur radio will die of old age.
c) other services will look to, and eventually take over, our bands if their usage declines.

This may sound pessimistic, but it is backed up by the facts. However, the situation must be used to give a clear warning to the National Societies of the World, to reverse these trends. RSGB Council *has* acted, because it is convinced that it has the very best interests of all UK licensed amateurs at heart. This is leadership of the very best kind; Council has not sat on the fence and just let the worst happen, it has done something very positive.

At the January 1987 Council meeting, the first discussions took place on the licensing of Novices in the UK as a means of bringing more people, especially young people, into the hobby/service as a means of protecting its future. This led to Project YEAR launched officially by our Patron in 1988. There *had* been discussions on Novice licensing prior to 1987, but obviously the objectives were less clear and the ideas came to nothing at the time.

1991 will have an exciting start. The Project YEAR recruitment video will have its first public showing at Cardiff Castle on 12 January. The occasion will be the Installation of the 1991 President, John Case, GW4HWR, who, as Chairman of the Society's Education and Training Advisory Group, has done so much to stimulate Project YEAR and the Novice Licence - what a fitting tribute. The part played by Yorkshire Television in producing the RSGB's first ever recruitment video is also to be acknowledged. Representatives from YTV will be in Cardiff on the big night, as will the Radiocommunications Agency and those who took part in the video, both on and off the screen. Every member is welcome to attend the premier of the recruitment presentation; details can be found opposite.

Within weeks, the RSGB plans to make sufficient copies of the video available to be sent to all the leading Affiliated Clubs in the country, together with notes to help clubs get the video to the general public. Though the emphasis is on young people, the video will help all age groups to appreciate what amateur radio is about. Individual members will also be able to purchase their own copy of the video with the proceeds going to Project YEAR. The RSGB is indebted to ICOM (UK) Ltd who, by sponsoring the reproduction of the video, are playing their part to stimulate beginners.

In addition, Senior County Instructors have been appointed in over half of the UK counties and regions, novice training will commence this month and the first exams are expected to be provided by the C & G this Spring. The RSGB is also gearing up to provide a 5WPM Morse Test for prospective Novices and we should expect to hear the first '2' callsigns on the air this Summer.

If that is not enough, the theme of this year's National Convention will be Project YEAR and the Novice Licence. Make a date to be there on 27/28 April at the NEC - it will be a very special occasion. The more you know about recruiting beginners into amateur radio the better, and the more successful the entire Project will become.

The Year of the Novice will get off to a very good start. Remember that as a licensed amateur or keen SWL you are in an ideal position to influence the future of your hobby by the effort and enthusiasm you put into encouraging future generations of radio amateurs - a Happy New Year.

David A Evans, G3OUF

NEWS & REPORTS

Laurence of the Arctic and amateur radio helped to raise over a million pounds for Multiple Sclerosis research

£1,130,000 for MS

HRH PRINCE CHARLES attended a reception at Kensington Palace, where the Multiple Sclerosis Society announced that over £1.13M had been raised by sponsorship of the joint Soviet/British North Pole 90 Expedition (*RadCom*, March and Sept 90). Many of the sponsors were radio amateurs who are thanked for their support.

As part of the Expedition, UA0/GB4MSS and UA0/GB4ICE were active late February until early May from the base camp on Sredniy Island, USSR. Manned by Morag and Laurence Howell, GM0MUV and GM4DMA, the station made a huge number of amateur radio contacts. 5000 QSL cards have now been sent out including many for interesting SWL reports.

All reports are helping the study of the remarkable propagation conditions prevailing in the High Arctic.

The 50MHz operation from NQ59 square, the first of its kind from the USSR, yielded contacts in excess of 3000km and it is hoped that this will lead to future expansion of 50MHz eastwards. Laurence and Morag told *RadCom* "All the equipment has been fully thawed out and serviced and awaits future cold blasts. The human scars from the penetrating cold and memories of discomfort slowly fade. Weight lost is regained. Thoughts now move towards the next Polar operation."

MS MULTIPLE SCLEROSIS

Any reader who still wishes to make a donation to the MS Society Research Chair Appeal should send it to: The MS Society Research Chair Appeal, The MS Society, 25 Effie Road, London SW6 1EE

HQ NEWS

COUNCIL HAS BEEN conducting a review of Headquarters management and has concluded that there is a need for a change in emphasis.

As a result, Philip Smith, who has been Financial Controller since June, has been asked to take charge of the management of the Society from 1 January 1991.

The implications of this change wil be reported regularly here, so please watch this space.

Election of Council for 1991

THE VOTES CAST in the above election were as follows:-

ORDINARY MEMBER

J D Forward, G3HTA	1050 Elected
G R Foster, G1DRG	267
D J Hough, G4WRW	166
T D Jackson, G4HYY	672
N Lasher, G6HIU	204
N Roberts, G4IJF	705

ZONAL MEMBERS

Zone B

J Allen, G3DOT Elected Unopposed

Zone E

E P Essery, GW3KFE	92
C N Trotman, GW4YKL	113 Elected

Zone F

Council will fill the casual vacancy at its January meeting.

INVALID VOTES

Late	25
Unidentified	146
Duplicates	0
Subs in arrears	25
Invalid categories	6
Spoilt	18
	220

A full list of Council members appears opposite.

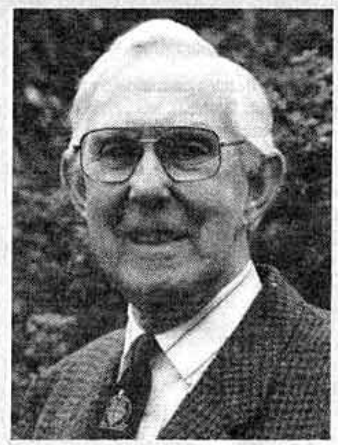
BARTG News

THE BRITISH Amateur Radio Teledata Group has a new Membership Secretary, Ann Reynolds, G6ZTF. Her address is 169, Bell Green Road, Coventry, CV6 7GW. BARTG would like to thank John and Pat Beedie, GW6MOK, and GW6MOJ, who did the job previously.

● From the Welwyn Hatfield Times – IBM PC Compatible portable computer, Sharp PC7000, dual 5ft 4in discs . . . .

The RSGB's 57th President John Case, GW4HWR

WILL BE INSTALLED at an evening reception and dinner at Cardiff Castle on Saturday 12 January. Any member may attend this prestigious event. The RSGB's Project YEAR Video will receive its first public showing at the Installation. Tickets are £16 per head from The Secretary, RSGB, Cranborne Road, Potters Bar, Herts, EN6 3JE.



G4P . . QSL Manager

THE QSL MANAGER for the G4P . . series is C Colvin, G0BXQ, 46 Beechwood Avenue, Woodley, Berks, RG5 3DG.

● Following the recent increase in postage rates, members should ensure that any envelopes deposited with their QSL submanagers are sufficiently stamped.

New HF Manager

FORMER HF Committee Chairman, Martin Atherton, G3ZAY, is the new HF Manager. He takes over from Dr John Allaway, G3FKM. John is Secretary of IARU Region 1 and will be very heavily involved in the preparations for the WARCs in 1992 and 93.

Write for RadCom

WE WELCOME technical articles of all sorts, but particularly those which will make about a page. These are some 1000 words long and include a diagram or two and preferably a photograph. Longer articles are just as welcome but are likely to take much longer to be published as there is quite a waiting list. Payment is made for all technical articles published. Articles submitted on a (non-returnable) PC disk attract a higher fee than manuscripts.

New publications

TWO NEW magazines are emerging in the USA from the demise of *Ham Radio* earlier this year. *Communications Quarterly*, to be published by *CQ*, and edited by former *HR* staff, was due for launch in November. In addition, *Beam* magazine, which aims to be totally financed by advertising, has already been published and sent free to some 20,000 radio amateurs.

Your own local RSGB Liaison Officer

THE FOLLOWING HAVE been elected as RSGB Liaison Officers for 1991 - 93. In cases where no nomination was received, the Membership Liaison Committee exercised their option to co-opt. Anyone wishing to fill a vacant post should contact the appropriate Zonal Council Member listed.

RLOs have a great deal of information at their fingertips, and can put members in touch with the RSGB's experts in various fields. Call your RLO first if you have a query - he is there to help you.

AVON (Zone D) VACANT. Contact Zonal Council Member
BERKSHIRE (Zone D) Dave Chislett, G4XDU, tel: 0628 25720
BORDERS (Zone G) Ian Wilson, GM4UPX, tel: 0835 62656
BUCKINGHAMSHIRE (Zone D) Ron Ray, G3NCL, tel: 0494 776420
CHESHIRE (Zone A) VACANT. Contact Zonal Council Member
CLEVELAND/DURHAM (Zone A) VACANT. Contact Zonal Council Member
CLWYD (Zone E) VACANT. Contact Zonal Council Member
CORNWALL & ISLES OF SCILLY (Zone D) Bert Hammett, G3VWK, tel: 0726 882758
CUMBRIA (Zone A) Mike Gibbings, G3FDW, tel: 0539 532433
DEVON (East) & DORSET (South)(Zone D) Ken Powell, G1NCG, tel: 0202 666050
DORSET (North) & SOMERSET (South) (Zone D) Ken Watkin, G3AIK, tel: 0935 825266
DYFED (Zone E) VACANT. Contact Zonal Council Member
EAST SUSSEX (Zone C) Jim Harris, G4DRV, tel: 0892 655894
ESSEX (Zone C) Brian Gibbard, G0AZF, tel: 0702 616691
FIFE & TAYSIDE (Zone G) Martin Hobson, GM8KPH, tel: 079 62140
GLOUCESTERSHIRE (Zone D) VACANT. Contact Zonal Council Member
GRAMPIAN (Zone G) Stewart Cooper, GM4AFF, tel: 0569 31182
GREATER BELFAST (Zone F) Gordon Curry, GI6ATZ, tel: 0846 638896
GREATER LONDON NORTH (Zone C) Roy Charlesworth, G4UNL, tel: 081 804 5643
GREATER LONDON SOUTH (Zone C) Robin Sykes, G3NFV, tel: 0372 372 587
GREATER MANCHESTER (Zone A) Bob Catlow, G4ARP, tel: 061 652 8617
GUERNSEY (Zone D) Brian Ayres, GU1HTY.
GWENT (Zone E) Peter Dombrowski, GW1NYO, tel: 0495 246359
GWYNEDD (Zone E) VACANT. Contact Zonal Council Member
HAMPSHIRE (Zone D) VACANT. Contact Zonal Council Member
HERTFORDSHIRE (Zone C) Peter Fairhurst, G0KLU, tel: 0992 33036
IOM (Zone A) VACANT. Contact Zonal Council Member
ISLE OF WIGHT (Zone D) Douglas Byrne, G3KPO, tel: 0983 67665
JERSEY (Zone D) Syd Smith, GJ0JSY, tel: 0534 38996
KENT (Zone C) VACANT. Contact Zonal Council Member
LANCS (Zone A) VACANT. Contact Zonal Council Member
LEICESTERSHIRE (Zone B) Gwyn Harries, G4WYN, tel: 0530 417307
LINCOLNSHIRE & SOUTH HUMBERSIDE (Zone B) Ray Degg, G0JOD, tel: 0522 750316
LOTHIANS (Zone G) David Milne, GM1YXM, tel: 0313 132882
MERSEYSIDE (Zone A) VACANT. Contact Zonal Council Member
MID/SOUTH GLAMORGAN (Zone E) Clive Trotman, GW4YKL, tel 0443 226198
NORFOLK (Zone C) William Higgins, G3PNR, tel: 0603 629150
NORTH EAST ULSTER (Zone F) AE Henry, GI4CRL, tel: 0266 41068
NORTH HUMBERSIDE (Zone A) Norman Bedford, G4NJP, tel: 0262 673635
NORTH YORKSHIRE (E of R Ouse and Swale) (Zone A) Bob Wilkinson, G4YKO, tel: 0723 352823
NORTH YORKSHIRE (W of R Ouse and Swale) (Zone A) Gareth Foster, G1DRG, tel: 0904 421392
NORTHERN IRELAND NORTH (Zone F) Victor Mitchell, GI4ONL, tel: 0504 311019
NORTHERN IRELAND SOUTH (Zone F) Danny Campbell, GI4NKD, tel: 0762 342620
NORTHUMBERLAND (Zone A) Jack Swayne, G3BLE, tel: 0665 720601
ORKNEY (Zone G) Bill Wright, GM3IBU
OXFORDSHIRE (Zone D) VACANT. Contact Zonal Council Member
POWYS (Zone E) Paul Essery GW3KFE, tel: 0686 28958
SHETLAND (Zone G) Pete Weller, GM3XOQ, tel: 095 02354
SHROPSHIRE (Zone B) Chris Hughes, G0DQW, tel: 0743 241194.
SOUTH YORKS (Zone A) VACANT. Contact Zonal Council Member
STAFFORDSHIRE (Zone B) Ken Parkes, G3EHM, tel: 0782 397240
SUFFOLK (Zone C) See Norfolk
TAYSIDE (Zone G) as Fife
TYNE & WEAR (Zone A) Ian Batley, G0IID, tel: 091 548 3301
WEST SUSSEX (Zone C) See East Sussex
WEST YORKS (Zone A) VACANT. Contact Zonal Council Member
WILTSHIRE (Zone D) VACANT. Contact Zonal Council Member

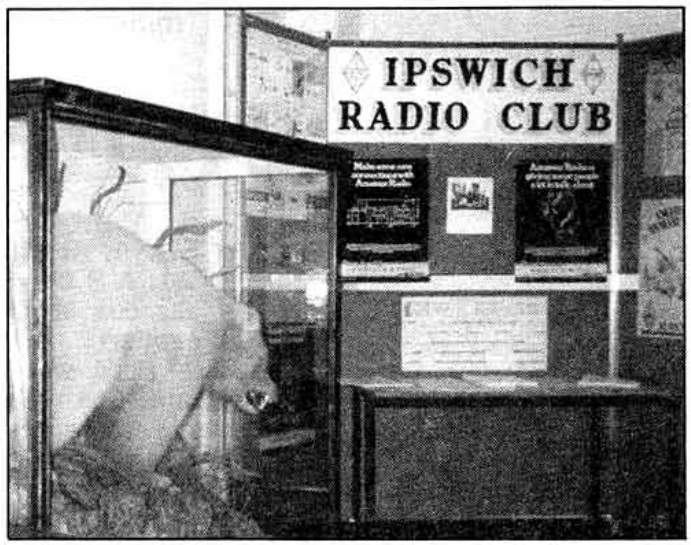
Zonal Council Members
Zone A: Geoff Smith, G4AJJ, tel 0723 85845
Zone B: John Allen, G3DOT, tel 0472 825899
Zone C: John Greenwell, G3AEZ, tel 0306 77236
Zone D: Peter Chadwick, G3RZP, tel 0666 860423
Zone E: Clive Trotman, GW4YKL, tel 0443 226198
Zone F: Terry Barnes, GI3USS, tel 0247 473948
Zone G: Ian Suart, GM4AUP, tel 0236 65937

Membership Liaison Committee Changes

Ian Suart, GM4AUP, Zonal Council Member for Scotland, and Chairman of the Datacomms Committee, has been elected Vice Chairperson of the Society's Membership Liaison Committee.

A new member of the MLC is Jim Harris, G4DRV, RLO for East and West Sussex. We inadvertantly got Jim's address wrong last month. His correct address is: Upton, Crowborough Hill, Crowborough, East Sussex, TN6 2DA. Apologies to Jim and to John Greenwell whose address we printed by mistake.

PHOTOGRAPH: G4IFF



GB2IRC - The Bear Facts

The Ipswich Radio Club put on a special event station last October at Ipswich Museum's Open Day which attracted 1500 visitors. There has always been a radio connection with the Museum as the first local radio broadcast was made from its premises in 1899. GB2IRC was such a success that it eclipsed the other aspects of the event in local press reports. Well done, Ipswich Radio Club.

ICOM (UK) Rise to the Challenge

The task for Anneka Rice on *Challenge Anneka* (BBC1, Sat 8 Dec) was to fit out a Thames barge as a floating classroom for handicapped and disadvantaged youngsters. One requirement was safety communications, and ICOM (UK) Ltd came to the rescue by donating all of the VHF radio equipment, power supplies and aerials to this worthwhile project.

Stolen Gear

On 5 December, from David Thornton, G0EHF, in the Bedford area: Yaesu FT290R S/N 1L080931; Yaesu FT790R S/N 2N070904; Trio TS430S S/N 4051216; Trio AT230 S/N 4030106; and a variety of other equipment. Anyone with information should contact David, or any police station.

On 28/29 November, from David Kiellor, G0CJL, in Luton: All Yaesu equipment - FT902DM S/N 1H200025; FC902 S/N 1H220210; FTV901 S/N 9K050644; FV901DM S/N 1C060241; PSU S/N 0L060489; FT290R S/N 4F360950. Anyone with information should phone Luton Police on 0582 401212. A £100 reward is payable on return of the equipment.

From Gordon Parkin, G0ISJ, in Wakefield: ICOM IC740 S/N 02025; Yaesu FT209 S/N 1H031952. Contact Gordon QTHR or on 0924 379280.

Awards News

Some changes to the application rules for RSGB VHF/UHF awards take effect 1 January 1991. Applicants will be charged as follows:- RSGB members £3, US$6 or 12 IRCs; UK residents who are not RSGB members £6, US$12 or 24 IRCs. Overseas residents who are members of their IARU approved national society £6, US$12 or 24 IRCs. Overseas residents who are not members of their national society £9, US$18 or 36 IRCs. Proof of membership (if appropriate) is required. RSGB members should note that this represents a 50% discount over non-members. No charge will be made for endorsement stickers. Remember to include sufficient postage and an SAE for the safe return of QSL cards.

The RSGB recently issued the first RSGB VHF/UHF Award to be awarded to an Australian amateur. VK3OT had 50 countries 2-way confirmed on 50MHz. WL7AZB is the first overseas YL to be issued with the 50MHz 10 countries 2-way award (number 41). G4WND received the 45 square / 8 country sticker for 70MHz, proving there is significant activity on that band. On 144MHz, G3IMV has confirmations for 425 squares and 50 countries, an astonishing feat.

Half a Million

Latest statistics show there are 488,391 radio amateurs in the USA.

Just What the Reader Ordered!

AUGUST LAST, WE carried out the biggest ever survey of RSGB members on what should, and should not, appear in the magazine. Thanks to the generosity of many amateur radio equipment dealers and manufacturers in donating prizes for the draw, over 1,500 readers submitted their views. The *RadCom* team spent many hours poring over the forms and analysing the results. Finally, a new format was agreed which incorporated as many requests as possble.

The Result

THE MAIN FINDING of the survey was that an overwhelming majority of members want to build equipment. The major change we have made has therefore been a re-balance towards technical theory and practice.

There was also a plea for more of the simpler 'weekend project' type of article. We have tackled this in two ways. Firstly, each month there will be at least one simple project. Secondly, we have introduced a new column - *Eurotek* - which will carry edited translations of short articles from the magazines of our sister Societies in Europe.

More and Less

THE MAIN SURVEY question asked members to tick the five types of feature they would like to see featured more prominently. Top of the poll, came Pat Hawker's *Technical Topics*, followed by technical construction and technical theory.

One of the snags of having a fixed number of pages is that, if the space given to technical items is increased, something must be decreased. The survey, therefore, asked which five should be less prominent. Least popular was the RF Byrne cartoon strip. This has been dropped, at least on a regular basis. Next in unpopularity came all contest rules and reports which a very high proportion of respondents wanted reducing in size.

The Changes

FROM THIS EDITION, you will notice the following main changes to our regular features:-

A brighter *Contents* page divided into news, technical and regular columns. Spectrum Analysis has been replaced by two pages each of *HF News* and *VHF/UHF News*. The HF Propagation information turned out to be the most popular part of Spectrum Analysis so it now has its own full page, *Propagation News*, incorporating both HF and VHF information.

The two SWL columns have been combined into one - *SWL News*, and a new monthly column - *Novice News* - has been introduced.

Underpinning the move towards a more technical magazine, *Technical Topics* will be a minimum of five pages monthly, frequently more. There will be equipment reviews each month: an in-depth *Peter Hart Review* bi-monthly, with mini-reviews in between. *Product News* is increasing to approximately two pages monthly.

The 'columns' section will feature *EMC* increasing to about two pages bi-monthly, *Datacomms*, *Satellites* and *QRP* one page each bi-monthly, and *Raynet* a page a quarter. *Microwaves* will now appear as a bi-monthly two-pager allowing a greater technical content.

HF Contests have a single page monthly and *VHF Contests* share a page with *Direction Finding* which was the least unpopular of the competitive reports. The Contest Calendar has been split into HF and VHF, and major overseas HF contests are now included. There will be additional space allocated for General Rules and reports on the larger RSGB contests.

By popular demand, the type size for *Members Ads* has been increased and the first few words have been highlighted. *Silent Keys* will now appear monthly. The surprisingly popular *Helplines* will occupy half a page each month, and *The Last Word* will be bigger with the removal of the cartoon.

Style

IT WAS NEVER OUR intention to throw the baby out with the bathwater, and your comments confirmed our belief that *RadCom*'s style is about right. No less than 30% made unsolicited comments to the effect that ours was the best amateur radio mag in the UK. Thanks for your support.

There are several minor design changes but the most significant is an increase in type size on most pages. By careful design we have managed to retain the number of words per page, always significantly greater than any of our competitors.

You wanted . . .	Done!
Bigger type	✔
More technical pages	✔
More basic construction projects	✔
More Technical Topics	✔
More Helplines	✔
More QRP	✔
More EMC News	✔
More equipment reviews	✔
More Product News	✔
More for new amateurs	✔

What we couldn't do

THERE WAS ONLY ONE popular request to which we could not accede. There is a demand for the commercial advertisements to be separated from the editorial content, as it was pre-1989. Regretably, we are in direct competition for advertising revenue with other UK amateur radio magazines and if they are prepared to mix editorial and advertising (highly desirable for the advertisers) then so must we. The alternative is to accept less income from advertising and find the money from an increased subscription.

Quotes

HERE ARE JUST a few of the things you said . . . .

"Enlarge the typeface for the old G3 eyes" *[who are you calling old? - Ed]*; "Shambolic Shack - A disgrace"; "I read everything"; "Expand Technical Topics"; "Do not stop RF Byrne. Sometimes we all need deflating"; "We are all put off by jargon"; "More simple effective projects"; "Don't spoil a good magazine"; "I refer to the Ads more frequently than any other section"; "*RadCom* assumes its readers are professional electronics engineers"; "Cut Spectrum Analysis"; "Editorial/news/comment is rather pompous"; "We can't all afford a TS950!!"; "Do not let print get any smaller"; "Most hams are not contesters"; "The magazine is the main draw to any major society"; "Use more glossy paper"; "Is this just a survey or will it be used to improve *RadCom*?"; "We need to cover all aspects of the hobby"; "Good luck!"; "Review smaller items not just expensive equipment"; "I like *RadCom* - its the best on the market"; "Too much Society and not enough radio"; "Practical information at all times"; "*RadCom* has taken on a trash magazine style"; "*RadCom* has improved no end"; "I tend to read *RadCom* like a text book"; "Too much waffle, too many adverts, saving grace is *TT*"; "Despite my comments it is still a good magazine"; "I read *RadCom* from back to front always"; "It wasn't easy to tick the 'less' boxes" *[now you know how I feel - Ed]*; "Pleased you have asked for comments at long last"; "I am still reading past issues"; "Most people have a limitted amount of time - I certainly have and I'm retired"; "I look forward to receiving my *RadCom* each month".

Thanks

THANKS ARE DUE to the donors of prizes and to you, the readers, without whom we would still be using guesswork. We hope that every member will find something he likes in the new look *RadCom*. There are more goodies to come as you have given us a great many ideas for future articles.

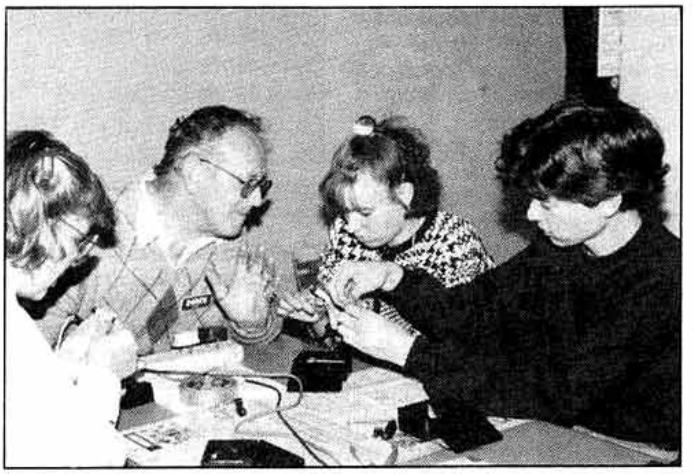
We will be conducting further surveys to ensure that *RadCom* is continuously responding to your needs. We know we can't please all of the people all of the time, but we're having a good try.

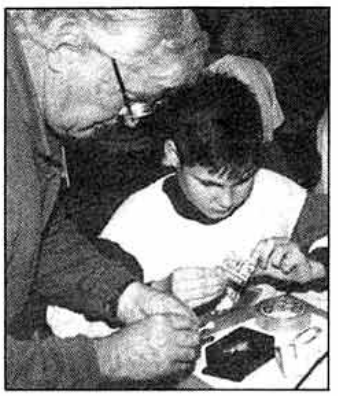
Mike Dennison, G3XDV, Editor

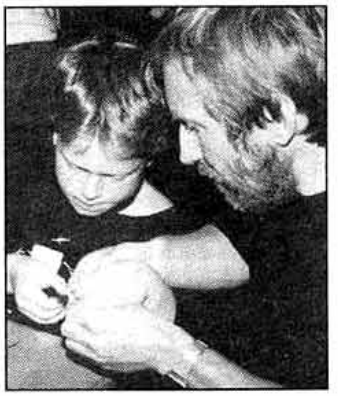
PROJECT
Y.E.A.R
Youth into Electronics
via Amateur Radio

Project Y.E.A.R The Way Forward!

No less than 60 Norfolk school children have experienced the delights of D-i-Y Radio – here's how it was done







AS THE TIME approaches for the Novice Licence to become a reality, it is encouraging to see the gathering momentum of Project Year among our leading Affiliated Societies. The message that amateur radio is fun and can be good for your career prospects, is now being projected to youngsters all over the country in a manner that will surely receive the approval of all Society members.

You will already have seen reports of the educational activities of such clubs as Verulam (St. Albans) and White Rose (Leeds). This latest report comes from the Norfolk Amateur Radio Club in Norwich, which has completed the first stage of its Project Year plans by running a most successful Open Day at the Hewett School, Norwich. The event was attended by upwards of sixty young people ranging in age from seven to seventeen, all supported and supervised by the club members.

Chairman, Geoff Agness, G4ODC, describes how planning started a year in advance with the booking of the big school hall, and an appeal to local businesses for funds. It fell to Project Secretary, Sheila Snelling, G0KWP, to write to dozens of local companies connected with electronics, and to organise weekly club raffles and other fund raising activities. The result of all this hard work was that sufficient cash was raised to cover all expenses completely.

Project leader, Alan Wright, G0KRU, and his committee set about planning a programme that would appeal to children and would enable them to try their hand at talking over the air and at simple construction work. Invitations were despatched to schools all over the county and the club's insurance policy was checked to ensure cover was adequate for the occasion.

Norfolk firmly believes that hands on experience is the way to implant a degree of interest in our hobby that can be expected to bear fruit in later years. The club's first priority, therefore, was to put together a small kit for a medium wave receiver that could be built in about an hour by an absolute beginner. Design work commenced, prototypes built and the final result is thought to be a 'first' for any club involved in the mass production of radios for Project Year.

Following feverish work on the Friday evening and all day Saturday, Sunday the 7th of October dawned with bright sunshine - a perfect day to attract visitors. At 9.30am the children started to arrive to find the hall set out with visual displays and no fewer than six stations already on the air. GB2HPY (Hewett Project Year) was active on HF CW, HF phone, VHF packet, VHF FM, SSTV and satellite. Jim Bacon, G3YLA, found a ready audience for his propagation forecasting station.

PROJECT
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The Headmaster, Mr. C Wade, welcomed the speakers and then Victor Brand, G3JNB introduced the role of the RSGB and the Project Year Novice Licence story. G0KRU and G3YLA described the hobby and its many aspects before showing the ARRL video *The New World of Amateur Radio*. They then encouraged everyone to have a go at amateur radio for themselves. Club members went on the air surrounded

by eager groups of youngsters, for a majority of whom it was a new and exciting experience to hear remote stations addressing them by name.

After a break for lunch in the school canteen, it was time for the practical session. Every child was presented with the radio kit which included a pair of phones and batteries. Seated at work tables and equipped with work boards (to protect school property) they were first introduced to the mysteries of soldering. Club members had loaned sixty irons for the day and the leading 'home-brew' experts sat at each table to guide the work and to help with the intricacies of coil winding.

The first set was up and running in just thirty minutes, a feat which spurred everyone to greater efforts. At the end of the day, Radio Norfolk, Radio Broadland and Radio One were booming into the sixty pairs of ears of the grinning and delighted pupils.

The undoubted success of the day was summed up by young Andrew Stainer (10) and Daren Billings (12), of Thetford Grammar, who said how impressed they were at the thoroughness of the day's presentation and how they had enjoyed talking over the air. They were already planning to make a morse oscillator to start preparing for the Novice Licence exam!

At the closing gathering, every child was presented with a personalised Project Year Certificate. The strategy behind this was that it was essential to try to convey their interest and active participation to their parents, and to their own teaching staff. The certificate features the logos of the RSGB and the DTI, together with the names of the sponsoring companies and it is seen as a mark of the seriousness of the occasion as an educational event rather than just a visit to a demonstration of amateur radio.

The youngsters were last seen making their way homewards, clutching bags of information leaflets on amateur radio, back copies of *RadCom*, *D-i-Y Radio* and other magazines, QSL cards and all sorts of attractive bits and pieces.

The real star of the day was of course the radio kit. It was good to see primary school youngsters with their little piles of components, wielding a soldering iron like professionals, and eventually experiencing that unique thrill of one's first home construction work that can so easily be recalled by the majority of our readers of more mature years.

PROJECT
Y.E.A.R
Youth into Electronics and Amateur Radio

What next? Well that's another story. Chairman, G4ODC, believes that follow up sessions will be important and promises to keep us all informed as to progress. His Project Year Team will be happy to advise sister societies on their own schemes and on how to prepare that all important kit.

Congratulations to Norfolk. Other clubs please copy! All enquiries by post to club secretary G4DYC (QTHR) should enclose a large SAE and £1 to cover copying and expenses.

THE AMATEUR SATELLITE ORGANISATION OF THE UK

AMSAT-UK

WHY NOT APPLY FOR membership of the Organisation which is at the leading edge of our hobby? It deals with Amateur Radio Satellites for use at HF, VHF and UHF.

If you have equipment on these frequencies you can communicate with the world via satellite, using far less power output. Modes of operation are SSB, CW, and Packet in addition to FM Telemetry decoding of scientific data.

There are currently twelve satellites in operation with another to be launched from USSR during this month, (RS-14) which has an exciting new comms mode, (RUDAK) aboard.

AMSAT-UK is dedicated to the funding and information dissemination of amateur satellites, and to the design, building, launch, and ground command of all amateur satellites. There are no paid staff and your RSGB membership does not fund any part of the organisation.

Membership is by donation only, and a current Information Leaflet, the Constitution, Services to Members List, and a list of software, hardware, and books on satellites will be sent for the courtesy of an SASE or two IRCs. A reply is immediate.

Apart from over twenty books on the subject, and thirty software programmes, we have the following Technical Handbooks published this month:

The New Guide to Oscar Operation @ £3.60 plus postage.

The 1990 Colloquium Technical Papers; 120 pages of expert advice from Lectures at our Annual Colloquium @ £11.00 plus postage.

The new *MIR (USSR space station) Technical Handbook*. £4.75.

Members of AMSAT-UK may deduct 10% for the above items which are now in the Services to Members List. If you require a full catalogue please remit £2.00 with your enquiry. You will also get a £3.00 Voucher off your first purchase.

All enquiries should be made to The Hon. Secretary, G3AAJ, AMSAT-UK, London, E12 5EQ, enclosing a self addressed and stamped envelope.

CONTEST TROPHY WINNERS PICTURED AT THE HF CONVENTION: Left to Right. Front row; G3FXB, G3SXW, G4BLE, BRS 87156, BRS 1066, G3OAY, G3RIR, G3NAJ, G3XBY. Back row; GW3NYY, GW3YDX, G4OBK, G3ORY, G3JKS, G3WRR, G4ARI, G0KJW, G4BUO.

CITY AND GUILDS OF LONDON INSTITUTE

Report on the May 1990 Radio Amateurs' Examination

(Reproduced by authority of the Institute)

OVERALL RESULTS (UK CANDIDATES)

Examination Date	No.of Candidates Completing Exam	Candidates Qualifying for RAE Certificate No	%
May 1988	2453	1550	63.2
Dec 1988	1182	835	70.6
May 1989	2250	1516	67.4
Dec 1989	956	753	78.8
May 1990	2157	1599	74.1

COMPONENT RESULTS FOR THE MAY 1990 EXAMINATION

Paper	Components	No of Candidates	Distinction %	Credit %	Pass %	Fail %
01	Licensing conditions, transmitter interference and electromagnetic compatibility (EMC)	2160	13.8	39.4	33.1	13.7
				86.3%		
02	Operating procedures, practices and theory	2159	11.2	32.4	33.9	22.5
				77.5%		

RADIO AMATEURS' EXAMINATION

REPORT ON MULTIPLE-CHOICE QUESTION PAPER

Paper No. 765-1-01 Examination series May 1990

Syllabus Topic or Objective	% of Items	Comments on performance of candidates
Licensing Conditions	33.3	Questions on Licensing Conditions were well answered. In the question on the frequency measuring equipment required for a crystal controlled 144MHz transmitter, 37% of candidates thought that it was necessary to have a digital display. Only 25% of candidates knew how to notify a change of the Main Station Address. Over one third of the candidates thought that the operator's signature was required in every log entry.
Transmitter Interference	33.3	Almost half of the candidates thought that a two-tone test was to test the access to a repeater rather than to check the operation of an SSB linear amplifier. Only 24% of all candidates answered correctly the question on the cure for parasitic oscillations. Confusing them with harmonics, 49% of candidates said that parasitic oscillations were cured by the use of a low pass filter at the transmitter output. The question on the purpose of an RF filter in the key leads to a transmitter was badly answered. 30% of candidates thought that such a filter was to eliminate chirp, while others were divided between short and long range key click interference.
Electromagnetic Compatibiilty	33.3	Candidates had a good understanding of EMC problems and how they should be approached. The only item requiring comment is on a filter in the input of a microphone amplifier. 58% of all candidates did not recognise the filter as a means of limiting the audio bandwidth. Many thought that it was to bypass RF.
General Comments		Overall, Paper -01 was extremely well attempted, most candidates having prepared themselves adequately for the examination. 86.3% of all candidates taking the paper were successful. A greater number of candidates obtained high marks compared with last year.
Operating Procedures	16.4	There was some confusion over the purpose of the IARU Frequency Band Plans. Although the band plans are provided to enable the most effective use to be made of the amateur bands, about half the candidates thought they were to prevent interference to other services. The item testing the knowledge of the phonetic alphabet was well answered, 97% of candidates giving the correct answer.
Electrical Theory	10.9	All questions on electrical theory were very well answered.
Solid State Devices	12.7	Solid state devices caused little difficulty. The more able candidates answered correctly the question on barrier potential, and a question on the output impedance of a common base amplifier caused some difficulty.
Receivers	12.7	Items on receivers were well answered by most candidates. There was some confusion over the correct type of demodulator to use for frequency modulation.
Transmitters	14.5	An item badly answered was one requiring candidates to recognise the circuit diagram of a linear amplifier. 28% of candidates thought this was a VFO, while a further 18% felt it was a self-oscillating mixer. All other items on transmitters were well answered.
Propagation and Antennas	16.4	Propagation and antennas were the subjects causing most difficulty among candidates. Of the 9 items in the paper, 4 were badly answered. Only 19% of candidates chose the correct feeder for a half-wave dipole; 61% of candidates chose an unbalanced (co-axial) feeder for the balanced antenna. The question on a trap dipole also caused some difficulty; many candidates were not familiar with its physical design. Most candidates did not know that selective fading is caused by the phase difference between two sidebands and can be overcome by using SSB emission. Also, only a third of candidates correctly answered a question on tropospheric propagation.
Measurements	16.4	In an item on the measurement of the DC input of a transmitter 37% of candidates thought it necessary to measure the total current to the oscillator, driver and power amplifier stages. All other items on measurements were well answered.
General Comments		Candidates were well prepared for Paper -02 and 77.5% of all candidates were successful. It is encouraging to see a general improvement in the performance of candidates taking the examination which apparently is as a result of better preparation.

LOWE LANDS AT HEATHROW!

We are very pleased to announce that you now have a choice of Lowe branches in and around London. You will probably know our first outlet at Eastcote run by Fred G4RJS, but to help those coming in by car or plane we have opened our newest branch right beside the M4 near Heathrow. The map shows how close we are to the motorway, indeed it shows how close we are to the entire motorway network.

Initially it will be run by Barrie Kissack G3MTD and a permanent manager will be appointed within the next six months (a job opportunity here for someone). The Lowe Heathrow branch will be different from our other branches in one major respect. In addition to Kenwood equipment, we will be stocking most of the other well known brands from the market leaders, plus a strong representation of scanners and specialist receivers aimed at the aeronautical enthusiast. In addition the range on offer will be complemented by a selection of communication products for the marine, PMR and HF SSB commercial markets, plus the very latest in high performance communications receivers.

The opening of this branch marks the start of a new series of Lowe Global Communications Centres being set up around the country. They will all offer an unequalled combination of long experience, knowledgeable advice, complete product coverage and the best service in the business.

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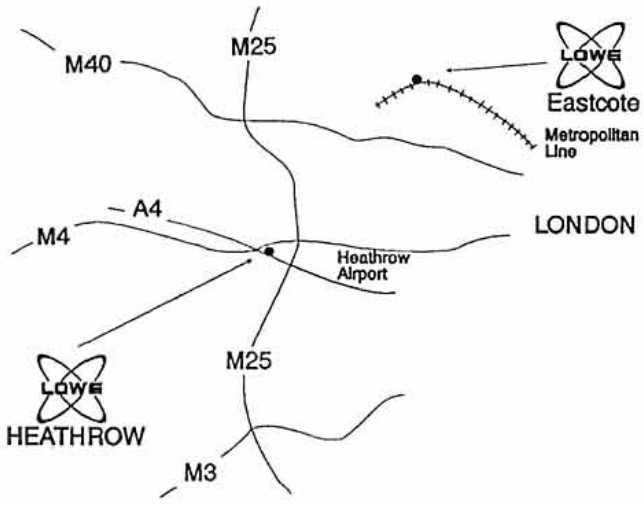

HOW TO FIND US

The new Lowe shop at Heathrow is located just 50 feet from the main A4, 200 yards from the M4 access roundabout at junction 5.

Leave the M4 at junction 5 and take the A4 from the roundabout towards Heathrow Airport and London. After about 200 yards you will see a gap in the brick wall on the left hand side. We are directly through the gap — next door to a fish and chip shop if you are feeling hungry! You can either pull up on the grass verge and walk through the gap, or alternatively carry on another 300 yards and turn first left at the lights into Sutton Lane then first left again into Trent Road. This will bring you out right in front of the shop, where you can park for free without a yellow line in sight.

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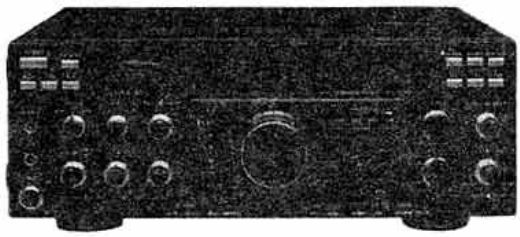

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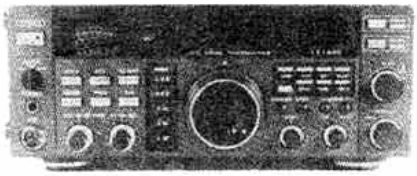

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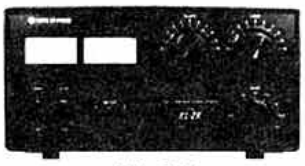

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HL110V	2m 2/10W in 100W out RX Preamp	**£215.00**
HL180V	2m 3/25W in 170W out RX Preamp	**£295.00**
HL36U	70cm 6/10W in 25/30W out RX Preamp	**£135.00**
HL60U	70cm 10/25W in 50W out RX Preamp	**£215.00**
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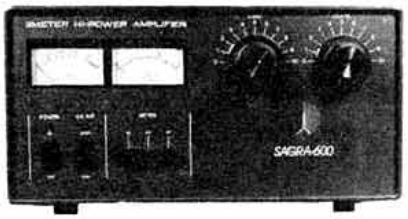

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OSCAR171-B	3.5-150MHz... Relative Power/SWR	Twin Meter £26.85
SP425	140-525MHz 5/15/150W	PWR/SWR £119.95
W570	1.8-1300MHz 5/20/200W	PWR/SWR £119.00
YS60	1.6-60MHz 20/200/200W	PWR/SWR £93.15
YS500	140-525MHz 4/20/200W	PWR/SWR £81.65
CM420	140-150/430-450MHz 15/150W Mini	PWR/SWR £36.00
CD120	1.8-200MHz 15//60/200W	PWR/SWR £75.00
CD160H	1.6-60MHz 20/200/2000W	PWR/SWR £89.00
CD270D	140-525MHz 15/60/200W	PWR/SWR £78.00

DUMMY LOADS

T30	30W PL259 to 500MHz	£11.35
T100	100W SO239 to 500MHz	£49.00
T200	200W SO239 to 500MHz	£65.00
DL30	30/15W PL259	£5.75
L60PL	60/30W PL259	£11.95
CT530	100/500W SO239 to 250MHz Fan Cooled	£59.00

CARRIAGE ON ALL METERS £4.00
CARRIAGE ON DUMMY LOADS UP TO 60W £1.75, ABOVE £4.00.

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13M10BP	30FT BASE PLATE MOUNT	£517.50
13M10FB	30FT FIXED BASE MOUNT	£481.62
13M10W	30FT WALL MOUNTING (Luffing Gear extra)	£420.67

STANDARD 13M20 SERIES

13M20P25	25FT POST MOUNT	£458.85
13M20P40	40FT POST MOUNT	£646.30
13M20P60	60FT POST MOUNT	£761.30
13M20FB25	25FT FIXED BASE MOUNT	£317.40
13M20FB40	40FT FIXED BASE MOUNT	£481.85
13M20FB60	60FT FIXED BASE MOUNT	£596.85
13M20BP25	25FT BASE PLATE MOUNT	£541.65
13M20BP40	40FT BASE PLATE MOUNT	£750.95
13M20BP60	60FT BASE PLATE MOUNT	£845.25
13M20M25	25FT MOBILE TOWER	£2179.25
13M20M40	40FT MOBILE TOWER	£2387.40
13M20M60	60FT MOBILE TOWER	£2557.60

HEAVY DUTY 16M20 SERIES

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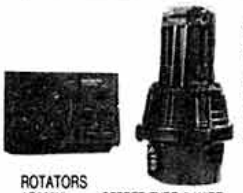
16M20P60	60FT POST MOUNT	£910.80
16M20P80	80FT POST MOUNT	£1426.00
16M20FB40	40FT FIXED BASE MOUNT	£644.00
16M20FB60	60FT FIXED BASE MOUNT	£763.60
16M20FB80	80FT FIXED BASE MOUNT	£1219.00
16M20BP40	40FT BASE PLATE MOUNT	£851.00
16M20BP60	60FT BASE PLATE MOUNT	£952.20
16M20BP80	80FT BASE PLATE MOUNT	£1530.65
16M20M40	40FT MOBILE TOWER	£2847.40
16M20M60	60FT MOBILE TOWER	£2967.00
16M20M80	80FT MOBILE TOWER	£3680.00

ALL TOWERS EXCEPT MOBILES ARE AVAILABLE FROM STOCK. 10M10 SERIES SUPPLIED WITH STANDARD WINCHES. 13M20 & 16M20 SERIES ALL SUPPLIED WITH AUTO BRAKE WINCHES. ALL ARE SUPPLIED WITH H2R HEAD UNIT DRILLED TO TAKE GS-065 BEARING. HOLDING DOWN BOLTS FOR BP AND FB TOWERS ARE AVAILABLE AT £28.75 PER SET EXTRA.

ALTERNATIVE WINCHES AND HEAD UNITS ARE AVAILABLE AT EXTRA COST.
DELIVERY IS BY QUOTATION DEPENDENT UPON DISTANCE

ROTATORS



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G-250	BELL TYPE TWIST/SWITCH CONTROL	£78.00
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G-400RC	BELL TYPE ROUND CONTROLLER	£179.00
G-600RC	BELL TYPE ROUND CONTROLLER	£235.00
G-800SDX	BELL TYPE 450 DEG VAR. SPD	£325.00
G-1000SDX	BELL TYPE 450 DEG VAR. SPEED	£368.00
G-2000RC	BELL TYPE ROUND CONTROLLER	£445.00
G-500	ELEVATION METER CONTROLLER	£199.00
G-5400B	AZIMUTH/ELEV DUAL CONTROL	£375.00
G-5600B	AZIMUTH/ELEV DUAL CONTROL	£435.00
RC5-3	BELL TYPE PRESET	£275.00
RC5-1	BELL TYPE ROUND CONTROLLER	£219.00
RC5A-3	BELL TYPE VAR. SPEED AND PRESET	£425.00
RC5B-3	BELL TYPE VAR. SPEED AND PRESET	£675.00

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KS505	ROTARY BEARING 1½" MAST	£19.95
GS-065	ROTARY BEARING 2" MAST	£29.95
GC-038	LOWER MAST CLAMP G-400, 600 etc.	£16.95
9523	CHANNEL MASTER BEARING	£19.95
CK46	ROTARY BEARING 1.5-2.5 MAST	£34.95
MC1	LOWER MAST CLAMP RC5 SERIES	£25.00

ROTATOR CONTROL CABLE

RC5W	5 WAY G-400RC, 800, 1000SDX PER MTR	£0.48
RC6W	6 WAY G-250, 400, 600, RC KR500 PER MTR	£0.66
RC8W	8 WAY HAMIV, T2X 2000RC RC SERIES PER MTR	£0.72

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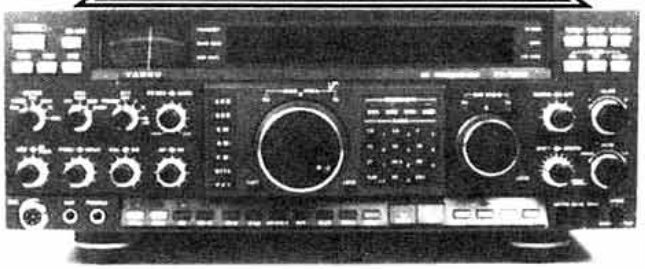

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BERNIE'S NEW YEAR MESSAGE

Ealing has for many years been the amateur radio centre of London. Ever since Brenda and I first opened our corner shop 14 years ago, overflowing with second hand junk and fresh coffee, has this area been famous with the amateur radio fraternity. To Ealing, other shops have come and gone, but the image that Brenda and I set up on how to run a friendly emporium, overflowing with goodwill and coffee has never yet been captured by our competitors. And so it is now, our shop at Hanger Lane, Ealing retains the same friendly atmosphere that has been the hallmark of this organisation. I am still on call most days, but if you phone and I'm out, leave your number and I'll call you back.

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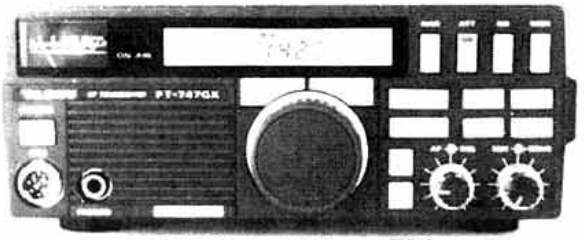

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HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham B17 8QB

CONTESTS SEEM to be the subject of much loathing by some of us who seem to think that what *we* want is the right and proper thing for everybody else. However, I have just received a letter from G0NLM which tells me about the fun he is having chasing new countries and islands during contests. You only have to look at some of the scores reached by leading entrants in major events like the CQWWDX contests to realise that DXCC can be worked in a weekend. How about some friendly competition by non-serious participants to see who can work the most countries/zones/oblasts/whatever without worrying about QSO points. A *real* test of operating ability?

If you have an interesting picture which you think readers would like to see please let me have it. Hopefully it will be returned but no guarantee can be given. Preferably people - not just equipment !

DX NEWS

HF0POL, IN THE **S Shetland Is** is to be found most days after 2200 in the area around 14.215MHz. He has also been on 28.558MHz at 1400.

There is a newly reissued callsign - VQ9CQ - on **Chagos**. He should be on the air by now as he was scheduled to open up on 9 November for one year.

The W5YI Report says that the Siam International DX Club was formed by a group of DX and contest minded amateurs in **Thailand** on 11 October, and that this will try to help those trying to make contacts with HS, arrange schedules, and generally help to put the country back on the amateur radio map. There are now some 13,000 licensed amateurs - but all but about 30 are on VHF only. W1RU and 9V1RH - IARU President and Chairman of IARU Region 3 respectively - have very recently had an audience with HM the King of Thailand - who is also interested in amateur radio and has a callsign.

According to *DX'press*, XQ0X is likely to be the callsign used on **San Felix Is** for about six months from the middle of November 1990. He is said to prefer CW.

CONTESTS

HOWEVER HARD I try not to leave anyone out of a contest results listing it still happens! In the November column under the **1989 CQWW SSB Contest, Multi-Operator Single-transmitter section**, I overlooked **GU0JCI** who scored 463,845 points - a very respectable total. Sorry Phil . . . .

There was quite a large entry from the UK in the **1990 ARRL DX Contests**. In the **CW Section** (All-bands), **G3MXJ** scored 1,175,499 points, G2QT 349,530, G3NKS 200,430, GW3JI 1831,138, G3ESF 180,810, G0MFO 151,632, G3DFV 79,110, GM4ZAS 43,416, G4ZME 23,256, G6NK 19,296, and GM4HQF 8,262. On **1.8MHz**, **GM4OBK** scored 264 points. On **7MHz**, **G0IDR** 2,832, and G4OTY 2,610. **21MHz**, **G3FXB** 184,338 and G4BKI 33,024. **28MHz**, **G4BUO** 93,639, G3SXW 78,678, and GU4ARI 68,667.

In the **1990 ARRL DX Contest Phone Section** (All-bands), **G2QT** was top UK score with 539,676 points, followed by GM3BCL with 251,877, GM4HQF 138,651, G0MFO 108,585, G4XKR 90,144, and G4XOM/P 15,180. On **1.8MHz**, **GM4OBK** scored 3,120. On **7MHz**, **G4VMM** scored 8,856, on **14MHz**, **G3FXB** 376,014, and on **28MHz**, **GW4BLE** 459,819, GW0ARK 445,968, G4UDU 297,198, G4OJH 270,522, and GM4CHX 64,428. Congratulations to **G3MXJ** who is therefore the winner of the Society's Milne Trophy as leading G, and to **GW3JI** who wins the Braaten Trophy as leading non-G.

UBA CONTEST

1300 26 January - 1300 27 January (SSB); 1300 23 February - 1300 24 February (CW)

3.5 to 28MHz (no WARC) in IARU contest-preferred segments. Exchange RS/T plus serial number (from 001). Belgian stations will give their province. QSOs with ON, DA1, and DA2 count ten points, with stations in other EEC countries three and with others one. Multipliers are Belgian provinces and prefixes and EEC countries (a possible 42 per band). Copies of rules available - SASE please. In the 1990 UBA Contest (CW section) **G5LP** won the Third European Community Trophy. He came fourth in the single-operator multi-band listing with 140,320 points. G3ESF scored 19,404. In the SSB section **GW4UZL** scored 126,750 points and led the EEC entrants to win a Third European Community Trophy. In the multi-operator class GW4EZW scored 46,008, and G3XYZ 30,702.

ARRL INTERNATIONAL DX CONTEST

0000 16 February - 2400 17 February (CW); 0000 2 March - 2400 3 March (Phone)

1.8 to 28MHz. Single-operator all and single-band, multi-operator all-band, and QRP (all-band maximum 5W output). Work USA/Canada and give RS/T plus power. Multipliers are mainland US states, VE provinces, DXCC countries (except W and VE), worked per band. Entries may now be submitted on disk and full details are given in the rules - copies available - SASE please.

DUTCH PACC CONTEST

1200 9 February - 1200 10 February

1.8 to 30MHz - frequencies according to IARU Region 1 band plan. Phone and CW but no cross-mode QSOs. Single- and multi-operator and listener sections. Exchange RS/T and serial number (from 001). PA stations give province (DR, FR, GR, OV, GD, UT, NH, ZH, FL, ZL, NB, and LB). One point per QSO and a station may only be worked once per band. Copies of rules, summary sheet and log form are available from me. In the **1990 PACC Contest**, **G3ESF** came top UK with 12,644 points. **GM3CFS** scored 11,742, G4IQM 10,560, G2HLU 10,200, GM3KLA 7,644, G4ZIB 5,740, **GW4BYY** 3,483, G0AOL 3,465, G0IEZ 3,008, G4UHM 1,950, and G4ZME 1,890.

CQ WW 160 METER DX CONTEST

2200 25 January - 1600 27 January (CW): 2200 22 February - 1600 24 February (SSB)

Single and multi-operator - use of packet etc automatically makes you a multi-operator! QSOs with own country two points, with others in same continent five, and all others 10. Multipliers are US states, VE call areas (KL7 and KH6 count as countries and do

QTH CORNER

CY9CF	FP5DX, PO Box 4204, F-97500 Saint Pierre et Miquelon.
FG5R	via W7EJ, 21060 Turner Lane, Hillsboro, OR, 97123, USA.
FR7QT	F5QT, Jean Bruniquel, Chemin Bartas, F-31470 Saint Lys, France.
FT4WC	F6GVH, Michel Godefert, BCAC Courriers Exterieuse, 14 Rue St Dominique,F-75997, Paris Armees, France.
HC8A	PO Box DX, Cuenca, Ecuador.
HK0TU	HK3DDD, Box 25827, Bogota, Colombia.
PJ1B	via K2SB, 202 Minnetonka Rd, Hi Nella, NJ, 08083, USA.
T33R	OH3GZ, Veruskunta Rak. 47 AS 11, SF-11310 Riihimaki, Finland.
T33T	(As T33R).
TY1DX	IK6FHG, Via Solferino 62, I-61100 Pesaro, Italy.

28MHz COUNTRIES TABLE

G4MUW	200	(SSB)	G0MXU	101	
G0JZU	196		G2AKK	98	(CW)
G4VVP	195	(SSB)	G4SJG	81	
G4DXW	168		G0CKP	79	
G4NXG/M	136		GM4CHX	75	
G0KDS	135		G0DUS/M	74	
G4ZYQ	133		GM4ZIL	63	
GM4OBK	131				

A92BE's radio room in Bahrain, showing some of the QSLs awaiting reply on return from vacation.

not count as states), and DXCC countries. I can supply photocopies of the rules (SASE please).

VERMONT QSO PARTY

0001 2 February to 2400 3 February

Just the thing for those looking for rare US counties. Rules available - SASE please.

EUROPEAN DX FOUNDATION

THIS ORGANISATION is "the first all European foundation. It's goal is to support DXers and DXpeditions to allow the DX community in Europe a fair share in their work. We will also supply equipment to those in rare countries who cannot afford their own." The current officers are DK9KD, DL1LD, DL3RK, LA5HE/OZ8RO, and HB9HT. Membership costs a minimum of DM25 (or equivalent) a calendar year and I have some membership application forms available.

AWARDS

THE WROCLAW AWARD

For QSOs with Wroclaw since 6 May 1945. European applicants need 15 points, others ten. Ordinary QSOs count two points, with SP6PKQ five, with prefixes SP0, SR, SN, SQ, or 3Z seven, and contacts made between 6 and 10 May ('Wroclaw Days') count double the normal points. Same station may be worked on other bands/modes for credit. Listeners may apply. Send certified list of QSOs plus ten IRCs to Klub Krotkofalowcow SP6PKQ, P.O.Box 2190, PL 50-985 Wroclaw 47, Poland.

VYTIS AWARD

From the Vytis ARC in Lithuania. Requires seven QSOs with members of the club since 1 October 1989. All bands/modes. A list of members is available from A Albrechtas, LY2BQQ, PO Box 1, Siauiai-10, 235410 Lithuania (SAE and IRC please). (For awards general contacts requirement list contact G4BYW QTHR).

I am sorry to have to report that EL2BA has told me that the **LRAA Liberian Award Programme** has had to be suspended due to the present situation in Liberia.

BRITISH POSTCODES AWARD

The Civil Service ARS in Westminster is issuing this to mark the 150th anniversary of the issue of the Penny Black stamp. For QSOs with different postal areas after 6 May 1991. Gold (120 = all areas), silver (100), and bronze (75) classes. Full copies of the rules - send SASE to Civil Service Amateur Radio Society, Civil Service Recreation Centre, Monck St, London SW1P 2BL.

KARELIA AWARD

Issued by the Karelian DX Club 'Kivach'. Work/hear stations in Karelia (UN, UA1N, RA1N, U1N, UZ1N). First class for Europeans needs 30 QSOs, second 20, and third ten. No mode/band limits and stations may be worked on different bands/modes. Send log extract and 10 IRCs or US$5 to UA1NDR, PO Box 225, Petrozavodsk 185034, Karelia, USSR. The club also issues several other awards - I can send copies of rules if needed (SASE please).

SAMUEL F B MORSE AWARD

Also from the Kivach club (see above). For making 200 QSOs in the **Union of Clubs** contest - 1600 16 March to 1600 17 March. Copies of rules available.

GOLDEN CITY AWARD

Issued by the Johannesburg Branch of the SARL to stations outside Zone 38 who can submit certified log details of 15 QSOs with the Johannesburg area since 30 March 1960. The cities and towns of Alberton, Bedfordview, Benoni, Boksberg, Brakpan, Bryanston, Edenvale, Germiston, Kempton Park, Midrand, Modderfontein, Olifantsfontein, Randburg, Randfontein, Roodepoort, Sandton, Soweto, and Springs also count. QSOs on any band or mode with reports not less than 33 or 338. The award costs five IRCs and applications go to: Johannesburg Amateur Radio Centre, Golden City Award, PO Box 13754, Northmead 1511, Rep. of South Africa. There is a 'Golden City Net' run by ZS6HZ every Sunday from 1800 to 2000 near 14.170MHz and anyone looking for ZS6s is invited to join in.

DXCC HONOUR ROLL

NOVEMBER *QST* contained the latest listing (as at 30 March 1990) which shows those with credit for at least 314 out of the current 323 countries. The second figure is the total of 'all-time' countries worked. In the **Mixed** list at 323 - G3AAE(376), G3FXB(365), G3KMA(351), GW3AHN(367). 322 - G3FKM(364). 321 - G3HTA (342), G3LQP (338), G4CP (367). 320 - G3RUX (336), GM3ITN (353). 319 - G3NSY (333), G3RCA (325), G3UML (342), G3ZAY (332). 318 - G3SJH (329). 317 - G3IOR (351), G3JEC(339), G3MCS (333), GI3IVJ (356). 316 - G2FSP (353), G3GIQ (342), G3HCT (352), G3JAG (336), G3KDB (332). G3MXJ (334), G3YJI (324). 315 - G3ALI (333), G3RTE (316), G3VIE (328), G5RP (341), G5VT (359). 314 - G2DMR (335), G2FYT (349), G4DYO (320), G4FEU (317). **Phone** 323 - GW3AHN (364). 321 - G3TJW (337), GM3BQA (344). G3KMA (337), G3NLY (343), G3UML (343), G3ZBA 9336). 318 - G3FKM (356), G3RCA (324), G3SJH (329), GW3CDP (323). 317 - G3JEC (339), G3MCS (333). 315 - G3YJI (323), G3ZAY (328), G5VT (359). 314 - G4DYO (320), G5AFA (351), GI3IVJ (351). **CW** 314 - G3KMA (318).

Note that from this month, propagation news from me now appears on the same page as the F-Layer predictions, not as part of this column.

Thank you to the *RSGB DX News Sheet* (G4DYO), the *Ex-G Radio Club Bulletin* (WA8GTA), the *Lynx DX Group Bulletin* (EA2KL), *DX'press* (PA3CXC), *DXNL* (DL3RK), and the *Long Island DX Bulletin.*

Please let me have items for **March** issue by **24 January**.

BAND REPORTS

The very early closing date meant that reports were rather few. However, the following wrote in and I wish to thank them :- G2HKU, GM3CSM, G3GVV, GM4CHX, G4FRV, GW4KGR, G4s MUW, NXG/M, G8KG, GU0JCI, G0s KDS, and NLM.
CW calls in italics.

14MHz

0000	VP8BXK, VP8CEO
0700	FK8JA, KL7's
0800	YJ8RN
1100	1A0KM
1500	*T33T*, V63A0, ZL1WG, 9M8FH
1900	*UA0HAE/UA0K* (Wrangel Is), *7Q7LA*
2000	*C9QL*, HK0TU
2200	CE0ZCD, HC8A, KL7PA, *P43SP*

21MHz

0800	BY's 1BH, 4RSA, HL0C, J5CVF, 3D2XV
1000	BV2QL
1500	FR0P, HK0TU
1900	KH6WU, PJ1B, TA5KA, 7Q7RM
2000	FG5R, HC8A, HD1T

24MHz

0600	JA, VK, ZL, *ZS5LB*
1200	PJ6/KV4AD, YB3CEV
1300	J28NU, *J37T, P40T*, VK6RO, *3A2LF*
1400	VP2V/N6LL, 6W1QJ
1500	CM2JG, *FR0P, K6DC*, VP8AWU
1600	A45ZQ, PZ1EL, *ZP5XFB*
1700	N7OTE (Utah), VP5/KA8IIC

28MHz

0800	BY5RA, KH2/N3EMA, HL9UTT, KL7XD, XU8DX, ZL
0900	D68GA, H44AP
1000	BY8AA, HS0AIT, JT1BG, KH2/N0IMD, KH0AM
1100	D44BC, JT0DX, VS6VO, 6W/YU5AD
1200	D68GA, HK0TU, PJ1B, ZF2MZ
1300	FR5QT, VP2MEU
1400	CE0ZCD (San Felix), TY1DX
1500	CY9CF (St.Paul), FG5R, HC0E, VP5T
1600	HC8A, P40T, GW3YDX/VP9, ZS9A
1700	HK0TU, TG0AA, VP5VMA, ZD9BV, 6D2X
1800	PJ9W, VP9AD, ZF1RC
1900	FJ9A, FS/KC1F, HC0E, S01A, V47KP

Propagation NEWS

THIS MONTH SEES THE start of a new propagation column - a whole page devoted to reports, information and forecasts. From time to time, it is hoped that explanatory notes on propagation and on statistics can be included.

Propagation reports which were formerly part of *Spectrum Analysis* will continue to be provided by John Allaway, G3FKM, and Norman Fitch, G3FPK, but will appear on this page, instead of in *HF News* and *VHF News* respectively.

John Spurling, G4AQI, of the RSGB's Propagation Studies Committee (without whom the HF-F Layer Predictions would not appear each month) writes that a decision will be taken soon on whether the numerical or graphical formats will be used in future. Thanks to all those who sent him their views.

HF

THE G8KG REPORT goes as follows:"HF band conditions in the latter part of October and the first half of November were generally good and sometimes very good, notably during the weekend of the CQ WW SSB event. While solar indices averaged about 20% lower than in the corresponding period in 1989, there was an even greater reduction in the average level of geomagnetic disturbance so that F2 MUFs were generally high and conditions mostly stable.

"The decline in solar activity during 1991 will probably only be gradual, with the smoothed sunspot numbers staying above the 100 mark. The trend in the geomagnetic curve is more difficult to predict. In the early years of Cycle 22 the average level of activity (ie disturbance) was substantially higher than in recent cycles including even Cycle 19, and the difference between 22 and 21 was particularly marked which may explain why some found the higher bands disappointing. The differences between individual geo-magnetic cycles are much greater than between their solar counterparts but it is usual for average levels to fall gradually in the years immediately after the solar peak, reaching a trough somewhere in the fifth or sixth year and then rising to a peak somewhere between the seventh and tenth years. This means that, for the present, we are in the phase in which falling solar indices are to some extent compensated by falling geo-magnetic activity; but later the trends will both be disadvantageous in their effects on HF propagation."

THE GB2RS NEWS SERVICE, provided for all radio amateurs and short wave listeners, carries a comprehensive propagation report and forecast each week. Written by Charlie Newton, G2FKZ, the report is available on all GB2RS sound broadcasts (mainly Sunday mornings, 3.65, 144.25 and 144.525MHz) as well as via the packet radio network.

50MHz

IN HIS OCTOBER report Ray Cracknell, G2AHU (HWR), commented that it was an unexpectedly quiet month with no exceptional propagation. Conditions were very patchy and patience was needed to work any DX. A comparison with October 1989 shows October 1990 to have been well down on all circuits.

Ray's report included solar and geomagnetic data, and a brief comment on noctilucent clouds, the conclusion being that the case for their supporting propagation is 'not proven'. There were the usual propagation reports compiled from UK amateurs' notes and contributions from observers in EA6, JA, PA, SV, Z2 and ZS6.

HF F-LAYER PROPAGATION PREDICTIONS FOR JANUARY 1991

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 000001111122 024680246802	24MHz 000001111122 024680246802	21MHz 000001111122 024680246802	18MHz 000001111122 024680246802	14MHz 000001111122 024680246802	10MHz 000001111122 024680246802	7MHz 000001111122 024680246802	3.5MHz 000001111122 024680246802
** EUROPE								
MOSCOW	....59983...	....79995...	....99998...	....998992..	...3877786..	541765457854	886532224788	++42....24++
MALTA	....68875...	....899871...	....999994..	....9889971.	.1.287679951	662754457997	988631125799	+++3....25++
GIBRALTAR	.....7654...	....288771..	....599994..	....8989971.	....9777895.	342.75556896	888652224799	++++2....4++
ICELAND	.....2674...	.....4886...	.....79992..	.....89995..	....3888981.	231.76667862	787254335788	++++2...24++
** ASIA								
OSAKA	....3.....	....51.....	....84.....	....86.....	...1751..1.1	1...52123614	....2...2663	.........35.
HONGKONG	....884....	....886....	....7872....	....6774....	....354532..	2....2135641	1.......2675	353
BANGKOK	....8++82...	....179994...	....158887...	....27688....	.....54574..	3....2125855	2.......2677	355
SINGAPORE	....78883...	....169895...	....148888...	....176781..	.....44575..	2....1125855	1.......2685	352
NEW DELHI	....8884....	....17886....	....357881...	....225674...	.....2456.11	52....125566	72......2678	4........345
TEHERAN	....1+++83...	....388995...	....565888...	....6436782..	2..51.357621	7432..125876	772.....2677	54.......344
COLOMBO	....1+++94...	....267996...	....2258881..	.....26783..	1.....357721	61....125877	5.......2678	2........345
BAHRAIN	....1+8883...	....377895...	....5447882..	....5215785..	31.3..257842	863....25887	772.....2677	54.......344
CYPRUS	.....+++97...	....1999981..	....4888994..	....67778972.	42.754568963	885521246898	8862...13788	++3......4+5
ADEN	....1++8961..	....3667982..	....52258961.	1..4..378841	53.2...57985	873....25888	772.....2676	54.......343
** OCEANIA								
SUVA/S	.....2651...	.....4873...	.....7886...	....177881..	....465574..	....532354..	...12...22..	.....
SUVA/L	....4321.131	65421352	87654651	....8756673.	...27424661.	...241.144...	....2...11..	.....
WELLINGTON/S	.....564....	....17872....	....48885....	....68787....	....754672..	....521353..	....2...21..	.....
WELLINGTON/L	.....	....11.....	....431..111	....6521132.	....7423451.	...151.143..	....2...1...	.....
SYDNEY/S	....75671...	....87783...	....188886...	....177788...	.....554573..	....2213571.	.........251.	.........2..
SYDNEY/L	.....1.....	.....31....1.	....2642.141	47532451	....5534575.	....32.1462.	.........13..	.....
PERTH	...166544...	...278766...	...1487881..	....276783..	4357721	1125873	2661	.........33.
HONOLULU	.....	.........1..	.........3..	.........6..	.12.1.1.16..	..52411143..	..253...21..	...3.....
** AFRICA								
SEYCHELLES	...1446631..	...2447862..	...21258861.	1..1..378841	53.....57985	851....25888	73......2667	5.........344
MAURITIUS	...1477771..	...2457884..	...22258973.	1..1..378962	63.....57997	84.....25899	62......2688	4.........355
NAIROBI	....767873..	...26568962.	1..422379851	31.4..168984	7612...37998	983.....4898	772.....2576	54........243
HARARE	....4466752.	...144578741	21.222258973	43.3...38996	8711....6999	983.....3799	761.....1588	53........255
CAPETOWN	44677741	1...44568862	32..32237996	64.11..16998	9822....3799	984.....589	862.....268	53.........45
LAGOS	....8+889741	1...87669863	42..73238996	65.161.16998	99343...3899	8985....1699	6782....378	355.......45
ASCENSION Is	68556631	77556762	31..84224886	64..72..2798	98415....589	89852....279	7785.....58	4552......25
DAKAR	....5++7873.	78768862	21..86336985	43..851.4898	885.72..1699	88944....379	76861....158	4453......25
LAS PALMAS	....3+98861.	....5999982.	89889961	11..98778983	553.86556898	988463223689	888741..1379	+5+5.....4+
** S. AMERICA								
Sth SHETLAND	....2444543.	46666552	11..77654464	43..87532246	664.642...14	355341.....1	12221.....	.....
FALKLAND Is	....2556763.	47665641	1...77531354	321.873...36	775.74....15	688351.....2	36652.....	.332.....
R DE JANEIRO	.....653453.	17544551	47311374	321.661..167	765.73....48	98935.....16	77862.....3	5454.....
BUENOS AIRES	....1344562.	35544541	67421143	21..872...35	655.75.....5	789252.....3	57862.....	2453.....
LIMA	.....++761.	.....97553.	1842231	....2361..13	324.653....4	6782521.....1	47762.....	.454.....
BOGOTA	.....9+771.	.....97663.	842241	.....162..23	324..43....5	7782321.....3	67763.....1	3444.....
** N. AMERICA								
BARBADOS	.....2++772.	.....496663.	6832462	.....761.154	424..53...37	8782321....6	87662.....3	5434.....
JAMAICA	.....7++61.	.....88662.	863241	.....1641.33	324.1341....5	7782421.....3	67763.....1	3443.....
BERMUDA	.....8++71.	.....198773.	3865651	5642463	324..541.157	8782321...26	77663.....3	5444.....
NEW YORK	.....5++7..	.....79872.	.....88664.	1775562	324..4442256	87824311..26	77663.....3	4444.....
MEXICO	.....8+6..	.....9851.	.....8521.	.....173.11	224.1135...2	47824212....	27763.....	.453.....
MONTREAL	.....5+96..	.....79981.	.....88774.	2776662	334..4453366	88823312.136	77663.....3	4444.....
DENVER	.....185..	.....396..	.....6862.	77431	234.1..55113	578342122...2	26863.....	.354.....
LOS ANGELES	.....64..	.....85..	.....861.	.....1841.	234.11.351.1	368342.23...	15863.....	.254.....
VANCOUVER	.....12..	.....24..	.....57..	.....772.	233.12.27532	468242125212	14763...2...	.243.....
FAIRBANKS	.....	.....	.....2..	.....11125..	242.14236721	466143125643	23553...2321	..23.....

The provisional mean sunspot number for November 1990 issued by the Sunspot Data Centre, Brussels was 130.5. The maximum daily sunspot number was 209 on 7 November and the minimum was 77 on 1 November. The predicted smoothed sunspot numbers for, January, February and March, were respectively: (classical method) 130, 128, 126; (SIDC adjusted values) 114, 112, 110.

RSGB NATIONAL VHF CONVENTION

Sandown Exhibition Centre, Esher, Surrey

SUNDAY 24 MARCH 1991

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

PROGRAMME

1030 **Convention opens.** Enter through main entrance.
Refreshments. Snack bar in the hall will be open from 1100 to 1800 and the licensed bar will be open throughout the convention.

1130 **AGM** 6m Group.

1330 **Convention address and presentation of trophies** by RSGB President John Case GW4HWR

LECTURE PROGRAMME

Detailed Arrangement for Lectures will be Notified on Arrival

	A	B	C
1415	'EME – Past, present and future' *Peter Blair, G3LTF*	'Repeater linking voice and TV' *Dave McQue, G4NJU*	'Amateur Radio Observation Service' *Geoff Griffiths, G3STG*
1515	'VHF/UHF DX' *Dr Ian White, G3SEK*	'High gain aerials for 23cm' *Derek Atter, G3GRO*	Remote Imaging Group AGM *Henry Neale, G3REH*
1615	VHF Committee Forum	'Modern generation of 10GHz equipment' *Dr Charles Suckling, G3WDG*	Morse Test Forum *Robert McEwan Reid, G4GTO*

1715 Lecture Sessions Ends

1800 Trade exhibition closes. Convention ends

ADMISSION

To simplify management and to reduce costs, it has been decided, as last year, not to issue admission tickets for this convention, either in advance or at the gate.
Admission will be by payment on entry as follows:

Convention and exhibition	£2.00
,, ,, ,, (OAPs)	£1.50
,, ,, ,, (under 18)	£1.00
,, ,, ,, (under 14)	Free

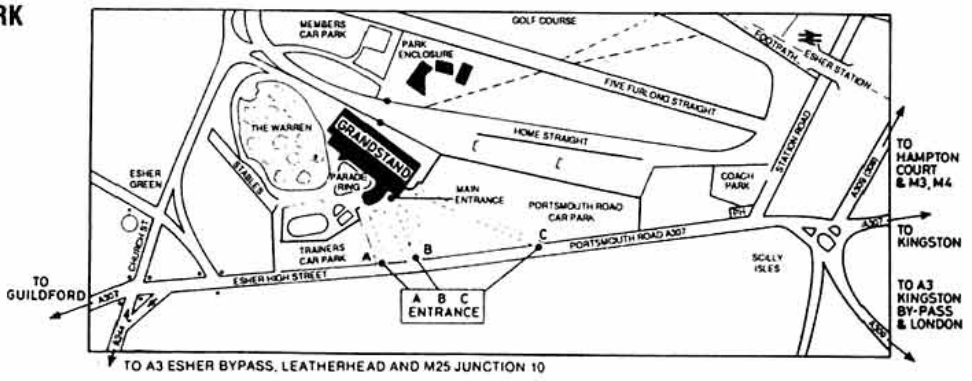
ACCESS MAP TO SANDOWN PARK

RAIL TRAVEL:
British Rail
WATERLOO TO ESHER

TALK-IN STATION:
GB2VHF:
Channels S22 SU22

STAND BOOKINGS:
Les Hawkyard G5HD
Tel: 090-928342

DETAILS:
Geoff Stone G3FZL
Tel: 081-699 6940



Map by courtesy of United Racecourses

VHF/UHF NEWS

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

A VERY HAPPY NEW YEAR to all readers and I hope you enjoyed your Christmas. Mine was somewhat marred by the news that the space allocated to VHF/UHF has been drastically reduced. Nevertheless, I will try to cover all the usual, wide-ranging topics. If we get any extraordinary events, perhaps I'll be able to haggle with the Editor for a bit more space?

Conditions on the VHF/UHF bands this past month have remained very uninspiring with no major autumn tropospheric lift in 1990. On 50MHz there was some reasonable propagation to North America, Africa and VK6, and Sporadic E provided some unexpected openings to Europe until quite late in the year. However, auroras seem to have been in very short supply; more of that later.

E-MAIL

WHEN I BEGAN WRITING THIS feature, I was allocated a British Telecom Gold mailbox and this proved useful in enabling readers on the system to send reports direct. The original number was recently cancelled at short notice, but unfortunately this fact wasn't publicized; I have ascertained that some mail was lost. Please note the new number is 76:MSX021.

TABULAR MATTERS

SOME PARTICIPANTS IN THE Locator Squares Table have not amended their scores for over a year. They are G0DAZ, G0GMB, G0HDZ, G0LFF, G4KUX, G4RRA, G4TGK, G4VXE, G6DER, G6STI, G6UWO, and GW4VVX. Please let me know if you still wish to appear in the list by sending in your current figures.

I propose to run the 1991 Annual Five Band Table from 1 January, using the same rules as for 1990. Henceforth the Annual and Squares tables will alternate - Squares next month, Annual in March, and so on. The March issue will show the final placings in the 1990 Annual Table and the first listings for 1991 will appear in the May *RadCom*, so you will have had about three months to accumulate a reasonable score.

DUBUS

KEN HATTON,G4IZW, IS THE UK agent for *DUBUS* magazine, required reading for all serious VHF/UHF operators. Subscriptions are now due for the four 1991 editions; the amount is £9.00 and remittances should be made out to M Hatton. Ken is QTHR but his telephone number is now Hexham (0434) 220636.

144MHZ MOONBOUNCE

G8MBI HAS SENT A REPORT for October. Graham was unable to operate during the perigee weekend on 6/7th due to windy weather keeping the big array QRT. However, he was QRV in the first leg of the ARRL Worldwide EME Contest on the 13/14th, working 64 stations with 31 multipliers.

Conditions were highly variable, but mostly poor, being depressed by auroral activity. 18 new 'initials' were worked, the figure in brackets denoting the number of Yagis, where known. They were: DL1MAJ (8), SP5EFO (4), EA2LU (8), SM4GVF (6), LA7KK (4), OK2VMD (4, QRP), W7HP (8), DL6YCY, DJ3WA (4 small, QRP and his first EME QSO), GI4KIS (8 small, QRP), PA3FOC (4?), HG0IL (Lots!), DL1GBF (4, QRP), G0GMS (2, QRP), F6EYM (4), SK0UX (4), K9RX/4 and VE2DFO (12).

Conditions to the USA were never very good, and for one hour on the 14th the only station audible was W5UN. Graham reckons that when conditions are like that, it's best to switch off for an hour and make coffee. However, these aurorally depressed conditions do tend to bring short periods (5-10min) of very good propagation. This often allows very small stations to call and get identified, creating some feverish activity. So it is worth staying patiently QRV in apparently adverse conditions.

Now some reports during September from the October issue of *2M Direct* beginning with Calum MacPherson, GW0EWX (IO67UL), on Skye. His CW brought QSOs with SM2CEW on the 3rd; KI3W, W5UN and OZ1HNE (2 Yagis) on the 5th; N1BUG and SM5FRH on the 6th; N5BLZ, K2GAL and OE3UP (sent 'R') on the 8th and W4ZD on the 9th. Next Andy Cook, G4PIQ (JO01MU), who completed with SM5FRH at 1940 on the 7th.

Lastly, John Regnault, G4SWX (JO02PB), who completed with HG0HO on random at 1900 on the 4th; SM5FRH at 1910 on the 7th; PE1LCH and N1BUG in the morning of the 8th and with PA0JMV (2 Yagis), OK1MS, HG0HO and SP5EFO during the evening; VE7BQH and WA6PEV in the morning of the 9th and with EA3ADW and EA3DXU in the evening; N5BLZ at 2300 on the 29th, all CW QSOs. On the 22nd at 1630 he worked W5UN on SSB with 42 reports each way.

G4YTL was bitten by the EME bug during the August trip to Iceland with the Five Bells Group. Till now, David has never used more than 80W and a 10-element Yagi, but is currently building a W2GN amplifier and hopes to put up four Yagis in 1991. Anyone with four or more long Yagis and reasonable power should be able to work around 100 stations, worldwide, so it's worth making the effort.

50MHZ

REFERRING TO A statement in the June VHF/UHF, Steve Richardson, G4JCC (HPH), reports that extreme southern African signals were received after 1947. On 26/3/81 he heard beacon ZS1STB and two days later worked ZS2SS crossband at 1304. ZS1STB was copied on 24/10/81 and in 1982 on 10/3, 19/3, 6/4, 12/4 and 18/10. Glad to put the record straight.

INFORMATION

Ted Collins', G4UPS (DVN), *Information Pages* for October and November confirm that the HZ1AB club station is QRV from Saudi Arabia, operated by W2USA. The first UK QSO was at 1235 on 30 October with G3HBR. The QSL route is via K8PYD, 5740 N Meadows Blvd, Columbus, OH 43229, USA.

From Senegal, 6W1BL and 6W1QC are QRV. For 'BL, QSLs should go to Box 4002, Dakar, Senegal and for 'QC via JA8KJH. 6W1/JA8RWU made his first European QSOs on 21 November; QSL to 1126 Kamiosatsu, Chitose, Hokkaido 066, Japan. Direct QSLs for KG6UH/DU1 should be sent to Captain Luis Anciaux USNR, USCINC PACREP-LNO, US Embassy Manila, APO San Francisco, CA 96528, USA.

F2CW operated from Morocco in October. On the 26th, as CN2CW, he worked ZS6LN, ZS6WB and ZB0T, and on the 28th, G4IGO, GW4EAI, G4DDA, GJ4ICD, G4UPS, G4AHN, GW4LXO, G3UKV and GW3MFY.

Issue 27 of *Six News*, the newsletter of the UK Six Metre Group, has been published. The editor is John Livesey, G0JJL, and Geoff Brown, GJ4ICD, did the graphic design and typesetting. I did not find it very easy to read and I respectfully suggest the editor decides whether he wants an A4 or A5 publication. That apart, it is full of useful information including lists of British Isles 'firsts' and DX QSL addresses.

ACTIVITY

Welcome to Mike Dunn, VE1XDX (FN84), who received his licence on 5 November. He runs 10W to a 4-element Yagi at 70ft and worked GM0GEI on the 7th; the band was open to G, F and PA for about 25min from 1400. On the 10th, 1230-1400, he worked over to DL, EI, F, G, GJ, GU, I, LX, OE, ON and PA. On the 11th, from 1158, he had over 40 European QSOs in 11 countries. Understandably he is very pleased with his week's achievement.

The following is a summary of activity from the last week in October, culled from your interesting reports. In October; 26th at 1308 ZD8VHF S9+ at GJ4ICD, also 9L1US, ZS9A and TU2EW; 27th Es to I0, CN2CW and 9L1US beacons; 28th CN2CW as reported above, Es to I0, I4 and I8 1030-1215, YO2IS later, CT0WW S9+ at 1715; 30th early evening Es to I0, I4, I8, IS0 and 9H, V51E keyer, V51DM and 7Q7JA; 31st late afternoon Es to I4, I5, IT9, YO2IS and 9H, weak aurora to GM in the evening and Z23JO copied.

In November; on the 1st TU2EW and CT1BH to the Midlands and South Wales, V51E keyer; 2nd TU2EW to GJ; 3rd the first opening of the season to VE and W 1400-1425; 4th VK6JQ reportedly worked G0KOI at 1110, lunchtime Es to I, OE and SM, V51E keyer, V51KC, 9L1US, ZS6, ZS9A and ZB0T till 1745 fade out.

5th GJ4ICD heard JAs, at 1105 VK6JQ S9 with G3HBR and G3IBI, V51E keyer, ZB0T, ZS6, ZS9A and TU2EW heard till fade out at 1558; 6th GJ4ICD worked VK6JQ at 0855; 7th VE1YX worked GM0GEI at 1403, W1 to GI and GM from 1415, VE1 to GI, GM and LA in the evening; 8th KG6UH/DU worked by GI8YDZ

and GD3AHV from 0945, open from VE1 and W1 to G around lunchtime, N5JHV heard at 1608.

9th G to VE1 and W1 1258-1630; 10th G to W1, W2 and VE1 1225-1415, VO1MUN beacon S9+40dB at 1230; 11th ZC4MK worked into the UK from about 0940, Es to Italy around lunchtime, open to VE1-3 and VO from late morning to 1630; 12th, HC stations heard from 1220, band open to VE1 and W1 1300-1400, lunchtime Es to OE and YO, V51E and V51VHF copied till 1500.

13th JA4MBM and JA3WXY heard at 0900 by G4UPS, 9L1US at 1330; 16th HCs and KP2A heard from 1326; 17th Es to I0, I3-5, I8 and OE 1115-1300; 18th G to VE1 from 1330, HC8 beacon copied in IO70 at 1500and later at G4UPS; 19th VO1MUN copied from 1235, HC5K and 9L1US heard in afternoon; 20th VK6JQ copied at G3JVL at 0933; 21st 6W1/JA8RWU (IK14) worked by G0JHC at 1351 and G4UPS at 1405. He was up to S9+40dB for 10 minutes with G0JHC.

ANNUAL VHF/UHF TABLE
January to December 1990

Callsign	50MHz Cty	50MHz Ctr	70MHz Cty	70MHz Ctr	144MHz Cty	144MHz Ctr	430MHz Cty	430MHz Ctr	1.3GHz Cty	1.3GHz Ctr	Total Points
G1SWH	55	33	56	7	91	20	49	10	16	5	343
G6HKM	60	38	-	-	71	23	34	13	28	11	278
G0IMG	52	33	44	4	52	13	32	4	-	-	234
G0CUZ	-	-	-	-	93	31	30	6	-	-	160
G0NFH	40	20	21	3	48	9	11	2	2	2	158
G8PYP	27	30	2	1	48	18	21	6	-	-	153
G8ESB	9	5	18	3	48	7	36	5	15	4	150
G4XEN	-	-	-	-	71	27	34	7	3	2	144
G4DEZ	5	23	-	-	36	9	28	11	12	12	136
G1WYC	16	18	-	-	53	14	25	8	-	-	134
GW6VZW	77	48	-	-	-	-	-	-	-	-	125
G8XTJ	13	24	-	-	60	13	-	-	-	-	110
G4OUT	-	-	29	5	60	10	-	-	-	-	104
G0EVT	21	23	-	-	36	14	5	1	-	-	100
GI4OWA	8	30	-	-	46	16	-	-	-	-	100
G3FPK	-	-	-	-	81	18	-	-	-	-	99
GM4CXP	9	6	7	3	54	13	-	-	-	-	92
G7CLY	-	-	-	-	60	9	-	-	-	-	69
GM0JOL	-	-	-	-	51	17	-	-	-	-	68
G6MXL	3	12	1	1	25	5	7	2	2	2	60
G6ODT	-	-	-	-	35	6	15	4	-	-	60
GM0GEI	29	22	-	-	-	-	-	-	-	-	51
GW7EVG	-	-	-	-	37	6	-	-	-	-	43
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.

70MHZ

THE OCTOBER ISSUE OF Roger Banks's, G4WND, newsletter *QSB* included details of the new band plan, a report on the EI2VPX/P DXpedition in August, notes on antennas and the Pye A200 transceiver and the usual Who's on Where? feature. For further details send an SASE to Roger who is QTHR.

It is planned to activate the special event callsign GB4MTR from 13 different QTHs throughout 1991, as it was in 1986. There is a parallel awards scheme and volunteers are needed to run these four week stints, particularly from the more unusual locations; offers to G4WND.

144MHZ

THERE WAS A MINOR TROPO opening on 7 November in which Gerry Schoof, G1SWH (MCH), worked OK1AXH (JO70), OK1VEI/P and DL7AKA (JO62) a new square. On the 8th, Terry Chaplin, G1UGH (SFK), contacted DLs in JO30 and JO31 from 1524.

Andy Smith, G7FWE (CHS), in a letter dated 9 November, reported his first continental QSOs but forgot to mention the date. He contacted OZ6AAP (JO55) and SM7JUQ (JO65) from 1105 one morning. Next day his tally was 17 Germans, one F and OZ, two ONs and three PAs in JN49 and 59, and JO20, 21, 23, 30, 31, 40 and 44.

Derrick Dance, GM4CXP (BDS), worked SM5BUZ (JO78) on CW by tropo at 1758 on 23 October and reckons he was right on the edge of the opening. On 8 November he had an SSB QSO with DB8KJ at 1908, but then had to go QRT, probably missing more DX. He was the only contributor to mention the CW Cumulatives and was QRV in four sessions. His best DX was G4YRY (IO90CR) at 540km in the final leg on 11 November.

Derrick mentioned that auroras have been few and far between lately. I discussed this with Charlie Newton, G2FKZ (YSW), who reckons this is because the geomagnetic activity has been in the wrong place. On many days when the K index at Lerwick (SLD) has been zero for every three hour period, at Hartland (DVN) it has been well above.

Another fact is that there have been periods when no coronal holes at all have been observed in the Sun's southern hemisphere, only in the north. There is little doubt that Cycle 22 is a rather odd one. It may be that the Solar System's interplanetary magnetic field is currently - no pun intended - exerting a more significant effect than usual upon Earth's magnetic field.

430MHZ

HARDLY ANYTHING TO REPORT on this band. G1SWH worked OZ9ZZ (JO46) for a new square and country on 6 November; it is Gerry's worst direction as he has to get his signal over the Pennines. Ela Martyr, G6HKM (ESX), reported poor activity in the Cumulatives but worked DL, GD, GI and GW stations on 18 November.

The VHF Committee has received a request from the Data-Comms Committee for the allocation of 439.8 to 434MHz for internode links. This is in accordance with an IARU Region 1 decision stemming from the Torremolinos conference last April. At its meeting on 24 November it was agreed that your views be sought before making any amendment to the band plan. Please send your comments, as soon as possible, to the Chairman, Peter Burden, G3UBX, at 2 Links Road, Penn, WOLVERHAMPTON, WV4 5RF. Note that is *not* QTHR.

SOFTWARE

ALTHOUGH THERE IS A Data-Comms section in *RadCom*, I get regular requests from owners of Amstrad PCW computers for RTTY, AMTOR and packet radio software. The only program I know of is COM12 for RTTY by Lee Rogers, G7EHA. If you know of any other properly documented software for any of these modes, written for the PCWs, please let me know the sources, and whether they are commercial, Public Domain or Shareware.

For the PCWs, I have amateur radio programs for meteor scatter and EME sked planning, distances and bearings, VHF contest logging and scoring, satellite predictions, locator calculating, HF propagation, Yagi antenna design, etc. Send me an SASE for a copy of the latest PROGLIST.

In the September Column I mentioned that David Searle, G7GOP, was looking for a morse code teaching program for the Amstrad PCW series computers. He has written: "I've had replies from all parts of the country and beyond. Perhaps you would be kind enough to say `Thank you,' in particular to Gerd Lindau, DK6HP, who wrote from Hamburg suggesting that, if I sent a disk, he would copy his own program onto it for me."

David has received Gerd's program which is excellent, generating random characters in groups of five, or a specified selection of characters in groups of five. It can also send complete words from a data file in random order, which can be edited from within the program. It is a machine code .COM file and very fast; output speeds are up to 20WPM.

CONTEST NOTE

THE FIFTH 144MHz CONTEST organized by the Derby and District ARS is on 10 March, 1300-1700GMT with rules as before. Send an SASE to the society if you want a copy of them.

SIGN OFF

THAT IS ALL THERE IS ROOM for in the new, slimline VHF/UHF, so please let me know what you think of it. Meantime please note the forthcoming deadlines which are **24 January** for the **March** issue and **21 February** for the **April** *RadCom*.

Novice NEWS

The Novice News column is intended as a news and information centre for Novice Licensees and potential Novices. For the first couple of months, it will concentrate on details of how the training scheme works, supplied to RadCom by HQ staff and volunteers. After that, it will be written by a regular columnist and its contents will depend on you, the Novice Licence students and Instructors. If you are involved in the training scheme, particularly as a student, please write to me with your comments and suggestions and I will pass them to the columnist. A picture would help, too, but we can't guarantee to return it. - Ed

THEY'RE OFF!

Training for the Novice Licence commenced on 1 January 1991. We don't expect many courses to have started on that day but no doubt some of you were so enthusiastic and prepared, that you have already begun.

THE COURSE

Many Instructors have already been registered, although late applications are still coming in. If you are interested but have not yet applied, obtain a registration booklet by sending a stamped and addressed A5 envelope to Mrs Hilary Claytonsmith, G4JKS, at 115 Marshalswick Lane, St. Albans, Herts, AL1 4UU.

Although the RSGB was not successful with its tender to run the examination (this will now fall to the City and Guilds), there is no reason to suppose that the RSGB Training Scheme will be degraded in any way because of this. There will be continuous assessment of each student's progress throughout the course, and a Course Completion Certificate will only be issued if all parts of the course have been certified as satisfactorily completed. An application to sit the examination will be entertained only if this certificate is presented at the time of registration.

Prospective students requiring information about training courses in a particular area can apply to the RSGB for a list of Instructors. A Senior County Instructor has been appointed for almost all counties and if no course is already set up locally to the applicant, the SCI will endeavour to find the nearest Instructor and between them set up a course. Clubs and groups (for example Guide and Scout units) will sometimes have a waiting list of candidates, in which case they will perhaps need to operate a number of courses per year. As each course is expected to run for 30 hours or about 13 weeks, it would be possible to run four courses in a year.

As with the full licence, the Novice licence will be available in categories - A and B. The A licensee will be able to use all the frequencies listed in the schedule while the B licensee will be restricted to those frequencies above 30MHz. The schedule, and much additional information, has appeared in the pages of *RadCom* since the April 1990 issue and references to most of them are listed in **Table 1**.

THE EXAM

This will be run by the City and Guilds of London Institute (CGLI).

Colchester Radio Amateurs demonstrated amateur radio at the 1st Lawford (Essex) Brownies' autumn craft fair last October where Brownies were able to pass greetings messages over the air. Seen at the microphone is Alexandra Prior (9), under the supervision of Ian Paterson, G4TZM. Standing are Dick Sellen, G3YAJ, and Tony Prior, G4UWW.

The first examination is expected to be held at the end of May 1991, and then at three-monthly intervals.

The type of test is Multiple Choice with a total of 45 questions to be answered in 90 minutes.

The distribution of the questions is shown in **Table 2**.

An explanation of the multiple choice type of question together with advice on the technique of answering questions appears in the Novice Licence Student's Notebook.

TABLE 1

NOVICE LICENCE DETAILS PUBLISHED IN *RADCOM* SINCE APRIL 1990

April:	page 5,	Novice Licence summary.
	page 16.	An outline of the training programme.
May:	page 47.	How to become an Instructor.
June:	page 5.	Novice Licence progress.
	page 2.	Final draft of Novice licence and schedule.
July:	page 4.	Registration of Instructors.
September:	page 9.	SA Novice follows RSGB.
August:	page 5.	The Novice Licence progress report.
October:	page 6.	RadCom Novice Column. Help required.
November:	page 6.	Project YEAR - the Video.

TABLE 2

CGLI EXAMINATION FOR THE NOVICE LICENCE

Subject Heading	No. of questions
Receivers and receiving techniques	4
Components and circuits	2
Measurements	4
Propagation and antennas	5
Transmitter and transmitter techniques	10
Operating techniques	6
Station layout	4
Safety	2
Licence conditions	8

'B' LICENSEES

A holder of a full licence 'B' (ie G1, G6, G7, G8) will be able to take the 5WPM Morse test and, if successful, will have the same access to the HF bands as the holder of a Novice Licence A. While operating under these conditions, he would be obliged to follow the requirements laid down in the Novice Licence schedule and would have to use a Novice callsign. He would of course revert to normal conditions when operating on the bands above 30MHz.

MORSE TEST

The Morse Test will be at 5 words per minute, but each character will be sent at 12WPM speed with large gaps between words and/or groups. It is very probable that the test will take the form of a simulated contact, with callsigns and abbreviations, so that the student will have some idea of what is to be expected when a contact is attempted.

To those 'B' licensees who take and pass the Morse test, we would suggest that, having reached 5WPM, keep practising and 12WPM (and a full Class 'A' licence) will soon follow.

Remember, too, that it is the intention that the Novice Licence should be a stepping stone to a full 'A' licence.

SWL NEWS

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

EVEN THOUGH I STILL receive pleasant letters from licensed colleagues who read and enjoy my two columns and find them of interest, not enough people - listeners or those who are licensed - passed this opinion on to the editorial staff in their readers' survey replies. As a result, there is now only one *SWL* column.

I now have only this page in which to cover the same ground, and the Editor has said he would like a photograph, too, which effectively cuts my space for your news and views still further. As you can imagine, there will have to be a few casualties. There will be no room for tables in 1991 (although I shall find room for a final table for this year) and there will be less room for details of what you have heard. Instead, I shall put together an overview of band conditions for the preceding month and will mention any table 'landmarks'. However, having said all that, I still need YOU to contribute to OUR *SWL News* page in whatever way you wish. The more contributions I receive, the greater the possibility of more space next year. *[See page 7 for a detailed explanation of why the changes have been made - Ed].*

SPECIAL CLUB PREFIXES

READERS WILL RECALL my mention of the use of the special GX prefix by listeners, and Doug Waterfield's claims to being the first British SWL to take advantage of this new facility. I am sorry to have to disappoint him, but GM4NNC has written on behalf of the Maxwelltown Amateur Radio Klub (MARK) in Dumfries to pass on the news that they aired GS0AEE (the Scottish equivalent of GX) within two hours of receiving the letter from the Society about the facility. The SWL, who GM4NNC failed to name, passed greetings to GM0AYW, GM6FT and GM0BPT between 1411 and 1420.

MARK considers that the facility offered by the special prefix is a real step forward and it has already been instrumental in attracting two newcomers to our hobby via their club. If any listener or licensed amateur is visiting Lincluden, near Dumfries, on a Wednesday evening they are invited to the MARK shack, which is at the rear of the Lincluden Inn.

HAB NEWS

MENTION WAS MADE IN my November column of Frank Parkhurst, BRS10663, who reached the milestone of logging stations in 4,000 WAB areas (there are only 4,200 in total). I am pleased to say that Frank has written to provide some more information. It is clear to see that Frank derives great passion from HAB, and obviously spends much of his spare time listening to the various nets. However, with so many areas logged it needs something special, and Frank appears to have most of the details he requires about what is coming up. Like a good DXer, he has his ears tuned to the bands waiting for news of impending expedition plans. His letter listed some of the more difficult, remote, areas that have never been activated, including NO72 Tayside (Bell Rock Lighthouse), NT28 Lothian (which is a Bird Sanctuary), as is NX23 in Dumfries and Galloway. It seems that SM40 Dyfed is also difficult, being a Lighthouse, but it seems someone had some plans to activate that one. Well done, Frank!

QSL TECHNIQUES

A LETTER THIS MONTH from GM3AWW about this forever contentious subject; he considers Mick Toms' remarks in the September column to have been rather harsh.

GM3AWW insists that in 44 years of operating he has never found any HF SWL report of interest (that must include one I sent him way back in 1969!). However, if the report corresponds to his log, he will send a QSL. He asks why he should not respond when most SWLs' hobby is collecting QSL cards. He maintains that SWL cards are no worse than some he has received from licensed amateurs, and he sent me some proof - wrong date, illegible callsign, no band shown. GM3AWW considers that the number of awards available now encourages the sending of QSL cards, but he considers that the SWL might actually enjoy getting his card and he will continue with his current practice of QSLing provided all the details correspond with his log.

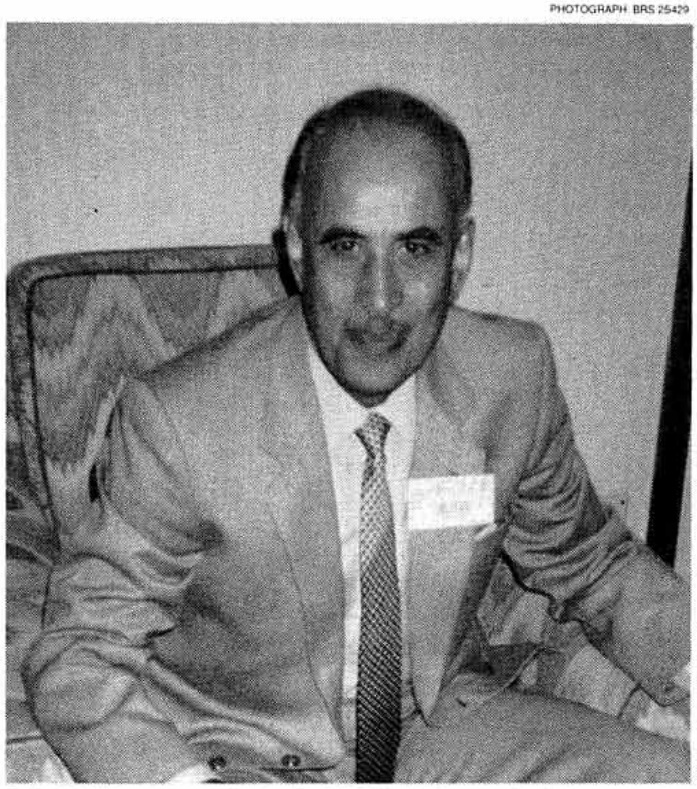
HF SUMMARY

THE MAIN NEWS FOR listeners during the weeks covered by this summary were the trip to Malpelo Is (HK0TU) and the superb conditions over the last weekend in October which coincided with the CQ WW SSB contest. Listeners reported the Malpelo expedition on all bands except 3.5MHz. A good piece of DX as the last expedition there was in 1983.

As for the contest weekend, several listeners thought it was probably the best CQ WW ever. There was much to be heard and logged but with a shortage of space I cannot expect to provide an in-depth look at conditions. The high spots appear to have been some good propagation on 7MHz which netted Robert Small, BRS8841, YJ, KH0 and KH2 during early evening hours, and a glimmer of hope for 1.8MHz which provided some Caribbean DX. Once again, the Caribbean was the place to be with most of the Islands occupied by a group of DXers. Some callsigns noted from those parts included FG5R, FJ9A, J37DX, KP2A, PJ1B, PJ9W, V31K, ZF2MZ, 8P9X and 9Y4H. It certainly seems that if you want to win a contest these days you ask for a 2 x 1 callsign!

Outside of the contest, conditions had been good with good DX to be found on all bands. Some of the more exotic callsigns noted included CE0ZCD, CY9CF, C9QL, FR5DX, FW1FM, TY2FG, XF3RD (Cancun Is), ZD8Z, ZK3KW and ZS8MI.

PHOTOGRAPH: BRS 25429



Bob, AP2JZB, photographed at the RSGB's HF Convention in Daventry last September.

VHF SUMMARY

IT WAS WITH SOME pleasure that I welcomed Mick Toms, BRS31976, to the 50MHz fold recently. He telephoned while listening to two keen 50MHz DXers discussing working V51 and 7Q7. These were the first stations Mick entered into his 50MHz log! We look forward to learning of Mick's success on the band in the coming months. David Whitaker, BRS25429, also caught the 7Q7, and not to be outdone, so did I!

Michel Monteil, F11ATZ, wrote to update his summer on 50MHz. He had logged stations in 19 countries and 57 squares, including V51E, SV1AB, CU2/G3KOX, CT1/G3SDL and ZB2HN.

TU2EW had also found its way into my log on 1 November, but, apart from some rather late Es to I, IS0, 9H1, CT, OE and ZB, the expected F2 openings had not materialised at the time of penning this piece.

FINALE

COPY FOR THE **March** column should be with me by **8 January**, and please try to find some photographs which I can reproduce in the column.

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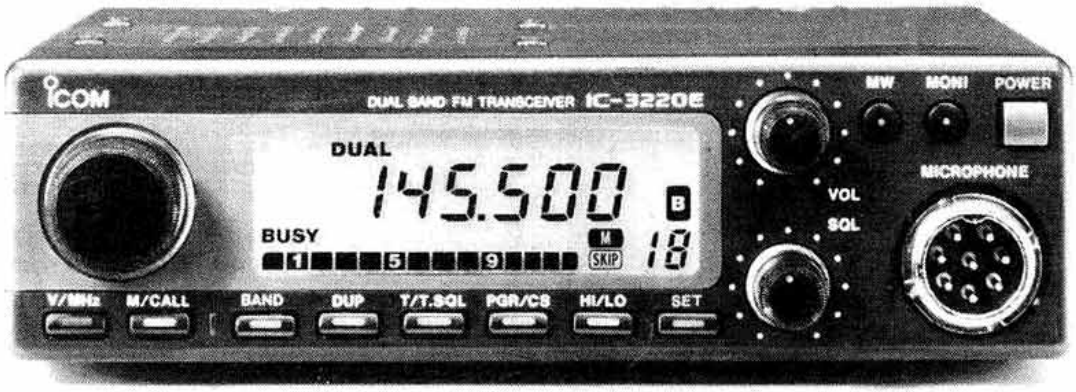

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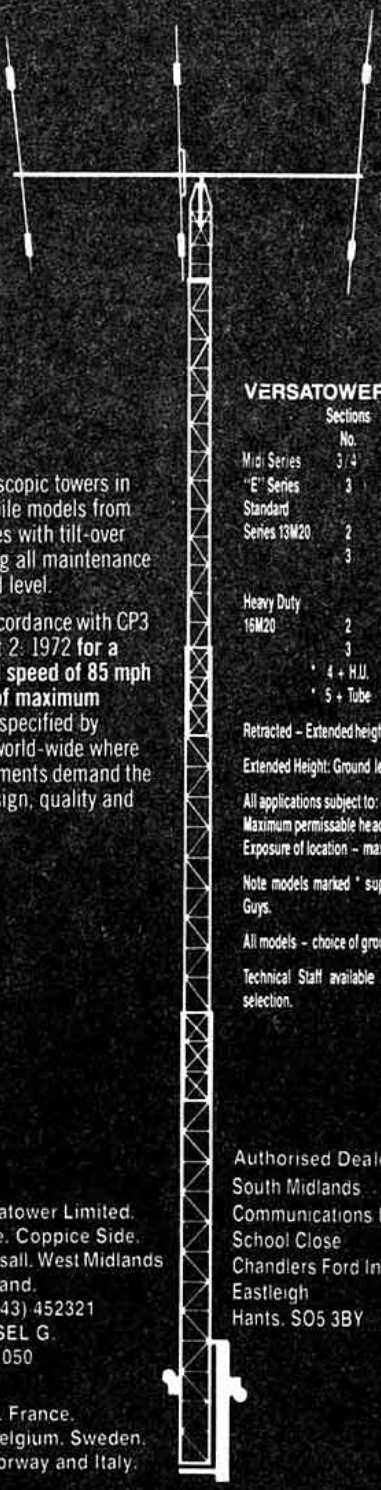

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TOPICS

PAT HAWKER G3VA

HOME-BREW END-FED ANTENNAS FOR HANDHELDS

TT, SEPTEMBER 1990 p31, DREW attention to a South African review of the AEA 'Hot Rod' 144MHz, end-fed, half-wave antenna which plugs into hand-held transceivers in place of the usual short helically-wound 'rubber-duck' antenna. ZS6GM reported a very noticeable improvement in performance, although his review gave no information on the matching section used by AEA to permit end feeding from the transceiver socket (it has been pointed out to me that some CB antennas are end-fed dipoles).

The item has resulted in useful comment from Hans-Joachim Brandt, DJ1ZB, who sent along a copy of a 1985 article he wrote for the German magazine *Funk* describing a home-brew half-wave 144MHz dipole that gave markedly superior results to rubber-duck antennas. He writes:

"In the February 1985 issue of *Funk* I presented a concept for home-brewing a 144MHz end-fed half-wave antenna with an LC matching section in a small plastic box, a telescopic antenna of rather random length (80cm to 133cm) and a flange BNC plug (or similar): **Fig 1.** The trimmers were 7pF air-dielectric made by Tronser. Starting values for the coil are 5 turns, inner diameter 5mm, total length 8mm. The coil may be varied if the setting of capacitor C2 is at an extreme end (when the section is being aligned using a VHF SWR meter). The plastic box is superior to a metal box in two aspects: it is easier to isolate the telescopic antenna; and there is no difference in tuning with the box open or closed.

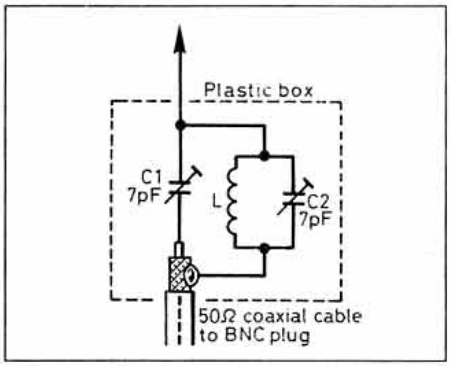

Fig 1. DJ1ZB's end-fed 144MHz antenna using a telescopic rod (80cm to 133cm) with matching network enclosed in plastic box (57mm x 28mm x 28mm). When the box is fitted with a flange-type BNC plug the antenna can be plugged directly into a hand-held transceiver or mounted separately and connected to the transceiver by length of 50Ω low-loss cable.

"Simple comparisons between a rubber duck and this telescopic antenna were conducted from the flat roof of a city building in Munich. With the rubber duck and 2.5W, the Austrian repeaters OE2XSL and OE7XKI could just be opened, but the German repeater DB0XF north of Munich could not be opened. With the telescopic antenna, all three repeaters could be opened easily with the low power option of 0.3W of this hand-held, indicating an improvement of at least (10log 2.5/0.3) equal to 9dB.

"Other comparisons were done as follows: An aluminium plate 20cm by 20cm was placed as a ground-plane on the roof of a car having a sliding opening in the roof, with the test antenna mounted on this. The feeder cable was routed into the interior of the car to the handheld receiver via a variable step attenuator. Either a fixed S-meter reading or the closing of the squelch was used as the input voltage reference. With each antenna, the attenuator was adjusted so that this condition was met. With a telescopic length of 90cm an improvement over the rubber-duck of 7 - 11dB was noted; with a length of 116cm the improvement was 11 to 15dB.

"Another type of matching section for this type of antenna employs a parallel resonant circuit, with a tap on the coil for the 50 ohm input (as often used on HF for voltage-fed antennas - G3VA). Such an antenna is being marketed in Germany by Bensch. This saves the use of a second high-grade trimmer but I would guess that the matching transformation cannot be as accurate as when using two continuously variable trimmers. I am also using this type of matching section for an 'under the roof' fixed vertical antenna for local FM working. In this case two quarter-wave radials are used as a counterpoise (see *Sprat*, Autumn 1981 'QRP via repeaters')."

DJ1ZB also mentions that his matching section arrangement with the two trimmers appears in the latest edition (11th edition) of *Antennenbuch* by K Rothammel, Y21BK, the most popular antenna book in the German language. Y21BK died a few years ago, but his widow hopes to recruit a group of competent antenna specialists to continue to update this most useful book. A copy of the first edition (1961) is still in use at G3VA, the many illustrations and tables overcoming the language barrier!

Rubber-duck antennas can, of course, be replaced by home-made quarter-wave systems without the use of matching networks. J M Osborne, G3HMO, writes: "I recently acquired a dual-band handheld (IC24FT) with the usual rubber-duck antenna. I had decided to use this for mobile operation during my summer holiday but two days before leaving had got only as far as reading the literature on mobile antennas. The shortage of time forced an empirical, but in the event entirely satisfactory, KISS solution.

"I extracted a telescopic antenna from a scrap transistor radio and fixed it to a piece of plastic channelling. An odd length of coaxial cable (about 2m long) with a BNC connector was also secured to the plastic, the inner being connected to the telescopic rod and the outer to a screw through the plastic channelling. The whole was fixed with insulating tape to the integral roof rack (Passat estate) so as to earth the coax outer to the roof rack via the screw. The lead was brought through a rear door to the handheld on a front seat through an SWR/power meter. The telescopic rod length was then adjusted for best compromise SWR on both 70cm and 2m bands (about 1.3:1 SWR on both). This proved to be with about a 54cm extension of the rod (roughly quarter-wave on 2m and 3/4-wave on 70cm). No coils were used for loading or matching and the antenna connected to the handheld via the meter or direct.

"My excuse for bringing this simple system to your attention is that the results were most satisfactory. From South Devon, I worked stations from Dorset to Cornwall (and in France) via a Brittany repeater on 144MHz during a lift, and routinely simplex as well as many other repeaters en route. On 70cm, results were equally good; during my return trip, I raised G0AKN (Twickenham) via the Farnham (UHF) repeater to give my ETA while on a high spot on Salisbury Plain (about 36 miles from the repeater). The handheld was producing about 5 watts on the power meter when running off the cigar lighter 12V supply.

"Once the optimum setting had been ascertained, the segments of the antenna were taped to fix the length. Mechanical performance was (unexpectedly) good. Once the contraption was dislodged by a branch in a Devon lane, but a spare reel of tape quickly restored it. Three months later the system still functions normally."

HF/VHF SCATTER COMMUNICATIONS

WHILE WE NORMALLY THINK OF radio signals being propagated to long distances by being reflected (refracted) from conductive surfaces (ionised layers or ground/sea surfaces), they can also be propagated by the scattering which occurs when radio signals pass through the layer or are reflected from the ground. Scattering normally implies only very weak signals, but since the effect occurs with signals passing *through* ionised layers it is not limited to frequencies below the MUF.

It is worth recalling that one of the pioneers of VHF scatter communications, shortly after the end of the second world war, was the same Dr E C S Megaw (G6MU) who, as noted previously in *TT*, played an important role in the 1940 development of the cavity magnetron, was a former Council member of the Society and several times described his microwave experiments in the *T&R Bulletin [another note for newer members; this was the fore-runner of the* RSGB Bulletin - *Ed]* in the 1930s. In the USA, the prime movers were H G Booker and W E Gordon, whose studies led to a major investigation of scatter propagation on a frequency just below 50MHz in conjunction with the US Bureau of Standards, Collins Radio and a large number of American amateurs. These studies showed that with very high-power transmitters using frequencies well above the MUF, weak signals could be received consistently far beyond the horizon due to incoherent scattering caused by random fluctuations in the refractive index in the troposphere or the lower ionosphere (primarily the E-layer). This work led directly to the development for commercial and military communications of troposcatter (and some ionospheric-scatter) systems, often using enormous 'billboard' antennas and multiple-diversity systems, although relatively low power systems can be used for narrow-band communications in conjunction with high-gain antennas.

A survey of the various forms of scatter

propagation of interest to radio amateurs by Mike Bosch, ZS2FM appears in the September 1990 issue of *Radio-ZS*. The following is a brief digest of some of the points made by ZS2FM plus some additional information.

Tropospheric forward scatter: Communication up to about 700 miles is theoretically possible on the VHF/UHF bands (a few hundred miles is more practical) by the reception of energy scattered in the troposphere, although at VHF this is usually not the sole propagation-mode involved. It requires high-power transmitters or very high-gain antennas and sensitive receivers of much the same order as those required for the Earth-Moon-Earth (moonbounce) path. VHF troposcatter on the 144MHz band was observed on amateur signals in South Africa in 1982. Troposcatter signals are weak, with very slow and deep fading in a cycle lasting up to 15 minutes, with the signals likely occasionally to dip below noise. Troposcatter can be present when band conditions are too flat for conventional tropo propagation.

Ionospheric forward scatter: Since the lower ionosphere is permanently turbulent, some degree of forward scattering is present at all times as indicated by the 1951 US investigations on 50MHz. System ranges up to more than 1200km are possible using frequencies between about 25 and 100MHz.

Signals are subject to rapid fading with some diurnal and seasonal variation. The need for very high power (eg 50kW or so) rules out amateur use of this mode, but ZS2FM points out that European Band I TV stations can sometimes be received in South Africa by scattering from the F2 layer, some hours before the VHF TV band (Band I) opens for normal ionospheric propagation in the sunspot maximum period.

Backscatter: Signals are scattered when returning to the surface of the Earth (particularly the sea) after first hop reflection from the ionosphere. This occurs at HF/VHF whenever a path is open for F2-layer propagation. Backscatter signals are often receivable on ordinary transceivers, antennas etc. The signals are weak but readable and largely free from fading, over distances up to 5000km when listening on bands close to the MUF. It is, for example, often by this mode of propagation that UK amateurs located well beyond ground-wave range, can be heard in the UK while they are working long distances on bands between 14 to 50MHz. Frequently noticed, for example, when the stations concerned are in contact with South American stations.

Meteor scatter: Well-known mode of VHF propagation as a result of bouncing signals off the short-lived plasma trails left by incoming meteors, with amateurs making effective use of the longer-lasting trails during the main meteor shower periods. Commercial/military meteor-burst systems, however, also exploit the very short-lived underdense trails of the micrometeors that occur in large numbers throughout the year, using a continuous probe signal to trigger off high-speed, computer-controlled duplex bursts of data. Among the commercial systems is one developed in South Africa by Salbu(Pty) Ltd under the direction of Dave Larson, ZS6DN. Transmitter powers of the commercial systems tend to be about 400W, with 4-5ele Yagi arrays.

Rain scatter: Forward scattering of microwave and millimetre-wave energy by heavy rain showers can provide a practical, if only intermittently available, mode for amateurs at 10GHz and above, for contacts well beyond the horizon or across hills, etc.

AVOIDING BATTERY HAZARDS

IN CONNECTION WITH RECENT *TT* items on the hazards of battery acid spillage, and those arising from overcharging, several more comments have come my way. R D Marshall of Cleveleys, Lancashire, writes:

"Possibly readers may like to know that washing soda (sodium carbonate) is twice as effective as sodium bicarbonate (which is already half neutralised) for dealing with acid spillage; it is also cheaper and easier (?) to handle.

"But what really prompts me to respond is concern over the serious hazard when disconnecting a 'gassing' battery from the charging supply. More than one person has blown himself into the perpetual world of perfect propagation by failing to observe a few basic rules. Hydrogen and oxygen form a lethal brew when in the correct proportions and it is essential to: (1) Ensure there is no stagnant cloud of escaping gases near the terminals of either the battery or the charger switch. Open the doors, windows, fan the area with your hat (or a folded newspaper) or anything else to dispel the gases into effective dispersion/dilation. (2) Do not disconnect the battery whilst it is still gassing freely. Wait 15 to 30 minutes. (3) If you are not sure if the battery is gassing, by all means look, but without any artificial source of light or anything that could spark off an explosion. If in doubt, wait as in (2)."

Tony Langton, GM4HTU contributes "Acid spills can be costly, part 3. In the 1960s, I took a girlfriend from London to the south coast on an old motorcycle. During the journey, unobserved, the battery boiled over and sprayed one of her legs with acid. On arrival, we found her shoe and, mercifully, her leg were undamaged but her sock had almost completely dissolved ".

Wallace Shackleton, GM0GNT, writes "to put in my twopence worth of advice about the safe disposal of acid and caustic solutions (for example, ferric chloride as used for printed circuit board etching). One of the first things that was drummed into me when I started working in a laboratory was how to dispose of such liquids. The maxim is ACID TO WATER, *NEVER* WATER TO ACID. Remember always that it's the acid that splashes when water is added to acid, hence the danger (there is also the danger that the first few drops of water are being added to undiluted acid, although battery acid is fortunately not concentrated acid - G3VA). Dispose of solutions by placing a jam-jar under a gently running cold water tap and let the jar fill with water. SLOWLY pour the solution into the jam-jar so that the solution is being diluted by a large volume of water. Diluting concentrated solutions can generate a lot of heat, so the more concentrated the solution the slower you should pour. It is worth considering wearing safety spectacles or goggles when working with hazardous substances. What's

SIMPLE HEATER-VOLTAGE STABILISER

STAN BROWN, G4LU, NOTED the arrangements for heater voltage stabilisation suggested by PA0LMD (*TT*, October 1990, p29) including the use of a PSU with an L296 IC regulator providing adjustable-voltage DC output. He uses, and has found more than adequate for his pair of 2C39s in a 23cm power amplifier, the simple arrangement shown in **Fig 2** running at just over 5VDC output.

He writes: "The circuit is simplicity itself and the large-value capacitor across the adjusting resistor provides a slow rise characteristic. The LM338K needs a finned heatsink, which is augmented by being mounted on the aluminium bracket for fixing to the case."

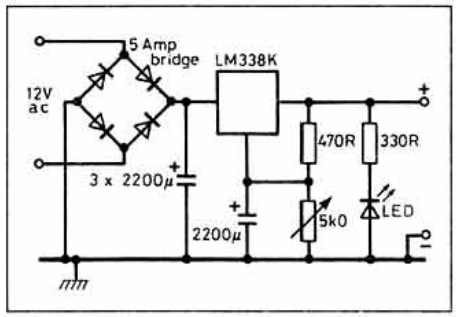

Fig 2. G4LU uses this stabilised DC supply to power the heaters of two 2C39 valves in a 23cm power amplifier, running at just over 5VDC output.

G4LU also notes that RS are now offering the LM396K IC regulator which is rated at 10A and incorporates internal current limiting.

1.8MHZ HELICAL VERTICAL DIPOLE

NOT MANY OF US COULD contemplate putting up a vertical resonate half-wave dipole for 1.8MHz since, if unloaded, it would call for at least a 250ft mast. However with a helically wound element (normal mode) the total height can be brought down to well under 20ft, though of course at the cost of lower radiation efficiency and more critical tuning.

In the Australian magazine *Amateur Radio* (October 1990), N Chivers, VK2YO described experiments with such an antenna, using wire wound on two 2m fibreglass rods (wooden curtain rod could be used): **Fig 3**. Each rod has a PL259 coaxial plug at one end which screws into a coax 'Tee' piece so that the lower rod hangs vertically under the higher rod, and is mechanically rigid. The top rod is fitted with a hook to hang it from a convenient support which could be a rope stretched between two points.

VK2YO describes construction as follows: "Wind enough wire onto one of the rods at the opposite end to the PL259 plug so that when it is coupled to a GDO it shows self resonance

at about 3.6MHz. This took 132m of 26SWG enamelled wire scrounged from an old power transformer primary. The wire is close-wound over 1.2m of rod, then the winding is tapered to connect with the PL259 connector at the other end. Repeat this process for the other rod. The wire on the upper rod is connected to the centre pin of the PL259 plug, while that on the lower rod connects to the outer collar of its PL259 plug.

"With the two rods assembled with the inter-connecting coax 'Tee' and supported horizontally on three chair backs, a socket with one turn was screwed on to the plug section of the tee connector. A GDO coupled to this loop dipped at 1.79MHz but when the antenna was raised vertically with the lower rod about 1m above ground, the resonant frequency went up to 1.86MHz. Squashing up the turns a bit lowered this to about 1.83MHz a popular frequency in Australia. The turns were then fixed with a coating of araldite.

"When coupled directly to a TS680S transceiver with 50Ω coax, results on reception were satisfactory but on transmit the VSWR was high and the built-in protection circuit reduced the power output."

With an impedance bridge, the antenna was found to null broadly about 20Ω at 1.86MHz indicating the need for some form of impedance matching. VK2YO put together the arrangement shown in Fig 3, winding 100 turns of 18SWG wire, tapped every 5 turns onto a piece of orange 20mm diameter electrical conduit, with a wide-spaced 20-150pF variable capacitor of second world war vintage.

This combination tunes from about 1.75 to 1.95MHz. By trial and error, moving the taps up and down the coil and adjusting the capacitor, a low VSWR could be achieved. The interconnecting cable between antenna and tuner should be kept as short as possible to minimise radiation from the outer skin of the coax-cable braid (unbalanced feed to balanced antenna). VK2YO adds: "Do not connect the transceiver to the tuner or the tuner to the load (antenna) via a coax switch, since the braid side will be common to all connected antennas and connected to earth for lightning protection. This antenna floats above ground and is independent of ground. If the station transceiver is separately RF grounded, then the tuned circuit should be fed by a link coupling wound over the centre of the tapped coil with a series capacitor (eg 10-100pF ceramic-based mica capacitor) in one leg of the link winding of about 20 turns 18 SWG."

VK2YO finds this modest 1.8MHz vertically-polarised antenna works as well as or better than his end-fed wire about 80m long, usually one S-point up on transmit.

THE LAZY MAN'S MULTIBANDER

GEORGE CRIPPS, , G3DWW, WRITES: "For some time I have obtained very good results from a 66ft inverted-L antenna used as a quarter-wave on 3.5MHz and fed directly from 50Ω coaxial cable. The need then arose for operation on 7MHz in daylight and 3.5MHz at night. A second 33ft length of wire was then strung under the first spaced from it with plastic insulators of the type used for open-wire line (about 6in). This worked well. It was then realised that the 33ft wire would also provide a low-impedance feed-point on 21MHz as a three-quarter-wave antenna. Later still a 16ft 6in wire was hung vertically downwards from the horizontal wire to form the arrangement shown in **Fig 4**. The final result performs well on 3.5, 7, 14 and 21MHz with a low SWR on each band and permitting direct feed from the 50Ω cable. The vertical portion of the antenna is at the bottom of my garden, about 48ft from the house and away from the zone of domestic electrical interference noises."

While clearly G3DWW is satisfied with his multibander, it needs perhaps to be said that the low SWR (if really low) does not necessarily imply high-efficiency. His diagram does not indicate a direct earth connection at the antenna end of the coax cable (which I would expect to see) so presumably there is an RF earth provided at the transceiver end of the feeder. Since one would expect the feed-point impedance of a quarter-wave wire to be only about 19-20Ω resistive, it is possible that the 'earth' is contributing extra RF resistance to achieve a match somewhere near-unity and that considerable RF current is flowing back down the outer braid of the cable (unless perhaps G3DWW buries the cable in its passage down the garden, in which case one would expect an SWR of at least 2:1). Such an SWR would be perfectly satisfactory from a radiation-efficiency point of view but might cause the transceiver to reduce power. A unity SWR might be more worrying since it would suggest power wastage. As W2DU pointed out many years ago: "A low SWR is *not* evidence that an antenna system is working efficiently. On the contrary, a lower than normal SWR over a significant bandwidth is reason to suspect that a dipole or vertical antenna is being affected by resistance losses. These may arise from poor connections, poor earthing systems, lossy cable or other causes."

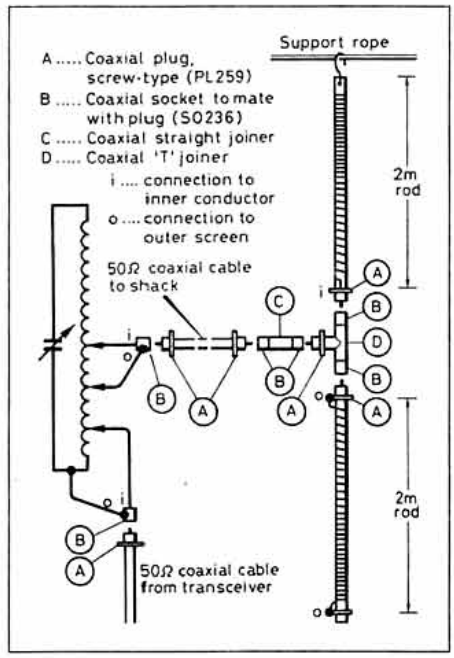

Fig 3. VK2YO's 1.8MHz helical-type vertical antenna can be suspended from a height of less than 20ft and operates independently of an RF earth connection.

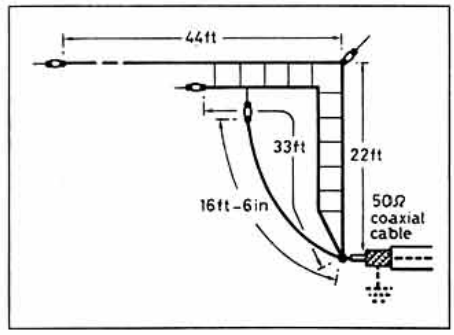

Fig 4. G3DWW's 'Lazy Man's Multibander' antenna for 3.5/7/14/21MHz.

STABLE INDUCTANCES

RECENT *TT* ITEMS (eg 'More on stable oscillators', November 1990, p29) have underlined the importance of good coils when attempting to achieve a stable free-running LC VFO. The lower and more consistent the temperature coefficient of the tank coil, the easier it is to provide effective compensation by means of negative coefficient capacitors. Even with the Nylon-loaded Bakelite formers and special techniques used in the R210 receiver, the coils were stated to have positive temperature coefficients of 12, 26, and 55ppm/°C with, as usually the case, the larger values of inductance having the greater temperature coefficients.

It is interesting to compare the R210 figures with data given in the book *Theory and Design of Valve Oscillators* by H A Thomas (first published 1939) for the performance of high-grade oscillator coils, including some using skeleton formers, complete formers (solid keramot) and a silica tube former with tinned copper wire wound in grooves while hot and then allowed to contract. Such a silica 8-turn (2.65in dia) coil with an inductance of 4.4μH had a cyclic positive temperature coefficient of only 7ppm/°C, compared with 32, 19, 34, 36 and 38ppm/° C for the coils wound on keramot and skeleton mycalex formers.

Dr Thomas commented: "Examination of the results shows that the temperature coefficient of any of the coils consisting of wire wound on a skeleton former is of the order of twice the temperature coefficient of expansion of the metal . . . . for coils employing a complete insulating former it appears that the temperature coefficient likely to be obtained is greater than the temperature coefficient of the metal but less than that of the former. For the silica-former coil, the wire was wound on the former while under tension and at a temperature of 80°C. The wire was soldered to end clamps and then allowed to cool. This ensured that the wire was permanently under tension within the elastic limit . . . . it is clear that this method of construction gives partial compensation, since the temperature coefficient of inductance is less than half that of the copper itself, but it is clear also that an imperfect contact exists between the wire and the former which produces changes in configuration on temperature change. This view is confirmed by L Rohde (1934) who gives values of +43, +41, +42 and +45ppm/°C for four coils in which copper wire was wound on a cylindrical ceramic former having an expansion coefficient of 7.8 x 10^{-6} per °C. In these cases

with no special tensioning of the wire, non-cyclic behaviour was also observed."

Dr Thomas notes that the logical development of this principle is to deposit the conductor on the former to ensure perfect adhesion, with the Germans developing such a technique in the 1930s: "but at present the inductance coefficient cannot be reduced below 8ppm/°C due to the mechanical properties of the former material." The good stability of German military equipment in the second world war presumably drew on this technique.

For amateur radio equipment, it seems to me, there is one further important factor encountered in practice: the use of paxolin formers and other materials that absorb significant amounts of moisture from the air (ie hygroscopic materials). This can result in enhanced, non-consistent rates of drift particularly where equipment is left switched-off for relatively long periods in dampish, unheated shacks. Back in the 1950s, an effective dodge was to fit a low-consumption (5 or 7 watts) light bulb close to the coil-pack which could then be left running between operating periods. A problem with hygroscopic formers is the difference between the temperature coefficient of a coil when completely dried out and when there is absorbed moisture. This makes it virtually impossible to compensate such inductors effectively. In the case of the R210 receiver, it was noted that this was enclosed in a hermetically sealed (dry air) aluminium-alloy diecast panel and case.

It can, of course, be argued that with the improved frequency synthesizers, having much less phase-noise, now available in factory-built equipment, the need for high-stability LC VFOs has diminished. True enough, but there is surely still a role for *low-cost* home-built designs capable of medium/high performance. It is in the tradition of the hobby to devise ways of equalling or bettering commercial designs at a fraction of the cost.

NVIS, SKYBEAMS AND NEW HF BEACONS

SEVERAL RECENT *TT* ITEMS have referred to the use for military HF communications of near vertical-incidence skywave (NVIS) propagation where the requirement is an antenna system with a high rather than a low vertical radiation pattern. When an antenna of this type is used on frequencies significantly below the long-distance MUF, the usual 'skip zone' vanishes permitting effective communication over any distance up to about 500 miles or so.

Amateurs, on the other hand, usually seek low-angle radiation to optimise long-distance operation, pleased rather than concerned that their 14 to 30MHz signals skip over nearby countries. But there are exceptions. For example, Stuart Kind, G4AYP in Harrogate, Yorkshire is particularly interested in the French language and seeks good, clear daytime contacts with French stations at distances between roughly 300 miles (Northern France) and 800 miles (Southern France). At this stage in the sunspot cycle, he finds 7MHz range often too short at around noon and with too much QRM when the path lengthens. He is thinking of buying a 14MHz Yagi array, mounting it low, possibly devising a method of controlling the vertical angle or even leaving it pointing vertically upwards.

He queries whether this would in practice have the required result of giving more reliable 14MHz contacts with France. My answer would be yes, provided that at the time the MUF towards the south was reaching 20 to 30MHz, as can often be expected at this phase of the sunspot cycle. However, before investing in a costly array, I would be inclined to try a very low horizontal dipole at a height of about 10ft above good ground, remembering that the feed-point impedance of a very low dipole is significantly lower than at normal height and may require matching if your rig baulks at SWRs of more than about 1.5 to one, or 2:1 to one.

I recall that the use of upwardly-shooting 'skybeams' and high-angle arrays was well covered in a two-part article by Paul Sollom, G3BGL, ex-VS7PS, in the *RSGB Bulletin [for newer members, this was the fore-runner of* RadCom - *Ed]* back in July, August 1952. This resulted from extensive investigations he carried out between 1947-51 at VS7PS while located on the premises of the Government HF broadcasting station, about 17 miles north of Colombo, Ceylon (now Sri Lanka) in order to devise an antenna system for the broadcast station that would give good signals throughout the island. This stretched some 200 miles to the north, 140 miles to the south with minimum wastage of signals coming down in the sea or in Southern India. In the course of this work, G3BGL developed a number of fixed skybeams providing high-angle radiation that covered the island in one or multiple hops, including an 8-element array mounted horizontally at a height of quarter-wave above ground: **Fig 5** and a VS7PS 'howitzer' a high-angle beam for short-skip broadcasting (**Fig 6**).

One result of the strong high-angle signals and virtual lack of ground-wave on the VS7PS or the broadcast transmissions was that an RAF HF D/F station five miles away was unable to take bearings on either station although receiving very strong signals.

In his article, G3BGL also provided a useful chart showing the optimum wave-angle for one-hop transmission by reflection from the F2 layer, based on its average height over the UK of about 185 miles: **Fig 7**. This shows that, for ranges of between 300 to 800 miles, G4AYP should aim ideally at wave-angles of between 20° to 50° rather than straight up.

A rough but useful guide to the relationship between the MUFs for different distances was given many years ago in *QST*: see **Table 1**. This shows, for example, that when a band is just open to stations more than 2500 miles away, the critical frequency (at which signals going straight up will be reflected back to Earth, ie skip of 0 miles) will be about 2.9 times lower, while the MUF for 750 miles would be approximately half the frequency (remembering always that the MUF towards the south is likely to be considerably higher than along East-West paths). Similarly, if you are receiving strong 14MHz signals from stations about 1000 miles away, the 21MHz band should be open for DX (ie stations more than 2500 miles away) in the same general direction.

For all those interested in 14MHz band conditions, the world-wide system of automatic amateur-radio beacons with stepped reduction of power that has operated for many years on 14,100kHz has proved a most valuable guide to real-time conditions. So much so, that it appears to have inspired CCIR Study Group 6 to plan an even more ambitious network of beacons, spaced throughout the HF spectrum in order to improve the data base of HF propagation, with a view to making better use of the HF broadcast bands.

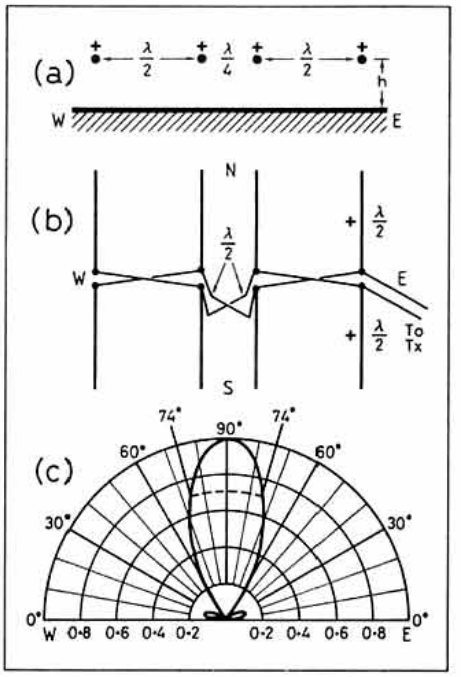

Fig 5. Vertically shooting 'skybeam' developed by G3BGL/VS7PS in the late 1940s with element spacing arranged to minimise side lobes. (a) side elevation; (b) plan view; (c) vertical radiation pattern with 'h' 0.125-lambda. Centre section must be 0.5-lambda so that the elements are all in phase. The gain with h 0.125-lambda is about 12.5dB with reference to a free-space dipole.

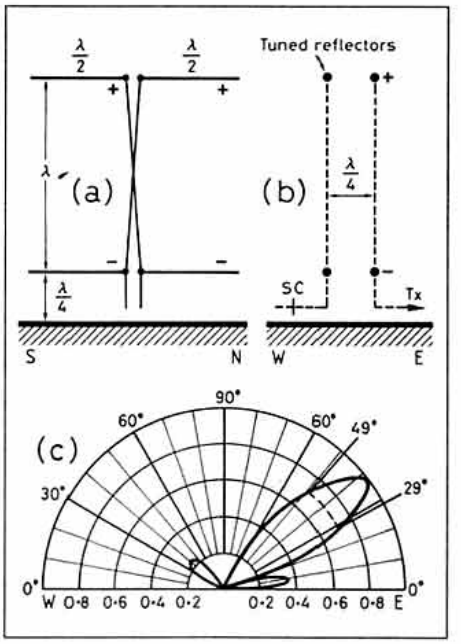

Fig 6. The VS7PS high-angle 'howitzer' antenna designed for a broadcast service from Sri Lanka to southern India, 300 to 700 miles range but covering most of India by multi-hop transmission. Gain (including ground reflection gain) about 13dB over a free-space dipole.

It has taken much longer than anticipated to obtain the necessary co-operation and to set up the system. Originally it had been hoped that up to 15 beacons would each operate on five co-ordinated, time-shared frequencies as on 14,100kHz. This is now most unlikely, and fewer beacons, each with their own set of frequencies, now seem to be the best that can be hoped for. However, the first beacon, of particular interest to UK amateurs, is now operating, transmitting the CW identification AUS1MLB and located near Melbourne, Australia with a 1kW transmitter and omni-directional, vertically-polarised antenna. It has been received in Germany on four of the five frequencies and should provide an excellent real-time guide to G-VK paths on 7, 10, 14, 18 and 21MHz.

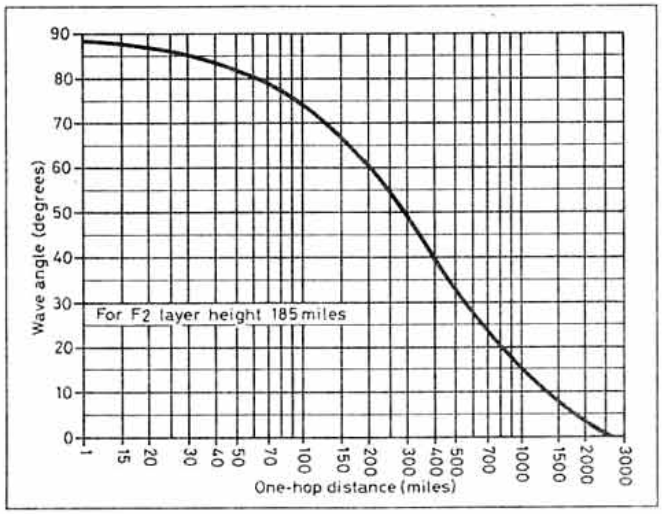

Fig 7. Vertical wave angle for distances up to 2500 mile hops assuming an average UK F2 layer height of 185 miles as given by G3BGL in 1952. In practice optimum wave angle will vary as the reflecting layer height changes. Ionospheric layer heights are roughly: E-layer 60-85 miles (100-140km); F1 layer 90-150 miles (150-250km); F2-layer (day) 150-300 miles (150-500km); F2 layer (night) 190-250 miles (300-400km).

AUS1MLB operates continuously to a fixed time schedule; each transmission lasts approximately four minutes, the signal format being a series of 12 second sequences, with the transmitter then changing to the next frequency. The times/frequencies of this beacon are: (1) 5470.845kHz (centre) at 00, 20 and 40 minutes past each hour; (2) 7870.845kHz at 04 24 44; (3) 10,407.845kHz at 08, 28, 48; (4) 14,407.845kHz at 12, 32, 52; and (5) 20,945.845kHz at 16, 36, 56 minutes past each hour.

A beacon transmitter in Scandinavia is expected shortly (possibly before these notes are published) but frequencies have not yet been announced.

The Study 6 format has been designed to permit a number of measurements to be made automatically on receivers using a specified form of active antenna. However the Morse identification and steady tone should provide amateurs with a ready means of assessing path conditions. The 12 second sequence comprises 1S of 100bit/s FSK (850Hz shift); CW identification (about 3S); 1.2Kbit/s sequences (about 0.75S); 4S of FSK reversals; steady tone for at least 3S. Final sequence may be cut short to permit change of frequency.

First hop distance (miles) versus Frequency factors where "1" represents the MUF for that distance

0	1	0.8	0.7	0.6	0.4	0.35
500	1.2	1	0.8	0.7	0.5	0.4
750	1.5	1.3	1	0.8	0.6	0.5
1000	1.8	1.5	1.2	1	0.8	0.6
1500	2.3	2.0	1.5	1.3	1	0.8
2500	2.9	2.4	1.9	1.6	1.2	1

Table 1 - MUF frequency factors for various distances

IMPROVING IMAGE REJECTION - A 1940 TECHNIQUE

WHEN, IN THE 1920s, Howard Armstrong persuaded RCA to develop his 'supersonic heterodyne' receiver for broadcast reception, the IF was often (for about ten years) 110kHz or thereabouts, only later moving to the 'standard' frequencies of 455kHz (American) and 465 or 470kHz (European) in order to reduce the amount of (high-cost) pre-mixer selectivity needed to keep 'image' rejection to an acceptable level for MF/LF reception. Image is the reception of 'spurious' signals spaced twice the IF away from the wanted frequency on the 'other side' of the local oscillator frequency. It is probably the most serious of all the various spurious responses to which superhets are prone.

With a receiver having only one signal-frequency resonate circuit in front of the mixer, often with its Q damped by the coupling to the antenna, image rejection is often poor even on MF (the higher Q ferrite rod antenna notwithstanding). When such a receiver is used on HF, where the tuned circuit becomes relatively less selective (percentage difference between image and signal frequencies reduces progressively as frequencies increase), transmissions on the image frequency may be received almost as strongly as when the receiver is tuned to the frequency of the transmitter. With 455kHz there is the particular problem on 14MHz that the image frequency falls in the 19m broadcast band with its enormously strong signals, at least when the oscillator is tuned (as commonly the case) on the high side of the signal frequency.

Designers of the early (valved) communications receivers stayed with 455kHz but tackled the problem of image rejection by adding more pre-mixer selectivity. The HRO had three pre-mixer tuned circuits requiring four ganged capacitors to tune also the local oscillator: even so, image rejection on the 28MHz band was only about 30dB or so. With less costly models, often having only one tuned RF stage, many amateurs improved image rejection by using an active or passive preselector with two or more tuned circuits in front of their receivers - a still valid arrangement (provided gain is kept low) with modern

receivers in order to prevent overloading by strong out-of-band signals.

It was soon appreciated that image rejection on HF could be improved at less cost simply by raising the IF to say 1600kHz or (later) 9MHz, though for some time it remained difficult to manufacture really good bandpass crystal filters at HF, while the once-popular mechanical filters have always remained limited to below about 500kHz. For VHF/FM broadcast receivers, the standard IF has long been 10.7MHz. Some modern communications receivers have a VHF first IF with up-conversion mixing.

However, for home construction of simple, low-cost superhet receivers such as the interesting 3.5MHz design reported by G3TSO in the November 1990 *TT*, using a NE602/SL6700 combination with a ceramic IF filter, there is still much to be said in favour of using a 455kHz IF, at least for 1.8 or 3.5MHz receivers. G3TSO noted that with the three-coil bandpass RF filter he used, image rejection was perfectly satisfactory on these bands, although he felt image response could be a problem at higher frequencies.

Lorin Knight, G2DXK, brings to attention a relatively simple but now largely forgotten technique used to improve image rejection in the Murphy Radio A92 'Stationmaster' receiver of 1940. This set provided, apart from MW/LW, bandspread reception of the 13M, 16M, 19M, 25M, 31M, 40/49M HF broadcast bands. It was developed as a successor to the 1939 A76 as the fourth of a series of Murphy Short-wave Specials (A36, A52, A76, A92) recently described by G2DXK in *Radio Bygones.* The February-March 1990 issue contains details of the novel image rejection circuit used in the A92. This utilised the same electrical principles found in a quartz crystal with its dual series-resonate and parallel-resonate frequencies, though whereas in a crystal these are separated by a matter of Hertz, in the LC circuit of the A92 the two frequencies are made to be 2 x 465kHz apart.

G2DXK considers that this technique, now seemingly forgotten, could possibly be adapted for simple modern amateur receivers having tuned signal-frequency tuned circuits. To quote directly from his *Radio Bygones* description:

"The basic circuit is shown in **Fig 8(a)**. f1 is the series-resonant frequency of L and Cb; thus at this frequency the impedance between frequency-changer grid and earth is very low. At higher frequencies, the combination of Cb and L looks like an inductance, and this inductance forms a parallel-resonant circuit with Ca at f2. Consequently at this frequency the impedance between grid and earth is high. Because the A92 had its oscillator on the lower side of the signal, the designers were able to arrange that f2 corresponded to the signal frequency and f1 to the image frequency.

"They were able to obtain the required bandspreading by placing a small variable capacitance in parallel with L. Variation of this capacitance caused f1 and f2 to move up and down together, the spacing between them conveniently staying fairly constant throughout the capacitance swing.

"The capacitance Ca was provided entirely by circuit strays, in particular the anode capacitance of the RF amplifier valve and the grid capacitance of the frequency-changer valve. The value of Cb was chosen so that, with L adjusted for maximum gain at the signal frequency, the frequency of minimum gain was a little higher than the image frequency of the various capacitance (fixed and stray) had their nominal values. The actual circuit used in the A92 is shown in **Fig 8(b)**, the starred values are those used for the 19m band."

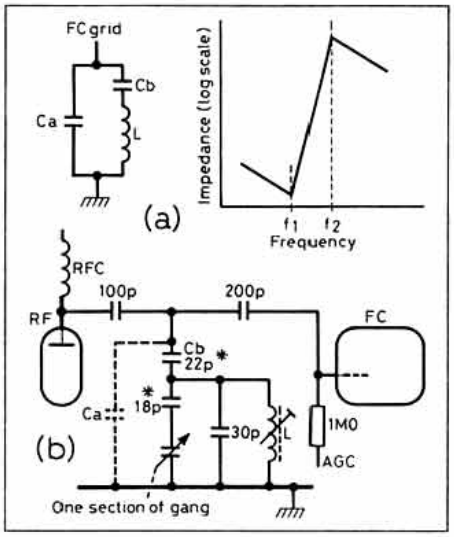

Fig 8. Ingenious image rejection circuit used in the 1940 Murphy 'Stationmaster' (Model A92) table model broadcast receiver, one of a series of Murphy models providing bandspread tuning on the HF broadcast bands. The technique might prove useful for simple superhet models with 455kHz IF. (a) Basic circuit providing series-resonance at f1 and parallel resonance at f2 (b) A92 intervalve circuit.*(G2DXK, Radio Bygones)*

HERE AND THERE

MORE YEARS AGO THAN I care to remember, I had a CW contact with G6CL, callsign of John Clarricoats who for so long was Secretary-Editor of the RSGB. But it was not Clarry at the key but his teenage son Peter who had qualified as an operator of his father's station. Peter Clarricoats never took out his own licence - he was too busy becoming one of the world's leading experts on ferrites and microwaves and becoming a professor at Queen Mary and Westfield College, London. This year he has been elected a Fellow of the Royal Society (FRS), the world's oldest continuously-operating learned society, founded in 1662. No more than 40 Fellows are elected in any one year, and engineers are in a small minority since the Society covers all fields of science. One of the few radio amateurs who have ever been elected FRS was Sir Martin Ryle, G3CY, the Astronomer-Royal. The recent work of Professor Clarricoats has included important development work on reconfigurable reflector antennas for space satellites. Although other forms of space-deployable reflectors exist, his team has developed the novel idea of changing in space the shape of a mesh reflector as an alternative to the phased array concept.

Electronic smog has long covered urban areas, generated by a myriad of domestic appliances, vehicle ignition, lifts etc. Fortunately for amateurs, the smog tends to be most dense at LF/MF, thinning out at higher frequencies, nevertheless the difference between the background noise levels between the towns and the countryside can make a lot of difference when it comes to hearing the weaker DX.

This difference is well illustrated and quantified by considering the signal levels accepted in the USA as being required to achieve a satisfactory signal-to-noise ratio on medium-wave AM broadcast transmissions: Urban areas 25mV/m (88dBμ); residential areas 5mV/m (74dBμ); and rural areas 0.5mV/m (54dBμ) where 0dBu equals 1mV/m. Apart from the electronic smog, the figures reflect also the problem of receiving signals in and among buildings with reinforced concrete. Incidentally, since coverage is deemed to depend on the range of good ground-wave signals, the night-time service-area of a medium-wave transmitter tends to be much less than its day-time service area due to interference from sky-wave signals. Even in the absence of interference from other stations, night time service-area distance from a transmitter is defined in the USA as being to the point where the ground-wave/sky-wave ratio is 10dB. This implies that night-time service area, even in the absence of co-channel interference, is virtually independent of transmitter power, since as power is increased both ground and sky wave signals become stronger but the ground-wave/sky-wave ratio remains the same.

Although the recent interim report of the US Environmental Protection Agency stated that there is sufficient evidence to demonstrate a 'significant' link between some rare forms of cancer (eg childhood lymphoma, leukaemia and brain cancers) and exposure to extremely low frequency (eg 50 or 60Hz) electromagnetic fields near electricity power lines (*TT* October, p32) not everyone is convinced that a casual link has been demonstrated. In a letter to *Nature* (4 October), James R Jachem of the Radiation Sciences Division of the US Air Force School of Aerospace Medicine points out that other recent studies (eg that by Savitz and Feingold) found that the incidence of childhood cancer was associated with traffic density, with odds ratios *greater* than those reported for EMF and cancer. He notes that one potential consequence of living close to traffic routes is a high level of benzene, a well-established cause of leukaemia. He quotes R A Cartwright as saying: "Our present scientific knowledge points at the very best to a minute risk of EMF verging on the point of non-existence".

CORRECTION

G3TSO Simple Superhet (TT, November, Fig 1). The 2N3819 BFO/CIP 455 kHz oscillator should have 2 x 470pF feedback capacitors from gate to source and from source to ground.

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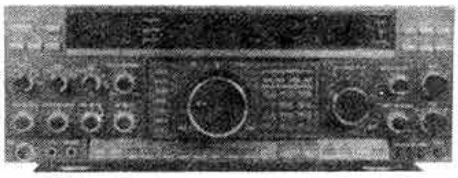

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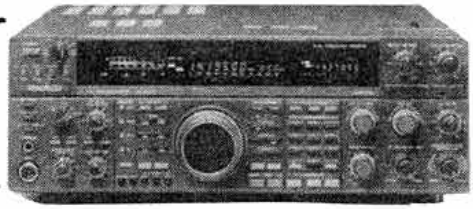

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A Buzzer Noise Source . . .

. . . and how to use it

To kick off a series of down to earth technical articles, David Sumner, G3PVH, describes an old but useful idea for a wideband signal source

TO LEARN ABOUT RADIO, as opposed to electronics, you need some source of RF (radio frequency energy) to play around with. This article describes a very old idea, but it represents by far the easiest way to obtain a little RF for experiments. It can be used to adjust tuned circuits and make measurements at radio frequencies. (But see EMC note below).

HOW TO MAKE IT

THE RELAY WILL PROBABLY have several sets of contacts. In order to make it buzz, you need a pair of contacts which are closed without the relay coil energised, ie normally closed. These can be found by trial and error or by using a multimeter.

Fit the relay into the metal box **Fig 1**, surrounded by plastic foam to silence the noise. Wire up as shown. A long loop of wire comes out of the box through a hole, and is formed into a two turn coil, or loop, about 40mm in diameter.

Connect the battery and check that the relay is buzzing. If nothing happens you have probably used the wrong contacts. If all else fails, check that if you connect the battery directly to the relay coil it operates.

With the relay buzzing, bring the loop close to the aerial of a receiver; you should hear a very loud buzz.

HOW IT WORKS

WHEN YOU SWITCH ON, the current flows through the contacts and through the relay coil. This causes the relay to operate and open the contacts, causing the relay to drop out and close the contacts again. This action carries on repeatedly. Every time the contacts open, the current in the coil drops to zero and the coil generates a brief pulse of reverse voltage. This voltage is very high for a moment and jumps the open contact gap. This happens very rapidly and causes the wire loop to carry electrical vibrations at high frequency for a brief moment. In the early days of radio, a spark was used as a transmitter. (But see EMC Note below).

HOW TO USE THE BUZZER TO TEST A TUNED CIRCUIT

A TUNED CIRCUIT IS MADE up from a coil (inductor) and a capacitor **Fig 2**. It works electrically in a similar way to a bell which, when struck, rings or vibrates at a certain frequency, known as its resonant frequency. If fed with a small amount of energy at its resonant frequency, a tuned circuit will produce large electrical vibrations. If fed with lots of energy at the wrong frequency, it won't do much.

These circuits are so useful they are widely used in radio. A tuned circuit can be made by winding a few turns of wire on a plastic or cardboard tube and connecting a capacitor across it. To trim it to the desired frequency, turns must be added or taken off, or different capacitors used. Using the buzzer, it is very easy to measure the resonant frequency and to make tuned circuits which are bang on tune.

Set up the buzzer as shown. Place the loop around one end of the coil. Now place a similar loop round the other end of the coil with the far end connected to your receiver.

Set the buzzer going and tune the receiver. A very large noise peak will be heard at the resonant frequency of your tuned circuit. It may be necessary to avoid too strong a signal by using the receiver's RF gain control. Once the peak is found, try sliding the two loops away from the coil winding, as they will themselves de-tune it a bit. This is called reducing the coupling. When this is done you will be able to set the tuned circuit much more accurately, probably within a few kHz. The method is very reliable and you don't get false readings. The disadvantage is that you need a receiver, but this is already available in most amateur's shacks.

An alternative piece of test gear for this job is a Grid Dip Meter. However, it is sometimes difficult to get going and can give false indications, so the buzzer device is really useful.

If you set up a tuned circuit using a variable capacitor, it can be calibrated in frequency and then becomes a very handy measuring device itself.

Note: To make a tuned circuit for 10MHz try about 10 turns of wire on a former about 30mm diameter and use a capacitor of 100pF. To change frequency you change the number of turns pro rata. If you keep the same coil, you need 4 times the capacitance, not twice, to halve the frequency. ❑

EMC NOTE

As described above, the buzzer will pose no EMC problems. However, it is important to realise that there is potential for generating interference if the device is mis-used, or not properly screened. It is illegal to use sparks to transmit.

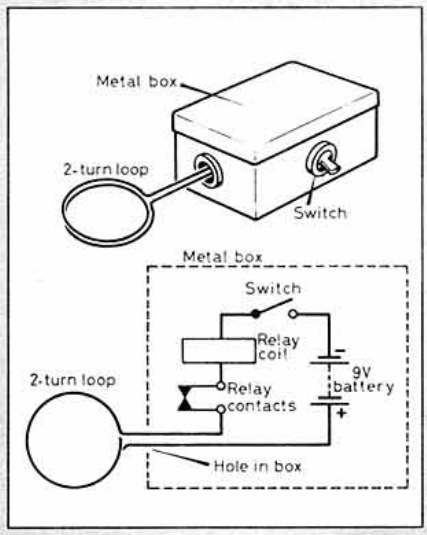


Fig 1.

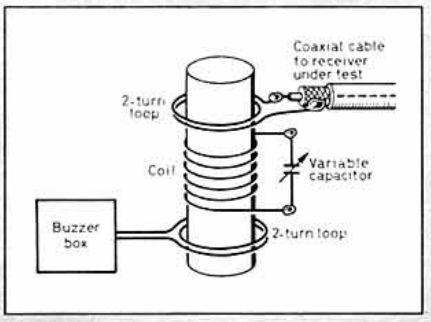


Fig 2.

COMPONENTS LIST

Any small relay which operates from 6 volts.

Metal box (this is essential to screen the buzzer; do not use plastic)

9 volt battery.

Battery snap connector.

On/Off switch.

Some Plastic foam.

A Simple Audio Notch Filter

Dr Paul Stewart, G7EAH, shows how to use the LMF90 chip as a simple high performance audio filter for about £10 including a 2W amplifier.

AUDIO FILTERS ARE USED in radio communications in a variety of ways depending on the nature of the wanted and interfering signals. If the wanted signal is broadband (eg SSB) and there is a narrow interfering signal within the audio band (eg CW), then a filter with a narrow band of attenuation can be tuned to the unwanted signal without any appreciable loss of information in the wanted signal - the 'notch' mode. If, on the other hand, the required signal is narrowband and the interfering signal is broadband, then a narrow passband filter tuned to the wanted signal is more appropriate - the 'bandpass' mode. If both signals are narrow band but both audible then either a passband or a notch filter can be used.

In order to understand the advantages of the switched capacitor filter over other types, it is useful to outline some of the practical difficulties encountered in realizing filters. One of the earliest types of audio filter consisted of combinations of inductors, capacitors and resistors. Of the three components, it was the inductor which was the biggest problem for the designer. This was because of its poor Q (goodness) factor, large size (due to inductance) and weight.

The development of cheap operational amplifiers, like the 741, and the development of active filters, meant that inductors could be eliminated from audio filter design, A filter could be produced with the addition of only resistors and capacitors - both cheap and small.

Such designs suffered from the obvious disadvantage that they required a power supply, but there was yet another serious practical problem caused by external component tolerances and temperature sensitivity. This is particularly serious in the design of high selectivity filters. Indeed, whether resistors and capacitors are implemented internally or externally to an integrated circuit, the temperature and/or voltage tracking between them has proved a difficult and expensive problem to solve to date. The constraints facing the designer, namely (1) the reduction of the external component count by larger scale integration and (2) the reduction of the temperature sensitivity of the complete filter, were to be met following a clever idea due, among others, to Poschenrieder (1966) and Freid (1972) relating to the AC behaviour of rapidly switched components. One aspect of their analyses particularly apposite to Metal Oxide Semiconductor (MOS) technology was the behaviour of various configurations of switched capacitors and amplifiers.

In essence, it became evident that a capacitor which is switched between nodes of a circuit at a frequency which is much greater than that of an alternating signal passing between the same nodes appears to the signal like a steady resistor across the nodes. The particular advantage of this fact is that, while the absolute value of a capacitor cannot be fabricated on a chip to better than about 10%, the ratio of two capacitors on the same integrated circuit can be made to an accuracy of about 1%. This has profound implications for the production of high selectivity filters with good temperature stability because the temperature tracking of two capacitors is excellent. As the basis of the switched capacitor filter is the switched capacitor integrator whose performance is directly dependent on the ratio of pairs of capacitors, all of the ingredients were now available for a new type of filter.

In addition to the above features, this type of filter can be continuously tuned simply by changing the applied clock frequency and the frequency response is scaled in direct proportion. For example, a bandpass filter designed to have a bandwidth of 100Hz and a central frequency of 100Hz, using a clock frequency of 100kHz, would have a bandwidth of 200Hz centred on 2000Hz if the clock frequency were doubled.

THE CIRCUIT

FIGURE 1 SHOWS A BLOCK diagram of the filter circuit which comprises essentially three elements: (a) switched capacitor filter, (b) voltage controlled oscillator (VCO) and (c) 2W audio amplifier. The filter's centre frequency is tuned by the application of a 5V square wave from the voltage controlled oscillator running at a frequency 100 times that of the centre audio frequency. The output of the filter is fed into a 2W amplifier feeding an 8 ohm loudspeaker.

The LMF90 is the latest in a generation of switched capacitor filters exploiting MOS technology. By using a 74LS629M VCO chip, whose frequency lies in the range of 36 to 360kHz, the LMF90 can be made to operate in the audio range 360 to 3600Hz.

While National Semiconductors designed the LMF90 as a notch filter, it can also be configured as a bandpass filter and this feature has been incorporated into this design. There are two advantages in practice in having a bandpass capability: (a) it is often easier to tune the filter to peak the unwanted signal and then switch to the notch mode for a final adjustment to reduce the unwanted signal further and (b) the bandpass mode can be used to receive a signal over a narrow band - setting 1 of switch S2 is particularly useful for narrow band reception of CW.

The bandwidth of the notch response, expressed as a percentage of the centre frequency (Fc) is independent of Fc, regardless of its value.

Figure 2 shows the measured notch attenuation of the design for the three bandwidth settings; here 1.0 on the horizontal scale corresponds to the centre frequency.

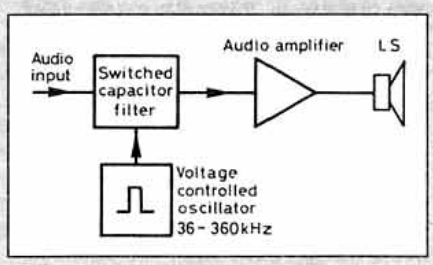


Fig 1: Block Diagram for the Switched Capacitor Filter.

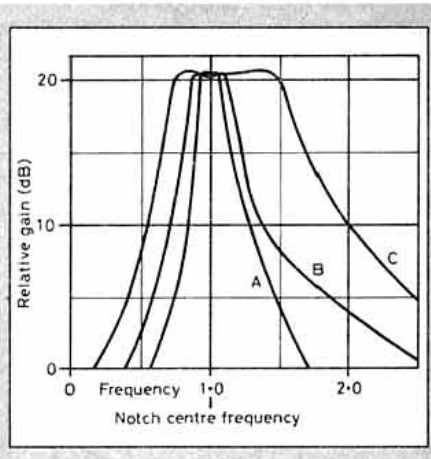


Fig 2: Filter Frequency Response in the Notch Mode

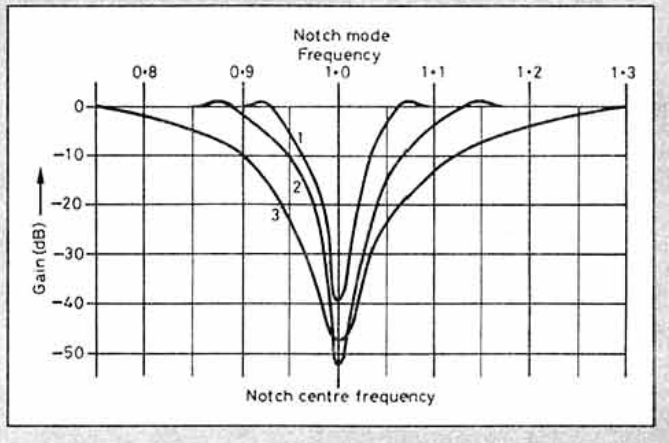


Fig 3: Filter Frequency Response in the Passband Mode

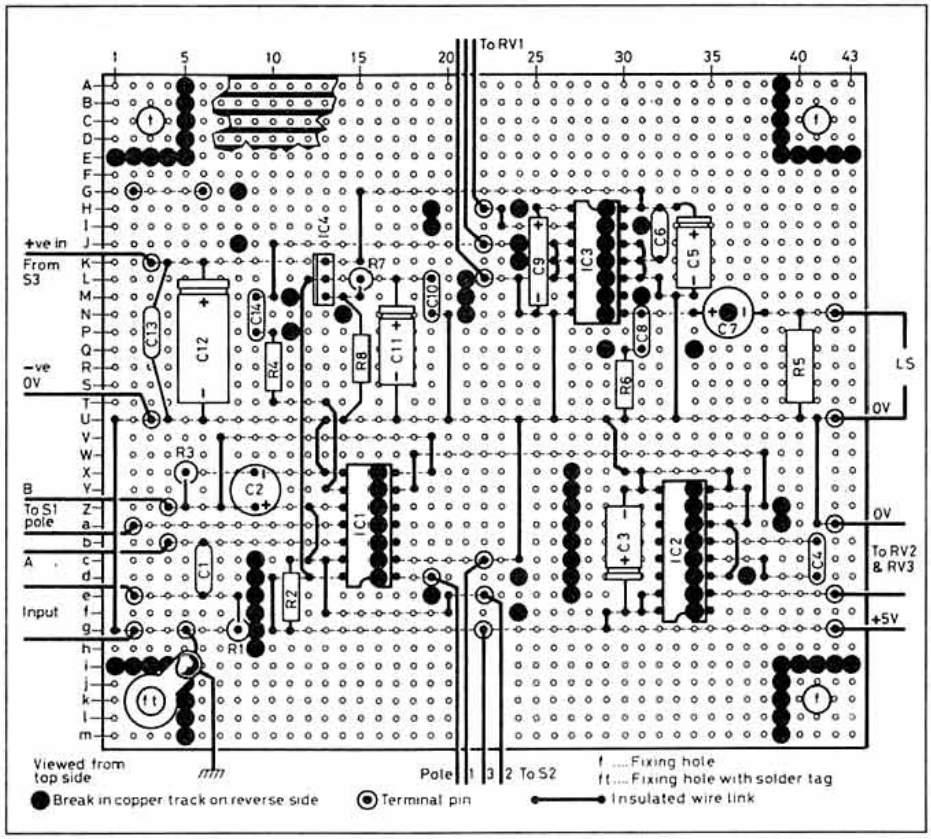


Fig 4: Veroboard Layout

The graphs marked 1, 2 & 3 in the figure area are the filter responses corresponding to the settings 1, 2 & 3 respectively, of S2. The values of 1%, 2.5% & 5% associated with these settings are the bandwidths expressed as percentages of Fc within which the attenuation is more than 35, 40 and 40 dB, respectively. The corresponding figures for the maximum attenuation at the notch frequency for these different settings are 40, 52 and 48dB. These responses are within the manufacturer's specification.

The bandpass performance of the present design is shown in **Figure 3**. It is clear that the bandpass response is wider than that in the notch mode, and this lower discrimination facilitates initial tuning. For the narrowest bandwidth setting, the bandwidth between 10dB points is 35% of Fc.

The notching of an unwanted sharply keyed CW signal, ie one with a relatively wide bandwidth, can be best achieved by increasing the bandwidth of the filter to its maximum setting to minimize key clicks.

Figure 5 shows the circuit which is designed to operate from a single voltage supply in the range 8 to 20V. The AF signal into the filter may be taken directly from the loudspeaker jack of the receiver, and the loudspeaker connected to the output of the filter.

The LM317MP was chosen to provide a high degree of regulation of the 5V supply required by the VCO chip. Its frequency is then so stable that the centre frequency of the notch filter is maintained to an accuracy of 1Hz in 3600Hz for a variation of the external supply voltage from 8 to 20V. The load and line regulation figures of the LM317MP are, respectively, two and six times as good as the cheaper regulator, the 7805.

The VCO chip provides the 50% duty cycle which the LMF90 requires. The audio signal to be filtered is fed to pin 12 of the LMF90; the output appears on pin 9 which is connected to the input of the LM380 audio amplifier which in turn feeds an 8Ω loudspeaker.

R1 is chosen to match the audio output impedance of the receiver and may be 4, 8, or up to 10kΩ (eg high impedance headphone o/p), depending on the receiver in use. This value is not critical from the notch filter's viewpoint but is inserted to provide the proper termination for the receiver. What is important, however, is that the input audio voltage to IC1 should not exceed 1.8V RMS. An input voltage as low as 80mV RMS will give maximum undistorted output from the LM380 with the 10k log volume control turned to max.

A value of 6000pF for C4 gives an Fc range of 360 to 3600Hz. Some transceivers have a top audio response of 2500Hz and by changing C4 to 9000pF the notch will tune from 250 and 2500Hz.

CONSTRUCTION AND TESTING

VEROBOARD CONSTRUCTION IS quite adequate at these frequencies; **Fig 4** gives the layout to scale. Several simple precautions should be observed. Sockets should be used for the ICs, particularly the LMF90 which, because of its MOS technology, should not be inserted until all of the soldering is completed. The decoupling capacitor leads to the IC supply pins should be as short as possible. Further, a solid earth rail is advisable as the VCO produces a square wave with fast rise and fall times. Finally, the filter should be housed in a metal box and the audio lead from the receiver to the input of the filter should have a screen connected to the filter circuit. The LM317MP regulator should have a heat sink about 2" (4cm) long attached to the bolt hole plane, and should be insulated from earth. The 0.1 and 1µF capacitors (C10 and C11) should be wired directly onto the chip.

To test the unit, connect a signal of about 1000Hz from the receiver's AF output to the filter input. The receiver's audio should now

continued on page 59

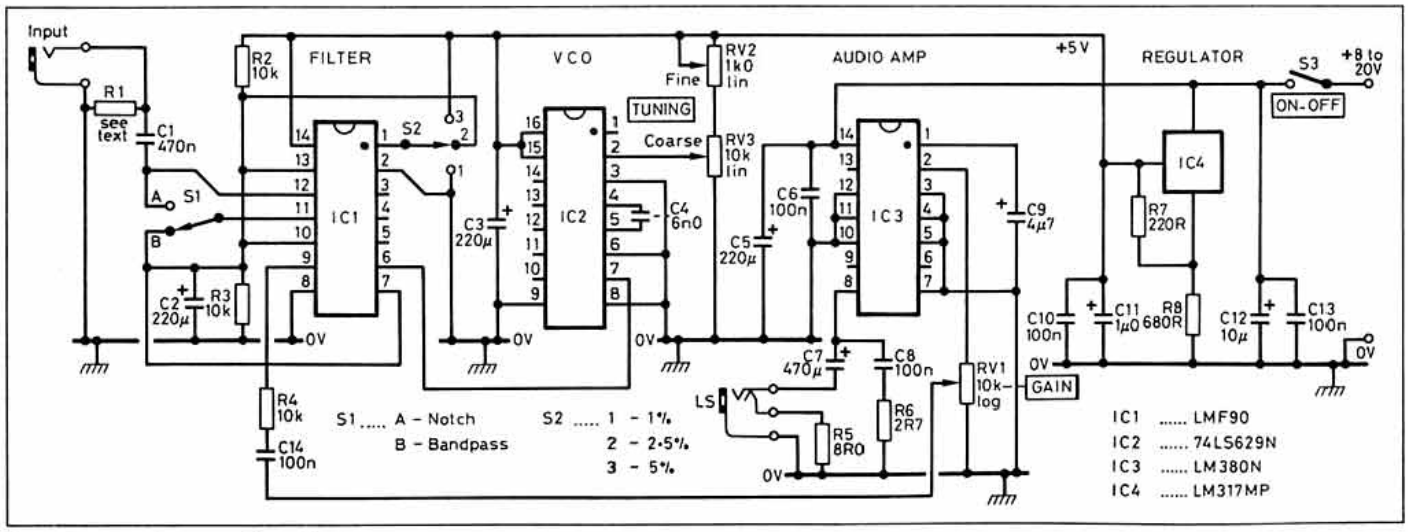


Fig 5: Switched Capacitor Filter Circuit

Is Your Own House In Order?

by G L Benbow, G3HB

THE FOLLOWING QUOTATION is from the *Television Interference Manual* published by the RSGB in 1972: "Television Interference is one of the most challenging problems in amateur radio, not because of technical intricacy, which is sometimes negligible, but because of the social difficulties created between the amateur and the viewer". This applies even more today because of the increased number of domestic electronic devices which may be affected.

When the dreaded enquiry from a neighbour arrives, you will obviously be in a much stronger position if you can show him your transmitter working at full power while members of your family are watching TV in the lounge and listening to the hi-fi elsewhere.

So what does 'putting your house in order' involve? Nowadays your transmitter is most likely a commercial one, so the design is probably adequate from the EMC point of view. If it is home-made, it is up to you to ensure that all the features necessary to minimise harmonic and other unwanted emissions have been incorporated in the design and construction. These are dealt with briefly in the *Radio Amateurs Examination Manual*, and in greater detail in other Society publications [1].

A typical amateur station layout to maximise electromagnetic compatibility is shown at the foot of the page. In this article we will look at the function of each section in turn.

TRANSMITTER/TRANSCEIVER

The high order harmonics radiated by an HF transmitter are low in amplitude and are unlikely to cause interference to UHF television. Harmonics from a 144MHz transmitter are much more likely to be a problem in areas where certain TV channels are in use, i.e the fourth harmonic of 144MHz falls in channel 34 and the fifth in channels 52 & 53. Problems with FM radio (87.5 - 108MHz.) may arise from a third harmonic of the high end of the 28MHz band or a second harmonic of the 50MHz band. The intermediate frequency of an FM receiver is generally 10.7MHz; strong third harmonics from the 3.5MHz band and the fundamental of a 10.1MHz transmitter are potential problems here.

The harmonic suppression achieved by the typical commercial transceiver (usually about 50 - 60dB) will be adequate in many cases, but in difficult situations additional filtering may be called for - eg, a low pass filter for HF and a band pass filter for the appropriate band on VHF. The mechanical design of the transmitter is of importance here, in that poor internal screening and inadequate screening and de-coupling of external leads (mains, key and microphone etc.) may cause unwanted signals to 'leak out', thus degrading the performance of any filters used.

THE TRAP

A trap is a very simple 'notch' filter which provides additional attenuation (up to about 25dB) at a single frequency over a narrow band width. This technique was widely used with HF transmitters in the days of VHF TV, and is still useful where a particular harmonic is troublesome. Such a trap may consist of a series tuned circuit (tuned to the troublesome harmonic) or a stub of the appropriate length of coaxial cable. [1]

SWR METER.

The SWR meter enables the ATU to be adjusted so that the SWR at its input is minimum, thus ensuring that the filter has the correct load impedance. A filter which is not correctly matched will give poor and unpredictable performance. The SWR meter is situated before the filter so that any harmonics which may be generated by the diodes in the meter are removed by the filter.

THE FILTER

To generalise, a low pass filter is used at HF and the appropriate band pass filter at VHF. At 50MHz and upwards it is usual to use a separate transmitter, feeder and antenna for each band. This makes it easier to achieve optimum conditions on any particular band.

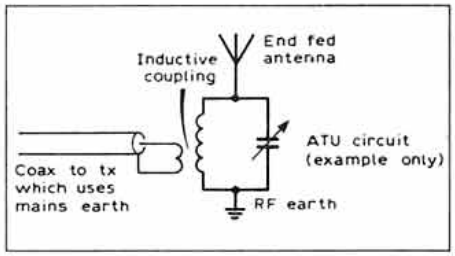
ANTENNA TUNING UNIT (ATU)

This title is applied by common usage. It does not tune the antenna; its function is to match the impedance seen at the input of the feeder system to the output impedance of the transmitter. For ease of adjustment, the ATU is normally located at the operating position.

It may be argued that an ATU is not necessary in a feeder system which is correctly matched. However, it should be recognised that the ATU will provide additional attenuation, up to 20 - 30dB, of unwanted signals. This is always useful!

ANTENNA

The preferred antenna is the balanced type; centre fed with low impedance line. If the feeder is coaxial, a balun will be required at the antenna end, or at the transmitter end if the feed is by 75Ω twin. In the later case, if the twin feeder is inductively coupled to an ATU, the use of a balun is avoided.



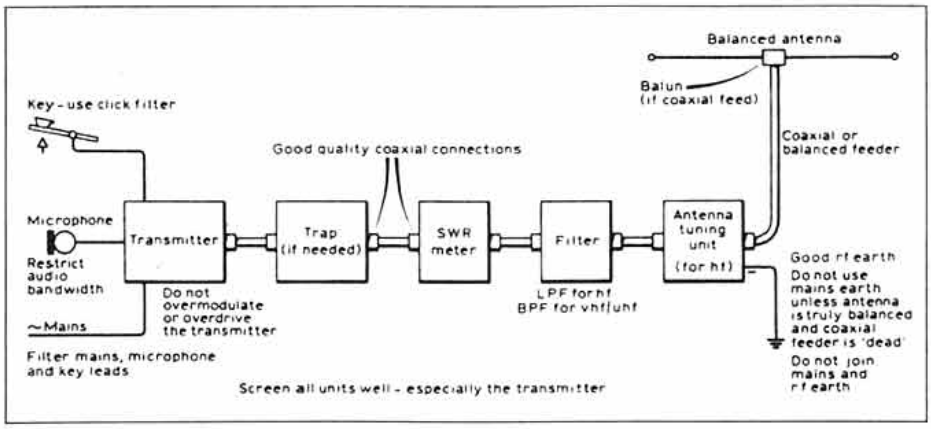
Use of inductively coupled ATU circuit to enable the RF and mains earths to be separated. Note that the RF earth is part of the antenna system and carries all the antenna current.

The feeder should drop vertically down from the antenna, preferably down to ground level. The antenna should, of course, be as high as possible and away from the house and hence from the TV and hi-fi etc.

There may be situations in which an end-fed antenna is the only possible solution. In this case there is likely to be significant radiation into the house, from the feed end of the antenna which may well be at high RF voltage. It may be possible to feed the antenna at the end remote from the house via earthed coaxial cable, and the un-fed end kept as far from the house as possible. This arrangement requires some form of ATU at the feed end.

The end-fed antenna requires a separate earth which carries the antenna current. For obvious reasons this RF earth must be separate from any other earth used. The following diagram shows a possible arrangement.

However, a preferable alternative which



An example of station format required for good EMC.

avoids this situation is an antenna which uses a counterpoise earth eg the W3EDP which is quite an effective multi-band antenna.

EARTHING ARRANGEMENT

The ideal earth system occurs when the transmitter is on the ground floor close to a window, enabling a very short direct lead to be used. The earth should be of the heaviest copper cable or copper strip obtainable, connected to one or more lengths of copper pipe hammered into the ground. While the use of the mains earth as the RF earth must be avoided, it is essential to ensure that an adequate safety earth is provided where appropriate. Further information on earthing practice can be found in chapter 9 - Electromagnetic Compatibility of the *Radio Amateurs Examination Manual* and section 19 of reference [1]. If there is any doubt about achieving a low enough earth resistance to give the required protection, an earth leakage circuit breaker of the 'residual current' type, should be fitted in the supply to the station.

If the station earth lead is on the long side, it is worth trying, but check that its length is not related to the wavelength used. There will be a length that does more harm than good, in which case, disconnect it, and try a different configuration.

A filter in the mains lead should not be forgotten. Several turns of mains lead through a ferrite ring may suffice, but using two or even more rings will be effective, especially at the lower frequencies.

SAFETY PRECAUTIONS WITH MAINS SUPPLIES USING PROTECTIVE MULTIPLE EARTHING (PME)

Various recommendations are made concerning earthing both at the transmitting station and at the affected equipment. These are intended to minimise interference problems, and such techniques have been used for many years with considerable success. However, some local electricity supplies now use the system known as protective multiple earthing (PME), and following these recommendations may contravene the safety regulations for such systems.

There is a serious risk of injury or death occurring under certain fault conditions. Accordingly, before any earth other than, or in addition to, the normal mains earth is connected to equipment or system, it is extremely important to check that PME is not being used. If it is, then further advice on how to achieve the EMC objective must be sought.

YOUR OWN DOMESTIC EQUIPMENT

As we have seen, dealing with likely sources and modes of radiation of unwanted frequencies is relatively straightforward.

Now, what can be done about all the equipment in your house which may be affected by interference caused by breakthrough of the main transmitted signal? Problems here are usually caused by the use of wide-band (and therefore unselective) circuits, and the lack of screening in most domestic entertainment equipment. Complete suppression of breakthrough to TV and audio equipment can be difficult.

Remember three simple points:-

a. Your transmitter should be as far from the TV, video or hi-fi as possible.

b. Breakthrough will often disappear with even a small reduction in power. If you have a linear amplifier, do not use it for local contacts. Power reduction is easy in a modern transmitter or receiver, and a speech processor increases the average level without increasing peak level.

c. You are able to tell the dealer who wants to sell you domestic equipment that you are not going to buy anything which does not have reasonable immunity to unwanted signals. You may have to explain what this means, but hopefully as 1992 comes nearer more dealers will become aware of EMC problems. At least it can do no harm to spread the word!

TV RECEIVER

Is a filter required in the antenna cable? Low pass or high pass as appropriate - or maybe a braid breaker [2], [3], [4], or a filter in the mains lead? [5].

Incidently, what about your TV antenna? If it has been there for ten years or more, it is quite likely corroded and possibly starting to sag because some of the supports are rusting away. The remedy is obvious!

Direct breakthrough into the circuits of a TV may be due to inadequate RF de-coupling of power supply or control leads, or lack of screening. It can cause rectification at the base/emitter junction of the input transistors of an amplifier.

To make good these deficiencies, one needs skill and a detailed knowledged of the circuits involved. A task unlikely to be approved by a neighbour having a brand new and expensive TV or hi-fi!

Breakthrough from a high power 3.5MHz transmission into TV colour circuits operating around 4.3MHz is best dealt with by reducing your power.

VIDEO RECORDER

In general the problems and remedies for video recorders are similar to those for TV receivers. Filters may be required in all connections between the TV and video, and also in the video mains lead.

BROADCAST RECEIVERS (MW AND VHF FM)

Very many of these are basic in design, with no internal screening. They are therefore very prone to direct pick-up, and extensive modification would probably be necessary to overcome this. Usually the best that can be done is to locate them as far as possible from the transmitter and antenna. Image interference from a top band transmitter, is not uncommon on a medium wave receiver. If the receiver has an external antenna a wave trap tuned to about 1.9MHz will significantly reduce the image signal arriving at the receiver mixer via the antenna. However, in most cases the only solution is to find out the best location and orientation for the receiver, and if this fails then avoid the particular frequencies which give trouble.

Breakthrough into the 10.7MHz IF circuits of an FM receiver can arise from the third harmonic of a 3.5MHz transmission, or directly from a 10.1MHz transmission. Again, internal modification is probably impossible, so as before locate the FM receiver as far as possible from transmitter and antenna, and avoid unwanted signals entering the receiver by using ferrite ring chokes on the antenna coax and mains lead as appropriate.

THE HI-FI SYSTEM

Important points here are:-

a. Connections between amplifiers and speakers should be as short as possible.

b. Where practical bypass *all* speaker leads to chassis at the amplifier end using disc ceramic capacitors. Values between .001 and .01µF should be satisfactory. It may be necessary to use screened speaker leads in which case the screen should be earthed at the amplifier end, and possibly at the speaker end; both should be tried. Earthing at both ends may create a loop of the screening braid, which could act as an antenna at some frequency or other. Generally this is only possible with your own equipment, and where you know that the chassis is properly isolated from the mains supply; otherwise it is simpler to wrap the speaker leads on a ferrite ring to form a ferrite ring choke. [5].

c. Unwanted signals can often enter a hi-fi via the mains lead or, where a radio is incorporated, via the braid of the antenna coax, and in both cases a ferrite ring choke is likely to prove effective.

In some instances problems are caused by signals picked up directly at the base/emitter junction of the first stage of the amplifier, and a possible - though unattractive - remedy is to fit ferrite bands and bypass capacitors to the affected stages. However, this course cannot be recommended unless you have the necessary knowledge and experience.

REFERENCES.

[1] *Radio Communication Handbook.* Fifth Edition. RSGB

[2] 'Diagnosis of a Problem'. R Page-Jones. G3JWI *RadCom* (Sept 1990).

[3] 'Were You On Your Radio Last Night?' (parts 1 & 2), Angus McKenzie G3OSS, *RadCom* (May and June, 1990).

[4] *How To Improve Television and Radio Reception* - A DTI publication available from main Post Office.

[5] *Reducing RF Breakthrough Using Ferrite Rings*, an RSGB pamphlet.

IDEAS FROM ABROAD

TRANSLATED BY ERWIN DAVID, G4LQI

FROM ELECTRON (NL), AUGUST 1990

Have your ears been insulted by the poor sound quality of the mini-speaker in the top or bottom of your transceiver, and have you been put off by the price of a 'matching external speaker'? Here is what you can do about it.

A LOUDSPEAKER FOR VOICE COMMUNICATION

Original article by Herbert L Rutgers, PA0SU

A SPEAKER FOR VOICE communication in its cabinet must be reasonably matched to the audio amplifier driving it, and have no resonances between 300 and 3000Hz, preferably between 200 and 5000Hz.

Most solid state audio amplifiers, including those in transceivers, are designed for a 4Ω or 8Ω speaker. While a 4Ω speaker would overload an 8Ω amplifier, an 8Ω speaker is suitable for either amplifier. So a speaker with a *nominal* impedance of 8Ω is wanted. As the 'unmounted speaker' curve (**Fig 1a**) shows, it will have an impedance near 8Ω in *mid-range*, say 1000Hz. At higher frequencies, toward 10kHz, the impedance increases due to the self-inductance of the voice coil. With so-called *full range* speakers, ie those designed for listening to music, this is of no importance at speech frequencies. At the low-frequency end, note the *self-resonance* peak, which may be as high as ten times the nominal impedance.

SELECTING A SPEAKER

A round 4" (103mm) diameter full-range single-cone speaker, without built-in tweeter, would serve our purpose.

Likely sources are junked TV sets and broadcast radios for home, portable or car use. Its self-resonance should be below 200Hz.

MEASURING THE SPEAKER IMPEDANCE

Fig. 2 shows the set-up. The voltage across the speaker is proportional to the impedance *if* fed from a current source. If the audio generator has a low-impedance output, as is usually the case, a 470Ω series resistor will turn it into a current source. The AC voltmeter across the speaker must have a frequency range of 50 - 5000Hz or better, and must be sensitive enough to give a readable deflection on less than 2% of the maximum output voltage of the audio generator. Assuming 1V max. from the generator, the voltage across an 8Ω speaker would be only 1x8/(470+8) = 17mV approx. An audio millivolt meter or a 'scope would be ideal, of course, but many digital multimeters on their 200mVAC range will do. A less sensitive ACV meter can be used if preceded by an audio amplifier.

Use an 8Ω resistor instead of the speaker to check out your instrumentation. Set the generator to 1000Hz and full output and see that you get a usable reading on the meter. Vary the generator frequency and check that the meter reading remains within 10% or so. It is handy to adjust the generator output to get a reading of 8, or 80, across the 8Ω resistor. If the generator output is not touched thereafter, the meter will be direct-reading in Ohms.

Place the speaker on the bench, face (cone) up. Connect it in place of the 8Ω resistor and start measuring at 1000Hz. The impedance should read approx. 8Ω. Then try 5000Hz. The impedance will be higher but, with a halfway decent speaker, not over 15Ω. Then, at the low-frequency end, find the frequency where the impedance is maximum and note that impedance: 50Ω near 150Hz would be typical.

THE CABINET

Take it from me that the speaker will sound best if completely enclosed in a cabinet. An inside volume of 2 litres (122 cu. ins) is adequate. A cube shape is best but any shape up to a ratio of 3:1 between the longest and the shortest side will do. The cabinet can be built of plywood or chip board with a minimum thickness of 5/8" (16mm) to keep the panels from rattling. The self-resonance of the speaker mounted in the empty cabinet must be below 300Hz (**Fig 1b**).

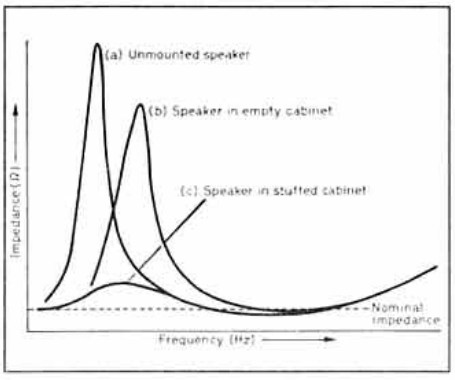


Fig. 1 The speaker impedance as a function of frequency of the a) unmounted speaker, b) speaker in the empty cabinet, c) speaker in the stuffed cabinet.

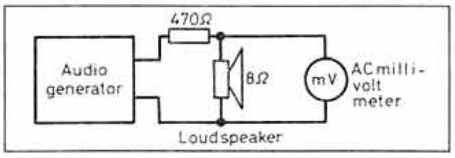


Fig. 2 The test circuit to measure speaker impedance as a function of frequency, 50 - 5000Hz.

CONSTRUCTION

The six panels must be accurately cut to avoid gaps. Suspend a panel from a string and strike it with a hard object. It should not resonate. If it does, the panels must be lined inside or out with glued-on sound deadening material such as lino or roofing felt. Assemble the box with good wood glue, using clamps. If none is available, use glue and screws; do not use nails. The hole for the speaker is dimensioned to mount the speaker from the outside. It will later be cemented in with its rim against the panel. I do not like to screw it on to avoid an errant screwdriver poking through the cone!

TUNING AND TESTING

First the speaker is temporarily mounted on the empty cabinet, eg with glueing clamps, and the resonant frequency and impedance measured. The frequency will be somewhat higher than that of the unmounted speaker, but the impedance peak less high (fig. 1b). Next, the cabinet is loosely stuffed with sound damping material so that the air in the cabinet, together with the speaker cone, no longer resonate. The damping material may be rock wool, glass wool, absorbent cotton, even a shredded wool sweater! Fill, but do not compress, and ensure that the stuffing does not touch the speaker cone; glue gauze to the back of the speaker if touching cannot be prevented without it.

Now measure again. The quantity of the stuffing requires some experimentation. What is left of the reasonance peak should be between the two previously measured frequency peaks and approx 18Ω for a nominally 8Ω speaker; below 15 or above 25Ω is not acceptable (**Fig 1c**). When satisfactory, fix the speaker into the opening with silicone cement; that is strong enough but can be undone if necessary. Fill any remaining gaps between cabinet and speaker, and the hole through which the connecting wires pass, with more cement and test for air leaks before the cement has set. Carefully push the cone inward by finger pressure near its centre. Hold it there for a few seconds, then release. If the cone slowly returns to its rest position all is well. If it jumps back, find the leak and seal it.

When the cement has cured a final test is in order. Connect the audio generator through an amplifier capable of a watt or two to the speaker. At a moderate sound level, listen for resonances as you vary the frequency 50 - 5000Hz. No rattle is tolerable. Place a finger on each panel of the cabinet in turn and make sure that no panel vibrates at any frequency. Plug the speaker into your hi-fi and listen to a voice broadcast. No trace of resonance should be heard. There will not be much bass but what is reproduced should sound clean and smooth. Now plug the speaker into your communication receiver and listen, especially under QRN conditions. You will be surprised!

The Peter Hart Review

TH-26E & TH-46E

Kenwood FM Hand Portables

THE DESIGNERS AT Kenwood have been very busy recently with the introduction, earlier in the Autumn, of two new ranges of FM handhelds *and* a new dual band FM handheld. The TH-26 and TH-46 are compact portables covering 144 and 432MHz respectively. The TH-27 and TH-47 are ultra-compact portables with similar output power and offered at the same price as their larger companions. Both ranges are packed with features with an extensive range of available accessories. The new TH-77 is a most interesting dual band portable, the smallest on the market today and only slightly larger than the TH-26.

The TH-26 and TH-46 are the natural successors to the TH-25 and TH-45 which have been around for nearly 3 years. This review features the TH-26E and TH-46E which cover the European requirements for the 144 and 432MHz bands. The TH-26A and TH-46A have slightly different features and frequency ranges for use in the USA.

PRINCIPAL FEATURES

WITH THE EXCEPTION OF the frequency coverage and repeater shift, the TH-26E and TH-46E have identical features. The 2m version covers 144-146MHz (or optionally 144-148MHz) although the receiver is capable of tuning the VHF PMR range, 136-174MHz, by a simple internal modification. The 70cm version covers 430-440MHz (or optionally 438-450MHz) and again this is capable of tuning the UHF PMR range by an internal modification. Within this fundamental tuning range, the actual tuning limits may be programmed by the user in increments of 1MHz. A small click-step rotary tuning knob on the top panel provides the tuning in steps of 5, 10, 12.5, 15, 20 or 25kHz as selected by the user. The tuning knob has 20 clicks per revolution. For rapid frequency changes, the frequency can be stepped in 1MHz increments.

20 memories are provided which store frequency data, repeater shift, and the various pieces of tone data where tone calling options have been added. The memories are battery backed by a lithium cell with a typical life of 5 years, and are stepped using the click-step rotary control. The memory contents or call channel may be transferred to VFO or cleared. Both positive and negative repeater offsets are provided but the shift is fixed at 600kHz on 2m, with 1.6 and 7.6MHz on 70cm. The TH-46A US model has a single 5MHz shift. Other frequency splits can be accomodated using the memories, 10 of which will store independent transmit and receive frequencies. Reversing of transmit and receive frequencies is provided and for the TH-26A US model, the relevant shift status whether positive, negative or simplex may be automatically selected, depending on frequency according to the US band plan. This would be a very useful feature to include in the TH-26E but would require variants for different countries.

A call channel facility gives quick access to a frequently used channel and may be embedded into a number of the scanning routines. There is no priority watch feature although call channel scanning largely provides this function.

The usual comprehensive scanning features are included. These provide the following options - scanning over the full band, scanning between programmable limits, scanning over a 1MHz range, or memory scan of the occupied memory locations. In memory scan, locations may be locked out to prevent the scan constantly stopping on heavily used channels, eg the local repeater. Scanning may also be initiated between any two of: the last used memory channel, VFO channel or call channel, or indeed between all three. The scan will stop on a busy channel and may be programmed to resume either after 5s or 2s after the channel becomes free.

A 1750Hz toneburst generator is built-in activated by a small button just under the PTT. This also keys the transmitter.

A number of other tone calling features are available as options. DTMF tones may be transmitted and decoded with the DTP-1 DTMF keypad and DTU-1 DTMF unit installed. The TH-26E supplied for review was fitted with this option as can be seen from the photo. DTMF (dual tone multi-frequency) is the system adopted for tone dialling in the telephone network and now being introduced in many parts of the UK. The DTMF options will allow up to four 15-digit numbers to be stored and transmitted although this uses five of the 20 memory locations. The DTMF option also provides DTSS (Dual Tone Squelch System). In this, a 3-digit user selectable number is stored in the radio. With the DTSS active, the audio output remains squelched until a received signal transmits the relevant 3-digit code. In this way a private or group calling system may be implemented.

Another method of implementing such a system is to install the TSU-7 CTCSS unit (Continuous Tone Coded Subaudible Squelch). In this system, one of 32 tones between 67 and 225.7Hz is transmitted continuously under the speech modulation at low deviation. The receiver squelch will only open if its CTCSS code matches that of the transmitter. DTMF and CTCSS are used extensively on the repeater network in the USA but have rather limited use in the UK.

The transmitter power output is switchable between high power (2 – 5W depending on battery voltage), low power (0.5W) and economy mode (20mW).

A small liquid crystal display fits on the top face of the unit and indicates frequency, memory number, S meter, battery charge state and a variety of status messages. For night-time operation, a backlight is provided which can be either continuous, or remains on for 5s after the last key press. The backlight, of course, does not illuminate the keys. Other facilities include frequency lock, key confirmation beep tone on/off, Tx LED, monitor key to lift the squelch and a tone alert when

the squelch opens. A series of four double beeps is produced when a signal is received and this can also be used with the CTCSS to indicate an incoming call.
The radio is supplied with a 7.2V, 600mAH, battery pack but a range of battery packs is available from 6 to 12V and from 200mAH to 1200mAH. An empty battery case is also available to take alkaline cells and the radio may be powered from an external supply in the range 6-16V.
Two power saving modes have been incorporated to help conserve battery power. With the battery saver mode active and with the squelch closed (no signal received) ten seconds after the last key operation, the radio will cycle between ON for 150mS and OFF for 800mS. If the radio is totally dormant with the squelch closed and no key operations for 60 minutes, the power will shut off. One minute before this condition there is an audible warning of four double beeps.
The radio is supplied with a small battery charger, 'rubber duck' antenna (the 70cm antenna is longer than the 2m antenna), other small items and a 50 page manual. This is a reasonable manual considering that it covers all models and variants in a single booklet. A circuit and block diagram is enclosed separately.
A whole range of accessories is available including batteries and chargers, speaker microphones, headsets, soft cases etc.

DESCRIPTION

I NEVER CEASE TO BE amazed at the ingenuity of the designers of hand portables; how so many features can be selected by so few controls. Naturally a small hand portable is very limited in the number of controls that can be incorporated, particularly in that most desirable location on the top panel, an area of limited real estate. Apart from the rotary tuning knob and concentric rotary controls for volume and squelch, the radio contains five push buttons on the top panel and four just behind on the rear panel. Four buttons on the side provide PTT, monitor, toneburst and power level functions. Using these controls, I have counted some 59 different operations selectable by the user! In addition, the LCD on the top panel conveys 19 separate pieces of information!

In order to accomodate so many selectable operations, each push button can set up to five different functions. Take as an example the MR key. A simple press of the key will select the memory mode. Pressing the key for longer than 1 second will initiate memory scanning and pressing again will stop it. Pressing the F key followed by the MR key will store data into the memory. Pressing the F key for longer than 1s, followed by the MR key, will enable a memory channel to be skipped during scanning. Finally, pressing the MR key at power on will clear all the memory channels.

The complete radio comprises the transceiver unit and the battery pack which clips onto the bottom. The approximate dimensions are 58(w) x 30mm(d). The length of the unit depends on which battery pack is fitted. Without a battery pack it is about 82mm and with the PB-10 7.2V 600mAH battery supplied, it is 136mm. The weight is 380gm with this battery.

KENWOOD TH-26E AND TH-46E MEASURED PERFORMANCE

RECEIVER MEASUREMENTS

		TH-26E	TH-46E
Supply current			
	- unsquelched no audio	72mA	63mA
	- squelched	67mA	58mA
	- with audio	to 150mA	to 140mA
	- battery saver mode	21mA ave	21mA ave
	- auto power off	16mA	7.5mA
Sensitivity for 12dB SINAD, 3kHz pk dev.		0.13µV	0.15µV
S meter sensitivity			
	- 2 blobs	0.25µV	0.18µV
	- 4 blobs	0.35µV	0.25µV
	- 6 blobs	0.5µV	0.35µV
	- 8 blobs	0.71µV	0.5µV
	- 10 blobs	1.1µV	0.8µV
	- 12 blobs	2.2µV	2µV
Squelch sensitivity		<0.1µV up to 0.2µV	
Adjacent channel rejection			
	- 25kHz with 3kHz dev.	66dB	66dB
	- 12.5kHz with 3kHz dev.	14dB	10dB
	- 12.5kHz with 1.5kHz dev	28dB	27dB
Co-channel rejection		9dB	9dB
Image rejection		66dB	62dB
Rejection of other spurious responses		67dB	85dB
Blocking/reciprocal mixing			
	- 50kHz offset	75dB	75dB
	- 100kHz offset	77dB	77dB
	- 200kHz offset	81dB	81dB
	- 500kHz offset	83dB	83dB
3rd order intercept		-29dBm	-34dBm
Max audio before clipping into 8Ω		see text	
Audio distortion up to clipping level		see text	

TRANSMITTER MEASUREMENTS

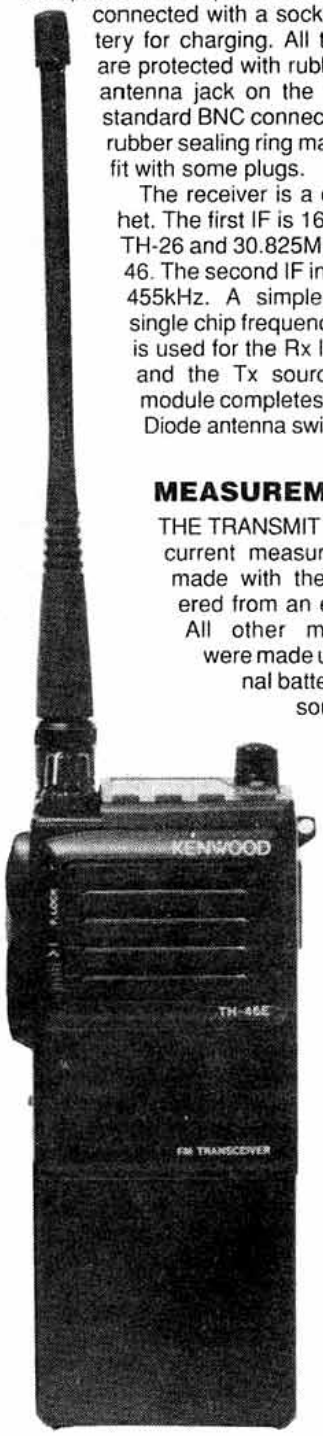
		TH-26E	TH-46E
Power output, high power			
	- 6V	0.8W	1.5W
	- 7.2V	1.3W	2.4W
	- 12V	4.7W	5.4W
	- 13.8V	5.4W	5.9W
Power output, low power		0.4W	0.5W
Power output, EL		36mW	30mW
Current consumption, high power			
	- 6V	0.65A	1.12A
	- 7.2V	0.76A	1.35A
	- 12V	1.14A	1.59A
	- 13.8V	1.15A	1.6A
Current consumption, low power		0.45A	0.58A
Current consumption, EL		0.11A	0.11A
Harmonic output		-70dBC	-65dBC
Spurious outputs		-70dBC	-76dBC
Max deviation		4.6kHz	4.5kHz
Toneburst frequency		1750Hz	1750Hz
Toneburst deviation		3.2kHz	3.4kHz

NOTE: All signal input voltages given as pd across antenna terminal.

The plastic case separates into two parts revealing two assemblies connected by a ribbon cable. The front part contains the microcontroller and associated circuitry together with the pushbuttons, controls and display. The lithium backup battery is mounted on the back of the display. The rear part contains two PC boards mounted in the case section which is metalised. One PC board contains the transmitter and receiver audio and IF circuitry. The other board contains the RF circuitry with shielding around the PLL. The 2m and 70cm boards are virtually identical with some small differences in the RF circuitry.

Miniature surface mount technology is used extensively. The tone calling options are easy to fit, little modules which simply plug into small sockets when the unit has been opened. Sockets on the side of the case enable external speaker, microphone and power to be connected with a socket on the battery for charging. All these sockets are protected with rubber caps. The antenna jack on the top face is a standard BNC connector although a rubber sealing ring makes for a tight fit with some plugs.

The receiver is a double superhet. The first IF is 16.9MHz for the TH-26 and 30.825MHz for the TH-46. The second IF in both cases is 455kHz. A simple single loop, single chip frequency synthesiser is used for the Rx local oscillator and the Tx source and a PA module completes the Tx lineup. Diode antenna switching is used.



MEASUREMENTS

THE TRANSMIT POWER AND current measurements were made with the radios powered from an external PSU. All other measurements were made using the internal battery as a power source. With the exception of audio and transmit power, all other performance figures were independent of supply voltage over the specified range of 6-16V. Indeed, the receiver functioned down to 4V. The measurements are detailed in the table with additional comments as follows.

Current Consumption

The current consumption is a little higher than the published specification, particularly for the TH-26E. The current on auto power off seemed surprisingly high for this radio considering that the majority of functions are powered down.

Sensitivity

The sensitivity figure is excellent for both radios. The squelch operated reliably on signals down to below 0.1µV.

S-Meter Calibration

The S-meter range is typical of FM rigs, a somewhat limited 20dB.

Adjacent Channel Rejection

The rejection of signals 25kHz away is reasonably good but for effective use of 12.5kHz channelling, the IF filters are too wide. The deviation of both the voice and toneburst was set about right for 25kHz channelling

Strong Signal Performance

The third order intercept is fairly typical of hand portables and generally mobiles and base stations have a higher intercept. However, high sensitivity and low current consumption are important for portables, and these factors do not make for a high intercept. Overloading of the radio may occur on large antennas but will probably not be experienced with the little 'rubber duck'

Receiver Audio

The audio output varied according to the supply rail. With 7.2V, about 200mW output could be achieved with 5% distortion. With 12V, the audio output was 360mW at 5% distortion.

Transmitter Power Output

The power output of the TH-26 at 7.2V is somewhat less than the specification. According to the suppliers, this is normal for this radio. However, at 13.8V the power is well within specification.

Spurious Outputs

Transmitter harmonic and spurious output levels are well down.

Frequency Accuracy

As supplied, and at room temperature, the transmit frequency was set very accurately, within 100Hz on 2m and within 200Hz on 70cm.

ON-THE-AIR PERFORMANCE

BOTH RADIO GAVE A GOOD account of themselves and functioned well in conjunction with the 'rubber duck' antennas. The receive sensitivity was good, the audio crisp and no spurious or strong signal problems were experienced. The adjacent channel measurements were confirmed; any reasonable signal would spread to the adjacent 12.5kHz channels but even the strongest signals were undetectable on the adjacent 25kHz channels.

The transmitter functioned well and good audio reports were received. It is surprising how far signals reached using the 20mW economy low power setting. Certainly there was no problem accessing the nearest repeaters at this power level and keeping the power to a minimum is the best way of conserving battery power.

The portables are a nice size and sit well in the hand. The most used functions are straightforward to select but with each key performing up to five operations, selecting the lesser used functions required careful reference to the manual. No doubt with a longer time for familiarity than is feasible during the period of a review, these operations would be remembered. A useful chart is given on page 35 of the instruction manual, summarising the functions of each key. It would be useful if this was reproduced on the back panel of the radio.

The TH-26E was also used in conjunction with a Tiny-2 TNC for packet operation. No problems were experienced although thin bodied connectors are needed to connect to the microphone and earphone sockets. Metal bodied connectors tend to short.

> Good solid portables with plenty of features and a good overall performance

CONCLUSIONS

ANYONE LOOKING FOR AN FM hand portable has quite a selection to choose from at the present time. The TH-26E and TH-46E are good solid portables with plenty of features and a good overall performance. They are a very convenient size, not the smallest available but with a higher capacity battery pack than the real miniatures. The ultra-compact TH27/TH47 is well worth considering if a pocket portable is required as these also have high capacity battery packs.

The TH-26E is a little light on transmit power compared with the specification and other portables on the market, and Kenwood should correct this. Narrower IF filters would also allow 12.5kHz channels to be used more effectively.

The current price of the TH-26E is £249 and the TH-46E is £269. Other battery packs are in the £25 to £40 region with the dry battery case £7.27

ACKNOWLEDGEMENTS

I WOULD LIKE TO THANK Lowe Electronics of Matlock, Derbyshire for the loan of the equipment.

Peter Hart, G3SJX

An Introduction to Meteor Scatter Operation

Conclusion of a two part article by Nigel Wilson, BEng A.M.I.E.E., G4VVZ

RECENT DEVELOPMENTS

ALTHOUGH METEOR scatter has been around quite a long time now, there is still much that we don't know about the mode. Most professional work in the field is based on a large body of work published in the 1950s and 60s. Research into meteor scatter has continued, and with the end of Band I television in the UK, interest in the mode from professional bodies has once again been on the increase. Amateurs have also been exploring new horizons for meteor scatter, most notably by proving the practicality of MS QSOs on 70cm.

MS ON THE 430MHz BAND

THE POSSIBILITY of MS propagation above 150MHz is virtually ignored by professional radio engineers. Typical curves for frequency dependence (see Part 1, Fig 1) finish as though nothing existed above. We, as amateurs, know different with the widespread use of MS at 144MHz. What is even more remarkable is the occurrence of MS at 432MHz where improvements in receiver sensitivity have increased the usefulness of the mode dramatically over the last few years.

It has only recently become accepted that MS is possible at 432MHz. Before 1983/4 much scepticism was expressed about the validity of some claimed QSOs. In 1984, I was one of the operators of a contact between the Derbyshire Hills Contest Group DX-pedition (EI2VPX/P) in WL02j and DL7QY (FJ59e), a recording of which was played to one prominent VHF-UHF columnist who subsequently acknowledged the complete QSO. Since then, however, still only a handful of contacts have been completed, although recently PA3DZL and SM2CEW did complete a new world DX record QSO.

MS at these frequencies is not for the faint-hearted! Generally a minimum of four long Yagis is recommended, although at least one station has apparently completed QSOs with only 2 x 21 element. A good low noise pre-amp at mast-head is *essential* and a high power amplifier (eg. the popular K2RIW, 2 x 4CX250B type) is required. Skeds are generally 4 hours, and operation is usually in 5-minute periods of high speed CW. Because beams are so sharp, the use of correct antenna headings - including the appropriate offset - is very important.

For those with suitable equipment, MS on 70cm is possible and many more QSOs could be made as long as times for skeds are carefully selected. It should be stressed, however, that MS on 70cm is not for newcomers to the mode, or for those whose equipment does not measure up to the requirements above - which unfortunately is most of us!

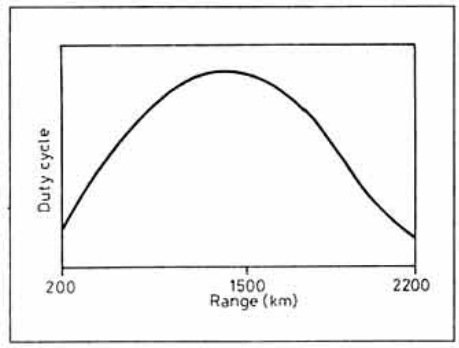


Fig 7 - Classic range dependence curve of MS.

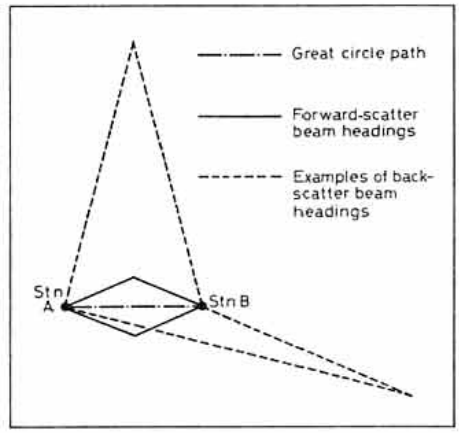


Fig 8 - Example of beam headings for back-scatter QSOs (plan view).

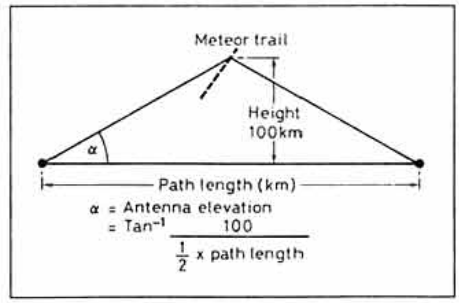


Fig 9 - Calculation of elevation required for short range contacts.

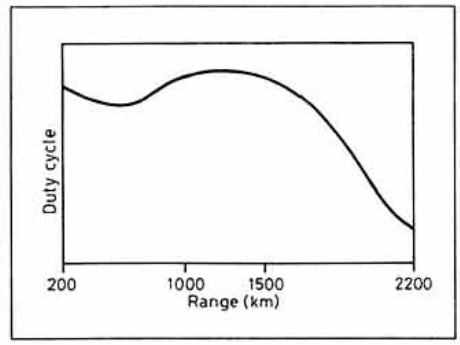


Fig 10 - Experimentally determined range dependence of MS.

MS OVER SHORT RANGES

THE USEFULNESS of MS over short ranges has never been of much importance to amateurs (or professionals for that matter) as tropo on 144MHz is generally sufficient to work well-equipped stations at distances of 500km under most conditions. However, with the advent of 50MHz and the increased interest in 70MHz, it is worth taking a fresh look at MS as a means of short-range communication. This mode of propagation is particularly useful for working expedition stations activating rare squares in the UK and Eire, as proven by successful MS operations by EI9FK/P and others on 70MHz.

The good news is that, contrary to the popular belief, meteor scatter does not always require large, highly directive antennas. In fact at short ranges they are a disadvantage!

Conventional theory indicates that the usefulness of MS propagation falls off below 1000km as quickly as it does above 1500km (**Fig 7**). This classical theory is based on the idea of antennas directed parallel to the ground. To overcome this, amateurs have often attempted to use a technique known as 'back-scatter' where both stations point their antennas at some common point well off the path centre (**Fig 8**). Back-scatter reflections, however, have 50% less usable 'duty cycle' than forward scattering from the same meteor trails.

The solution is very simple. Professionals working in the field [7,15,16] have predicted that useful reflections can be received from meteors well away from the centre of the path and in some cases behind the receiving station. A high gain antenna will not illuminate these regions, so many potentially useful meteors go un-detected. The answer is to use a small antenna, and to elevate beams to point at the centre of the path. The elevation required is very simple to calculate.

From **Fig 9**:

$$\text{Elevation} = \tan^{-1}(200/\text{path length})$$

Where 'path length' is the distance between the two stations in km.

It has been predicted [7] that for very short paths a dipole will work just as well for MS as a 5-element Yagi with which the comparison was made. Recent practical tests at just below 50MHz, comparing the performance of antennas over a short MS link indicate that small Yagis do have an advantage over a dipole, but the increase between a 3-element Yagi and a dipole is only about 20%. Research in this field is continuing but, especially with the ERP restrictions on 50MHz in mind, low gain antennas and higher powered transmitters may well have some advantages for short paths.

Using a correctly designed and pointed antenna, the theoretical range dependence graph shown in Fig 7 has been shown to be wrong. Practical tests [15] give results for range dependence shown in **Fig 10**.

Before leaving this subject it is worth pointing out that at 50MHz and 70MHz neither high power nor especially sensitive receivers are required. Of course more power helps, but I have completed many QSOs with only 10W on both bands.

PACKET RADIO FOR MS?

DATA COMMUNICATION has been the way professionals have always used MS. The reason for this is obvious: information can easily be stored ready for transmission while waiting for a suitable burst. This is not so easy with analogue signals (eg speech).

The problem for amateurs in the past has been the need for computerized control of the transmitter/receiver. Such technology, although relatively simple, has not generally been available to the amateur until the advent of packet radio in the last few years. As yet, amateurs have expressed little interest in using MS for packet. The author knows of only one article on the subject [17] where equipment and protocols are proposed. The possibilities are quite interesting, though. Assuming we use 144MHz, a Europe wide mailbox system could be quite easy to implement, provided everybody was using the same protocol. Repeaters would not be essential although a master station could be used to receive and re-transmit messages to other users. The possibilities are endless, but before the mode can take off some international agreement on protocols and frequencies would have to be made.

For anybody interested in this area, research by professional system designers [16] shows that there is practically no limit on the data rate a MS system can use. That being said, however, results indicate that about 10 Kbit/s is close to an optimum for trading off data throughput against minimum waiting time for a message to be delivered. This may be optimum, but speeds as low as 1200 or 2400 Baud will still give good performance. In addition, the packet length should be approximately equal to the average burst duration. Finding the average burst duration is rather more difficult, especially as some of the mathematical relationships proposed for it as a function of distance and frequency appear not to be valid in many practical circumstances. Suffice it to say, though, at 144MHz the average burst will still be quite short so the packet length should also be kept short. Special attention should be given to keeping the number of overhead bits to a minimum compared to the number of data bits.

CONCLUSION

THE AIM OF THIS article has been to consider some aspects of MS hitherto little explored in the amateur radio press. I have also tied together current information on MS from various sources for the beginner and for those who know something of MS already. For further details the list of references below should prove helpful, but for those considering getting started in MS for the first time a chat to a local MS operator will often prove the best way to learn the basics.

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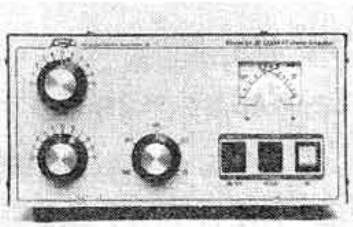

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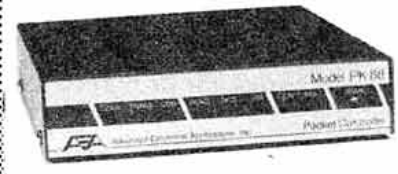

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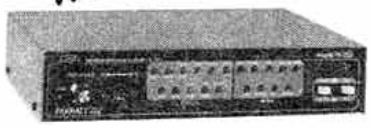

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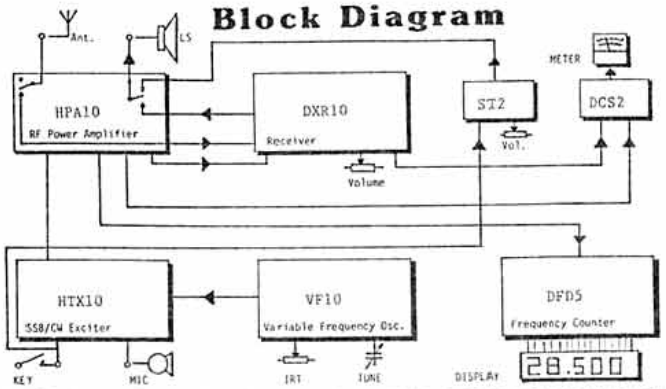

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73 from Dave G4KQH, Technical Manager

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At the heart of the DJ-560E are two quite separate transceiver sections that share the same logic control, yet provide quite separate volume and squelch controls for each band. The benefit of twin display, twin audio outputs and duplex operation provides almost limitless possibilities. Just as interesting is the optional receiver extension range to cover 130-174/400-520MHz. Add to this full DTMF and full tone squelch (CTSS), and you will see why all the waiting for the DJ-560E has been so worthwhile.

Of course we could go on by mentioning the 40 memories, multi-scan modes, programmable functions, auto dial, power saver, 700mAh pack, DC:DC converter etc. etc. But why not come and see for yourself this miracle of engineering or send for the colour leaflet. Each unit has a full 12 months parts and labour warranty backed up by the service skills of one of the oldest companies in the business.

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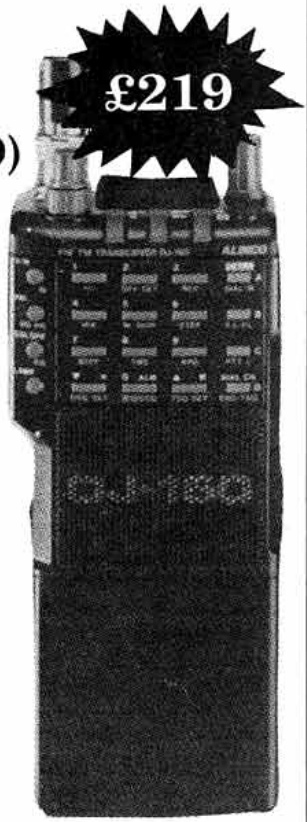
DJ-160E 2m
DJ-460E 70cm (£229)



The DJ-160E & DJ-460E have taken the market by storm and proved that there is a very obvious need for a "high-tech" portable that is realistically priced. The large volume sales have already proved beyond doubt that this is also one of the most rugged and reliable handhelds ever to reach the UK.

The 21 memories and comprehensive scanning programmes provide for every possible need and the large 700mAh pack combined with battery save ensures extended operation. Use the built-in DC:DC converter to increase the 2 Watts output to 5 Watts or enjoy the comprehensive DTMF programme for private or selective calling. Upon request you can have extended receive operation from 137-174 or 410-470 MHz. There are even multiple channel steps that make either transceiver suitable for both Europe and USA. Yet despite all these features it is ultra compact and underlines the fact that ALINCO is now very much the serious alternative at a lower price. Why not take a close look today or send for brochure. We'll give you what you want and change in your pocket!

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YAPP IS BACK!

STEVE COLEMAN, G4YFB, informs me that his latest release of mailbox software has incorporated a version of the well known YAPP binary transfer software. It is due to be released very soon and will again give the network the advantage of program areas that can be downloaded. As mentioned in *Datacomms* November 1990, is this the beginning of the move back towards on line databases?

R J Redding, G3VMR (@ GB7VMR) has taken the offer of using this column to discuss the future, and disagrees that this is the way ahead. He writes that we already have the facility of large on line databases with Prestel and Telecom Gold. These are extremely difficult to find your way around though; there is so much information you can't see the wood for the trees. He feels that all amateurs need to do is to elect one person to keep particulars on one subject; the REQFIL command can do the rest. Another view for the future is to have a 'technical bumf frequency' for amateurs to exchange information.

I understand that GB7VMR has a large file area for Atari Portfolio users listed as FOLIO. If you agree or not, your ideas and views can be sent to me for publication here in this column.

PACKET FOR THE BLIND.

THANKS TO ANGUS McKENZIE, G3OSS, last year I was able to show a way for the non sighted amateur to use the packet mode. Now, Jerry Johnson, K0QQS, has a program called Packet Reader which was written for his blind friend John Bloom, K0GCY. This makes use of the Commodore 64 computer and a Votrax Vo-Talker Synthesizer. The software causes the synthesizer to read every letter of received packets as well as each letter as it is typed, featuring a buffer so that packets or words can be repeated as they are needed. If you would like a copy of the program for a blind user here send a SASE to John Bloom, K0GCY , 1312 North Union, Fergus Falls, MN 56537, USA. Don't forget to enclose a disk.

TCP/IP FOR THE MAC

VERSION 2.0 OF THE APPLE Macintosh TCP/IP software is now available with a number of enhancements, including support of the new features in the PC versions, NOS and bug fixes. The software can be downloaded via Internet using 'anonymous ftp' from 'apple.com' in the directory 'pub/ham-radio', or from the N6OYU landline BBS at 0101-408-253-1309 (1200-9600 baud).

Alternatively you can send a $5 donation to Doug Thorn, N6OYU, c/o Thetherless Access Ltd, 1405 Graywood Dr, San Jose, CA 95129-4778 USA to obtain a diskette containing the software.

NEW PMS ROM

SISKIN ELECTONICS HAS released a new version of TNC2 Rom version No:1.16 D4 with PMS version 3.0. This replaces the old version of the same number, with some bug fixes including the Budlist which now works. If your original ROM came from there then the upgrade is free of charge, just send your ROM with a SAE to them.

Kantronics has also available an upgrade for KAM KPC series of TNCs. The changes include PBBS reverse forwarding to your local mailbox, simplified commands and a new command, REROUTE, which allows changing of the 'to' field.

Other enhancements include Navtex format, Amtor 625, Restore command, fully supported Host Mode, software DCD, new CWID and Beacon timings and PREKEY for HF use. All this is documented with the upgrade in a 64 page manual. The upgrade is available for £20.

Phil Bridges, G6DLJ, of Siskin has also informed me of a new product that is to be released very soon. It is a stand-alone satellite tracking system that needs no host computer. It has its own built in microprocessor, CAT interface for Yaesu rigs and RS232 for host input. Complete with its own LCD screen, the whole package will be available for under £300.

TINY 2 FACTORY MOD

SOME EARLY TINY 2 TNCs and Micropower 2s have been reported as 'going deaf'. All of these are items whose serial No. is below 2000. They are fine when new but with age seem to need a great deal of audio input to make them decode properly. Pac-Comm engineers have not been able to ascertain which component deteriorates but offer the following fix.

All parts are mounted on the underside of a 16 pin socket. The modem chip TCM3105 is removed, the modified socket inserted and the modem chip replaced.

Parts needed: 1-16 pin IC socket; 1-2222 Transistor NPN (EGC 123AP); 2-10,000 ohm (10k) 5% resistors

Instructions: Solder one resistor to the transistor emitter; the other end to pin 12 of the socket.

Solder the other resistor to the transistor base; the other end to pin 2 of the socket.

Solder the transistor collector to pin 5 of the socket.

Insert the socket into the PCB at the socket vacated by the modem chip and reinstall the modem chip piggy back into the socket.

DIGITAL SIGNAL PROCESSING

A FEW MONTHS AGO, I mentioned a new TNC that used DSP. I received a few letters and messages on the network that asked "What is DSP and how will it affect packet"? By way of an answer, a report by W5YI contained some of the following.

DSP involves the use of special microprocessors to digitize (convert into numbers) analogue signals, manipulate the numbers for a desired purpose, and then convert them back into analogue signals (voice, CW, images etc) that the human brain can comprehend. The processing is done with software instead of filter parts such as inductors or capacitors.

DSP is used throughout the long distance telephone network, in radio and TV broadcasting, in facsimile, medical and military applications. The cellular telephone industry in Europe and the US is starting a conversion to a DSP foundation. Spread spectrum and compact disk products are based on DSP.

In amateur radio, DSP will have far reaching implications. Some of the immediate uses include better HF modems for Packet and RTTY transmissions, special modems for satellite working and programmable filters and noise cancellers for CW and SSB. Your PC could become a spectrum analyzer with a DSP board, at a price far below that of a commercial unit. The Kenwood TS-950SD transceiver has a DSP module that enhances transmit performance.

DSP based direction finders could allow your repeater to output screen maps of the source of a received signal, in real time! DSP can recognize speech and could help us realise a true digital voice packet network.

The feeling that this was all imminent came when Bob McGwier, N4HY, who incidentally was the winner of the Dayton Technical Excellence Award, spoke at the last Dayton Hamvention in the Packet Forum, and mentioned 'writing' modems for various ham applications. No longer will modems and filters be assembled from electronic components, they will be computer programs written as any other piece of software.

The program could be downloaded to the DSP units from disk, or stored in ROM chips (read only memory) that can be updated whenever an improvement came along. TAPR and AMSAT are deep into development of DSP boxes and plug in boards to be offered to the amateur market.

AEA in the US has announced that the list price for its DSP unit will be $760, while the plug-in board from TAPR/AMSAT is hoped to sell for under $300 as a kit.

Thanks to W5YI and *Digital Digest* for the information included above.

While on the subject of *Digital Digest*, it may be worth noting that if you want to know the very latest from the US it is certainly worth reading. Their address is 4063 North Goldenrod Road, Winter Park FL 32792.

A very late small item just to amuse you all, as I drove to work today I saw the ultimate in modern communications taking place. Two Telecom engineers both with headsets on, sitting in different manholes about 50 yardS apart. One shouted to the other above the noise of both the traffic and a nearby pneumatic drill "GO BACK TO THE OTHER ONE".

All until next month - keep the letters coming please and if you are starting a new group or have updated information on your existing group drop me a line.

Acknowledgements: Maxpax, Siskin Electronics, SMC, Digital Digest.

Satellites

ARTHUR GEE G2UK
21 Romany Road, Oulton Broad, Suffolk
NR32 3PJ

OSCAR 17 READIED TO TALK

ACCORDING TO THE LATEST AMSAT Education News, edited by Richard Ensign, AMSAT's Science Education Adviser, DOVE is just about ready to start using its speech digitizer. Through the summer, diagnostic testing was carried out by Bob McGuire, N4HY, and Harold Price, NK6K. They discovered a hardware fault in Module 4 of DOVE which contains the S band transmitter and the speech encoder. The fault lay not in these units, however, but in a device called an AART which interfaces this module to the rest of the satellite. Special software was written to 'try-and-try again' to overcome the intermittent fault and this worked! Since then, DOVE has functioned satisfactorily. However, if a future failure of the AART occurs, DOVE will neither be able to 'talk' nor to use its S band transmitter. Harold has placed software 'watchdogs' throughout DOVE's programming to look for possible problems so that DOVE will not repeat the earlier condition when its 2 metre transmitter stuck 'on', and could only be turned off with great difficulty.

At the time of writing, DOVE is being programmed to 'talk' using its speech digitizer. The synthesizer chip and the particular mix of hardware in which it is sequestered proved just too awkward to program with acceptable speed quality. The necessary words for use in automatic telemetry readouts are currently being digitized in compressed binary form. Voice bulletins and telemetry readouts are due to begin very soon.

I have been monitoring DOVE regularly for a couple of months or more, and its signals on 145.825MHz are good and strong and are easily received on a normal 144MHz FM receiver.

There are three satellites now on 145.825MHz. They are all 'receive only' satellites, viz UoSAT-2 (Oscar 11); DOVE (Oscar 17) and BADRA-1 which have their telemetry beacons on 145.825MHz FM. UoSAT-2 and BADR-1 both have a transmit power around 0.4W whilst DOVE's is about 3W. All three are scientific/educational satellites whose beacons carry digital telemetry and science experiment readouts, as well as synthesized voice transmissions. BADR-1 is a clone of UoSAT-2. Digital data from BADR-1 and UoSAT-2 is 1200 baud ASCII. DOVE is packet and can easily be identified by ear as its signals have the characteristic sound of packet radio so familiar on the bands nowadays. It has a 2 minute 30 seconds 'on' and 30s 'off' sequence. None of them is currently 'talking'. though UoSAT-2 was very active in this respect earlier on. They are not likely to jam each other as their orbits do not come over the horizon at the same time.

One does not read much about the experimental results produced by amateur satellites such as the above and the recently launched Microsats. It was interesting, therefore, to read in the last edition of *AMSAT Educational News* some details of the Webersat Microsat activities in this respect. These included measurements made during a solar eclipse; pictures of the Pacific Ocean and impact sensor studies of several meteor showers.

On 22 July last, Webersat crossed over a part of the earth's surface which was experiencing a total eclipse of the sun. The onboard computer was set to take whole orbit data as the satellite entered the shadow, gathering current produced by the solar cells. This was followed by a 'picture sequence' in which its camera was set to take pictures of the Moon's shadow on the ground of partially or totally eclipsed sun. Unfortunately, these were not successful but a nice set of solar panel declining current readings were obtained. This issue of *AMSAT Educational News* contains some excellent graphs of this phenomenon and a more detailed account of these projects than it is possible to give here. Readers who are interested in these matters should write to Richard Ensign and take out a subscription to this publication asking for September last (Vol. 2, Issue 7) as your subscription starting point. Address is:- 421 N., Military, Dearborn, Michigan 48124, USA. Richard points out in the 'Next Month in AE' item that:- "Since the Microsats other than DOVE have sophisticated telemetry and data transmission modes and binary formats, and their data is very relevant for schools, we will devote the majority of the October *AMSAT Education News* to a 'How to do it and where to get it' section. Fortunately some of the hardware is inexpensive (TNCs and PSK Modems) and all of the software is either free or very inexpensive". So it might be worth while asking for that copy of *AE News* as well.

AUSTRALIAN AMATEUR SATELLITE INITIATIVE

THOSE WHO READ *OSCAR News* may have noticed on the last page of the October issue (No. 85) that the Australian Amateur Space Engineering Society was formed on 27 July 90. Australian Radio amateurs have been actively involved in amateur radio satellite matters right from the start. OSCAR 5 was designed and constructed by students at Melbourne University, Australia. It was designed to transmit data only; signals being radiated in the 28 and 145MHz bands. It was unique in that it carried two bar magnets in an effort to stabilise its motion in space and prevent the tumbling which earlier satellites experienced. It weighed 39lbs and measured 12 x 17 x 6 inches and carried 20lbs of batteries. It was launched on 23 January 1970, and became the first satellite to be used by the Talcott Mountain Science Centre at Avon, Connecticut, USA, in their educational programmes.

For those who did not see this item in *OSCAR News*, it read as follows: "On page 8 of Newsletter 63, I mentioned that AMSAT-AUSTRALIA had been approached by British Aerospace Australia to submit a proposal to the Australian Spacecraft Payloads study. This prompted Craig Lindley to contact me to see what I had proposed (a Microsat built here in Australia), and he offered his services in coordinating such an ambitious project. To that end, after only four weeks, Craig with the help of thirty interested individuals in the Sydney area already has formed the above mentioned society. As well, Craig has published the society's first six-page newsletter which contains the following topics:- the Formation of the Society; Project Management Document; Project Report; Activities of the Melbourne Group; Microsat Spacecraft Characteristics; Competition; Contact List; Agenda for the first AGM and finally Membership Details. I suggest if you are interested in participating in this project you contact the Treasurer, Richard Gooch, c/o CSIRO., Division of Radiophysics, PO Box 76, Epping, NSW 2121, Australia for further details.

"AMSAT North America has agreed to supply the Group with full design drawings for a Microsat including software, and in procuring difficult-to-obtain components and engineering support for some subsystems. This will cost the Group US$8000 'up-front', to defray expenses - this is the same arrangement that was agreed between AMSAT-Italy's Group and AMSAT-North America. Therefore, the first challenge for the society is to raise this money in the shortest possible time".

AMSAT-UK's policy has been to help such projects in a practical manner and it voted at its last Management Committee meeting to contribute the sum of £2000 to this project . We hope others will regard the project as one most worthy of similar help.

ORBITAL PREDICTIONS

THERE IS MORE NEWS about the orbital predictions for Oscar 13 mentioned recently. Using a large and detailed mathematical model of the earth's gravitational field and the perturbations to O-13's orbit from the sun and the moon, orbital dynamics experts have come up with results which show a mostly linear decay at a rate of about 785 metres per orbit, in the perigee altitude until it gets below 200km in mid-1992. From then on, the perigee altitude will start to rise towards about 800km in 1994, when it will reach a peak. It then drops again to 200km by mid-1996, then towards the end of 1996 it falls to 100km and re-entry.

It is pointed out that the computer program employed to generate these assumptions is only as good as the initial data available to work with, so re-entry time is by no means certain as yet.

NEW YEAR'S RESOLUTION?

WHY NOT JOIN AMSAT-UK? Write to AMSAT-UK HQ, 94 Herongate Road, Wanstead Park, London, E12 5EQ, for details of membership and all the services it can offer for the satellite enthusiast.

Microwaves

MIKE DIXON G3PFR
'Woodstock', Gazebank, Norley, Warrington, Cheshire WA6 8LL

BELATED SEASONS' GREETINGS

MY APOLOGIES FOR THE lack of a December column, due to circumstances beyond my control - the intrusion of work! Still, I hope it isn't too late to wish you all a prosperous New Year, even if the festive season is nearly over. My thanks to all of you who have sent in news and other topical matter over the past year. I hope you'll continue to do so. Really 'hot' news will be aired earlier in the *RSGB Microwave Newsletter* because of the shorter production lead-time, but if it is worth repeating here, it'll certainly be included in this column. Next time you put pen to paper, why not copy to both the column and the *Newsletter* so that your news can have the widest airing?

TIME FOR CHANGE

THE TIME FOR CHANGE has come, too! From this issue of *RadCom*, the column will become bi-monthly but run to two pages - contributions permitting - instead of the three-quarters to one page format of the past few years. There are a number of advantages to this, not the least of which is that it will be possible to include short technical items which many people have requested over the past months, and which have been discussed many times both in Committee and in forums at the various Round Tables.

So . . . . let's see some short write-ups of your latest brainchild or ideas, and your topical news. I shall continue, of course, to report Committee business and also abstract what technical ideas come from other journals - as and when these become available. The closing dates for copy will continue to be roughly the middle of the month before publication. For example, if publication is to be in the March issue (posted end of Feb), then I need copy by no later than mid-January. If drawings, graphs or other illustrations are needed, then two weeks before this should allow the necessary artwork to be prepared and checked, otherwise we can't guarantee either publication or accuracy! Good black and white (or contrasty colour) photographs should present no problem either, but don't forget we don't run to colour printing, nor can we undertake to return prints or negatives - they may be needed again!

HIGH PERFORMANCE RECEIVE CONVERTER FOR 10GHZ: G3WDG-002

FOLLOWING THE BRIEF review of the G3WDG-001 10GHz multiplier and amplifier in the November column, the Components Service (see Mail Order Price List on pages 78 and 79) has been quite inundated with requests for both the G4DDK-004 driver source boards and the G3WDG-001 mini-kit. It is most encouraging to have this kind of response to the two closely related projects and there has been much useful feedback from constructors.

I'm pleased to say that, by the time you read this, almost certainly the G3WDG-002 will be available: watch the *Newsletter* for details. The development testing and 'proving' has shown that the design is reproducible, even though the development has been a little more complicated than the earlier transmitter design, largely because the designers wished to make the receive converter board smaller than the prototypes. The first converters were almost double the width that they are now!

Fig 1 is the schematic circuit for the high - performance converter which, over the past couple of months, has been 'shrunk' down to a board the same size as the G3WDG-001 transmitter. Knowing this, all you intending builders can purchase your tinplate box in advance! The size is 37 x 111 x 30mm, available from Piper Communications under the stock number 7754. Don't forget that you will need three high performance sub-miniature coaxial sockets for this design, for LO and signal input and IF output!

Local oscillator drive at 2,556MHz – assuming you want to receive the current international narrowband frequencies, 10,368 to 10,370MHz, on a 144 to 146MHz receiver – is derived from a 106.5MHz overtone crystal in the G4DDK-004 board. This is fed into a GaAsFET x4 multiplier (F1), identical to the multiplier in the G3WDG-001 design. The correct harmonic, at 10,224MHz in this case, is selected by FL1, a small 'pill- box' filter. It is then fed via a microstrip track and matching circuit into a dual diode mixer (D1). The mixer is a hybrid ring-mixer designed to give good LO rejection at the RF port and good signal rejection at the LO port: the microstrip around the diode pair is a folded three-quarter wave line.

The 10GHz receive signal is amplified by a two-stage low-noise amplifier (LNA) consisting of one 'Birkett' low-noise (red-spot) GaAsFET (F2) and a second stage using a general purpose black spot device (F3). The overall LNA gain is around 20dB. Image protection is provided by a second pill-box filter, FL2, which offers about 20dB of image rejection. The inherent noise figure of the LNA is less than 2dB which, with the mixer noise figure and conversion loss, results in an overall noise figure under 3dB. The mixer is followed by a low-noise IF amplifier (T1) based on Charlie's well known bipolar transistor 144MHz LNA circuit which has been used previously in many applications, such as the G3JVL 10GHz transverter and many interdigital converter designs for the lower microwave bands. Wide use is made of surface mount technology (SMT) 'chip' devices, as in the 'WDG-001 design. As before, the various microstrip circuit elements shown as heavy lines, 'wings' on the lines, triangles and rectangles constitute printed matching and decoupling components. It should be said that the design, like its predecessor, is capable of covering the whole of the band from 10,000 to 10,500MHz: all that is needed is the correct choice of crystal and the appropriate tune-up procedure. Calculating the crystal frequency is as follows: (lowest signal frequency in MHz -144MHz)/96. For instance, if for some reason you wanted to receive 10,100 to 10,102MHz on a standard 2m IF, then the crystal would be (10,100 - 144)/96 = 103.708MHz. Other IFs could, of course, be covered by changing the tuning range of the post-mixer amplifier and retuning the two resonator filters accordingly.

Fuller details than possible here will be published in the form of a complete construction and alignment guide booklet, as for the earlier design. The mini-kit consists of the construction booklet, two boards - the main PTFE PCB and the fibreglass regulator board - and two resonator cavities. PCB pins, all the surface mount capacitors and resistors, including the special ATC capacitors and wire

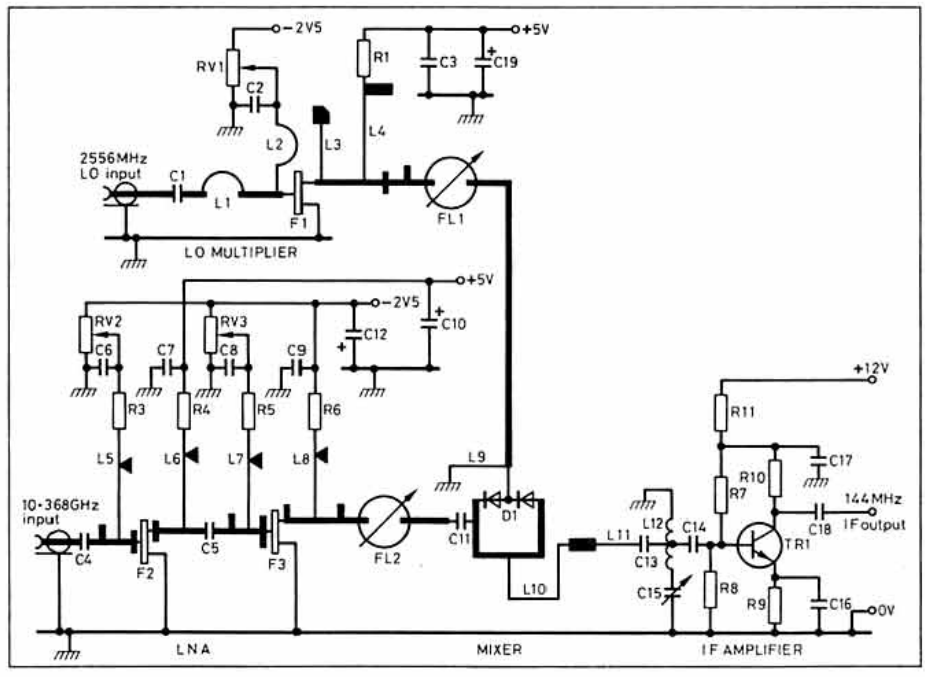


Fig 1 - G3WDG high performance converter for 2.3GHz.

for the various decoupling inductors. Alignment methods are described which, with a little care in tune-up, require no more than a suitable 2m receiver, multimeter and some kind of signal source - what better than a DDK-004/WDG-001 personal beacon? In a fix, you might be able to use harmonics from a lower frequency source or even a well stabilised Gunn or DRO in the band.

My thanks to the authors for permission to abstract this brief pre-publication pre-view from the write-up in the booklet mentioned above. My feeling is that here, at last, is a practical, really potent receive converter which should go a long way to revolutionising serious narrowband 10GHz operating in the UK, both in the portable environment and from the home station. I can't wait to start construction, especially after building the 'WDG-001 without any problems - and it worked properly first time, giving a little over 80mW output as measured by an ancient (but recently calibrated) ex-USAF, 1945 vintage thermistor power meter still in perfect working order!

THE CRAWLEY ROUND TABLE

SOME 37 ENTHUSIASTS (plus one junior op.) were present for this round table on 21 October, courtesy of the Crawley ARC at their club premises near Pease Pottage (of QRO 1.3GHz radar fame!). There were no less than four Microwave Committee members present, too.

Fun and games all round, it seems. There were live demonstrations of both narrow and wideband equipment, including reception of attended beacons in the town of Crawley itself. There was a Bring and Buy and also a calibration service (power and frequency), courtesy of Derek, G3GRO, who had also arranged the venue.

Chris, G0FDZ, gave a short presentation on amateur optical communications - no, not heliographs, but 'proper' electronic detection techniques! A 2mW laser was used and the equipment demonstrated over a 4km path. With a divergence of about 1 milliradian, at this range the 'spot size' is about 8m in diameter, leading to difficulty in accurate alignment between Tx and Rx. So you think you have troubles with your 3° wide 10GHz dish!!

On the subject of 10GHz operation, use of talkback was yet again debated. Now that much longer paths are being regularly worked on narrowband, it is being recognised that 144MHz is not without its failings and it was suggested that 100W to a smallish beam was the 'minimum' requirement for reliable talkback over distances in excess of 200-300km from poorish locations. It was suggested that 50W to a reasonable antenna on 70cm might be a better bet -however, there are no sound technical reasons why it should be better. After all, at three times the frequency, there is much more attenuation over a given path. It was noted, however, that in order to try to work into the continent on 10GHz, 70cm talkback on 432.350MHz would be necessary, since no EU stations will use 2m talkback. The light weight 'hilltoppers' would almost certainly object to having to carry both 2m and 70cm equipment as suggested for a trial period of a year. Nor could they carry the kind of battery power needed to run such equipment. I well remember this kind of debate many times before: each approach has its merits and demerits and the Microwave Committee would like your views. There are even some protagonists for 2m FM! I can't help but feel that, in some ways, this is an almost insoluble problem - 80 or 40m, or even a car-phone might be better, HI! Meanwhile, you 'takes yer choice'.

There was also discussion of beacons, both formal and informal. In this context, I'd like to try to compile a list of stations able to run personal beacons, either full-time, part-time or on request, so that new users of the bands can have some idea of what might be available to them. Periodic lists, here and in the *Newsletter*, might be a useful operating aid to all concerned. It appears that the meeting recognised the best route to a potent 10GHz beacon is now via the G4DDK-004 and G3WDG-001 RF boards, plus the G4FRE keyer. A board for the latter will soon be available via the Components Service, and EPROM blowing via G4DDK. Dave, G4FRE, who originally offered this service is on secondment in the USA where, incidentally, he has already 'plugged into' the American microwave scene by making contact with many of our trans-Atlantic confrères. He intends to attend some of the microwave events during his stay in the 'States, including the prestigious Microwave Update 1991 meeting in Colorado in late January.

Other discussions centred around the proposed IARU sub-band frequency changes (previously outlined in this column), the *Newsletter*, *RadCom* column, cumulative contests, site data and constructional activities. All points were duly noted by your scribe and will be acted on as necessary! The next (southern) round table is scheduled for 24 February, 1991, possibly at the Rutherford Laboratories at Harwell. Keep your eyes on the *Newsletter* and *RadCom* for information. Might I also suggest that the organisers use the GB2RS news facility? My thanks to Ted, G4ELM, for an excellent and very comprehensive report on this lively meeting.

As my final aside, arising from the frequency-move discussions, one of the principal advantages of the proposed moves is that the frequencies suggested are within the sub-bands allocated worldwide as Amateur Primary. There is also an advantage to placing terrestrial operations close to the space allocations: it might encourage terrestrial users to have a go at space comms - and vice-versa.

DATES FOR YOUR DIARY.

AS TO CONTESTS FOR the remainder of 1990 and all of next year, some dates were discussed at the last Committee meeting and, subject to no major clashes with other events and agreement with the VHF Contests Committee, will be as given below. Please note that, although aimed primarily at encouraging 10 and 24GHz activity, operators are invited to take out (and use) equipment for any band from 3.4GHz upwards. This represents a re-birth of the simultaneous 10GHz and microwave cumulatives which were popular some years ago.

First, it is proposed to introduce a 1990/91 'short' series of experimental Winter Cumulatives on 27 January, 24 February and 31 March. For this introductory series only, entries for two out of the three events will be accepted. These will put the informal 'first Monday of the month' winter activity days on a more formal footing and, with certificates to be won, may encourage more people to avoid dust and spiders gathering in their equipment during the winter - or even to go out and try out the new equipment they have built during the winter! The rules will be similar to the normal cumulatives. Home station operation is equally eligible for entry and it is hoped that this might encourage rain scatter or troposcatter tests between fixed stations, particularly on the higher bands. Look out for the full rules elsewhere in *RadCom*.

The normal cumulatives, following many complaints that attempted coordination with the IARU Region 1 contests did not work to the benefit of UK 10 and 24GHz activity, the dates have been moved so they do NOT coincide in 1991! Nevertheless, UK operators are encouraged to go out and make contacts, and entries under the operating rules and hours of these contests. The general feeling of UK operators, expressed in letters, at Round Tables and at the 1990 Sandown Convention, was that there should be seven 'summer' cumulatives, as last year. These dates will, subject to the confirmation mentioned earlier, be 21 April, 19 May, 16 June, 14 July, 18 August, 15 September and 20 October. As usual, three out of the seven events will count for the final score.

Finally, the 1991/92 Winter Cumulatives (replacing the informal activity days), will be five in number, on 17 November, 15 December (1991), 19 January, 16 February and 15 March (1992). Three from five will constitute a valid entry. Please, even if you don't operate regularly in enough of these contests to make a full entry, send check logs to the adjudicator who, it should be noted, is G4KGC (QTHR): Dave, G4FRE, the former adjudicator, reports receiving a couple of logs for the '90 cumulatives AFTER going to the USA on the secondment mentioned above!

9CM IN THE NETHERLANDS

NEWS FROM ARIE, PA0EZ, indicates that Netherlands amateurs have negotiated a 'long term' 200kHz wide allocation between 3400.000 and 3400.200MHz in the '9cm' band. Accordingly, Dutch activity will move there forthwith. It is believed that there may be Primary allocations at 3400 to 3410MHz in Regions 2 and 3: no doubt future IARU Region 1 conferences will discuss yet another possible move of operating frequencies. Meanwhile, sit tight and, if you wish to work PA stations, provide yourself with facilities for both 3400 and 3456MHz.

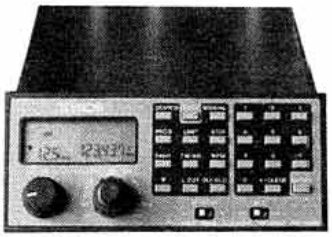
BEACON NEWS

I'VE JUST RECEIVED NEWS that the Martlesham 10GHz beacon, GB3MHX, is back on air following a complete rebuild - using the G4DDK-004 driver and G3WDG-001 multiplier/amplifier module. The beacon output is still on a NE-pointing dish, although eventually it may go omni. Sam also reported that the Essex beacon, GB3CMS, is off air, undergoing an upgrade to its output level, again using the above designs. When it reappears, it should be at least 10dB up on its previous output. ❑

PRODUCT NEWS

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

NEW FROM NEVADA IS the Fairmate HP200, a new and improved version of the HP100E. The set has extra wideband coverage; 500kHz - 600MHz and 805MHz - 1300MHz. In conjunction with Fairmate, Nevada has improved the receiver's sensitivity and stability. A UK spec charger and telescopic aerial are now available.



Nevada's MS1000 Scanner.

The MS1000 is the first in a line of Nevada branded base station scanners. It has the same spec as the HP200 handheld but also boasts switchable audio squelch, tape recorder o/p sockets with automatic signal-operated recorder switching and an all metal case. Price is £279.

Nevada Communications: 189 London Rd, North End, Portsmouth, Hants, PO2 9AE. Tel 0705 662145.

RECENT ADDITIONS TO the ICOM stable are the IC-970E and the IC-∝6E. The 970E covers the 144 and 430MHz bands with the capability of adding 1200MHz and wideband (50 - 905MHz) receive. Packed with the sort of sophisticated facilities you would expect from an ICOM base station, the 970 is able to operate cross-band for satellite working with tracking of uplink and downlink frequencies and even Doppler effect compensation. The use of DDS (Direct Digital Synthesis - see Dec 90 *RadCom*) "assures high speed PLL lockup times to meet today's high speed data communications."

The curiously numbered ∝6E is a tiny 50MHz handheld, just 58(W) x 75(H) x 30(D) mm and weighing 160g (2.3 x 3.0 x 1.2 in and 5.6 oz for readers not yet metricated). Covering 51 - 54MHz, this neat little rig runs 150mW on 5 switched channels, and includes a 50mW duplex option. "Experience the outdoors with it" runs the blurb which describes the ∝6E as "handy for skiing" though it hastens to add that the optional hands-free mic and phones set should be used!

ICOM (UK) Ltd: Unit 9, Sea St, Herne Bay, Kent, CT6 8LD. Tel 0227 363859.

ICS ELECTRONICS HAVE introduced three new products from AEA. The LA-30 is an HF linear amplifier which covers all bands including the WARC ones, and needs 40-60W drive for up to 1kW out on all modes. It uses a 3-500Z in Class AB2 grounded grid with a pressurized plenum cooling system at 30 cu ft/min. The LA-30 has a built-in mains PSU and weighs 15.9kg. Cost is around £800.

The ET-1 is a low cost (just under £100) antenna tuner capable of handling 300W RF 3.5 - 30MHz and 150W on the 1.8MHz band. It is compatible with "almost any antenna", including balanced (4:1 balun built in), coax fed or single wire. Switches are provided to change between feeders, and the unit features a built-in SWR/power meter.

For satellite enthusiasts, the PSK-1 data modem will allow the latest generation of OSCARs to be enjoyed to the full. Designed for the PK-232MBX and PK-88 TNCs, the modem will allow you to decode satellite telemetry and send packet messages worldwide. The price is around £200.

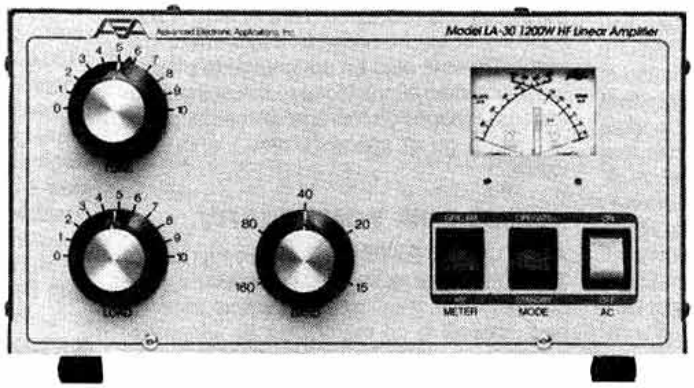
ICS Electronics Ltd: Unit V, Rudford Industrial Estate, Ford, Arundel, W.Sussex, BN18 0BD. Tel 0903 731101; Fax 0903 731105

GAREX ELECTRONICS, renowned for being *the* place to go for reconditioned commercial R/T gear, spares, mobile aerials, scanners and weather satellite systems, has moved to new larger premises in Devon. Managing Director, Peter Longhurst, G3ZVI, says "Since 1963, when Garex started up, we have seen enormous changes in both products and marketing and this move to our own custom designed building will enable us to improve our service to customers and meet the competition of the 1990s." The new premises are just off the A38 between Exeter and Plymouth. The retail counter opens 1000 - 1700 Mon to Fri.

Garex Electronics: Station Yard, South Brent, Devon, TQ10 9AL. Tel 0364 73394; Fax 0364 72007.

THE 1991 GREENWELD electronic components catalogue is now out. 132 pages long, the catalogue features a wide range of components, books and test gear for the audio, computer, radio or electronics enthusiast. Prices are: £1.50 for the basic catalogue, £2.50 if you want six Bargain List Supplements sent to you as well, or free to education and industry.

Greenweld Electronics: 27 Park Road, Southampton, SO1 3TB. Tel 0703 236307.



The LA-30 Linear Amplifier from ICS.

MUTEK HAVE BROUGHT out a 144MHz synthesised transceiver especially designed for packet data communications. This means that the usual restrictive audio filters have been replaced by filters properly designed to have a flat group delay characteristic. The transceiver is compatible with TNCs operating up to 9.6kBd. Output power is 10W and the receiver boasts a noise figure less than 2dB. Four channels are pre-programmed and are selectable from the front panel. Price is expected to be around £325.

Mutek Ltd: PO Box 24, Long Eaton, Nottingham, NG10 4NQ.

DO YOU WANT TO brighten up your QSL card? G4TJB has the answer. Added to his stock of QSL card pro-formas are four different designs featuring our very own RF Byrne drawn by G6MEN. They are available 100-off at £3.50 matt and £4.50 gloss.

G4TJB QSL Cards: 24 Portishead Road, Worle, Western-Super-Mare, Avon, BS22 0UX. Tel 0934 512757.

PC-MONITOR PROFESSIONAL is software for controlling the Yaesu FRG-8800 HF receiver, or Yaesu FRG-9600 VHF/UHF scanner from the keyboard of an IBM PC or compatible via the serial port and a CAT interface. Amongst the myriad features, the program allows direct keyboard entry of frequency, 10 selectable tuning steps, 1000 commented memory channels, logging, and tuning using the arrow keys. Colour and mono screens are supported as is a mouse (so that's what the CAT is for!). Minimum computer spec is an XT with 2 x 360k drives and an RS232 port. Cost is £41.50 including UK P&P and a manual. HF database software is available at under £20 and the Yaesu CAT interface is £77 plus the cost of a lead.

Barrie Jenkins: 32 Marsh Crescent, High Halstow, Kent, ME3 8TJ. Tel 0634 253850; Fax 0634 711362.

JUST THE JOB FOR field days, or fixing your aerial in a storm, is the new All Weather Torch from Maplin "made from amazingly light and superstrong alloy usually used in aircraft construction". It uses two AAA (penlight) batteries to power a miniature high intensity 'krypton' bulb (also useful for combatting Superman, it would seem). Most usefully, a spare bulb is included and the beam can be focussed by adjusting the lamp holder. 'O' ring seals ensure the torch is splash-proof and can even be immersed for a few seconds. Facts: 130mm long, 19mm lampholder dia, 13mm body dia. Price £3.95, batteries extra.

Maplin Electronics: PO Box 3 Rayleigh, Essex. Enquiries 0702 552911.

DELIGHTFULLY personalised mugs or plaques, manufactured and marketed by Norman Bedford, G4NJP. The amateur radio mugs are priced at £3.75. The companion door plaques are £3.25. Both include P&P. Delivery of the plaques is by return but two to three weeks should be allowed for the mugs to be hand finished and fired to order. And does the tea taste better out of a callsign mug? Try it for yourself. Cheers!

Norman Bedford, Characteristics: 44 Hilderthorpe Rd, Bridlington, Yorkshire, YO15 3BG. Tel 0262 673635; Fax 0262 670568.

MR DAVID TONG, G4MGQ, has devoted his professional career to the development of a whole range of electronic equipment for both the amateur and professional markets. Well known to *RadCom* readers since the early seventies, his ever popular morse tutor continues to be a best seller to aspiring 'A' licensees and his multimode audio filters sell all over the world.

The Datong success story is based on a formula which combines innovative design and customer service. The amateur radio products soon caught the eye of the professionals *[they must read RadCom - Ed]* and led to a series of equally innovative professional products.

One such product is the wideband DF Model F6, the latest in a range of DF products achieving world recognition and sales, and which begun with the amateur DF1 as long ago as 1981.

Designed for easy operation, the unit covers from 25 - 1000MHz and operates as a fixed or mobile installation. The system works with all normal types of transmission eg FM, NBFM, AM, SSB, CW, etc and appears to the user simply as a receiver with a DF display. Apart from the antennas, it is a single unit incorporating the IC-R7000 with Datong DF circuits.

A computer interface is included as standard allowing remote control of all receiver and DF functions via an RS232 *[no more letters please - Ed]* port. A second serial port drives an optional hand-held display and control unit, ideal for mobile operation.

The system uses a new DF processor with a high software content. Benefits include very easy operation, optimum treatment of pulsed and continuous signals, excellent long term stability and reliability, automatic correction for 'antenna spacing error', and extensive remote control facilities.

It is good to see yet another pioneering British manufacturer succeeding in the face of stiff international competition and to know that, as a matter of policy, the amateur side continues to retain a high priority in company thinking.

Datong Electronics Ltd: Clayton Wood Close, West Park, Leeds. Tel 0532 744822.

Professional DF receiver manufactured by Datong founded by innovative radio amateur David Tong, G4MGQ.

A Simple Audio Notch Filter

continued from page 39

be heard. Set the volume to a comfortable level and switch S1 to the notch mode, turning the coarse tuning potentiometer to give minimum signal, the fine control can then be used to obtain a final null. The three bandwidth settings of S2 should change the sharpness of the notch. Now switch S1 to the bandpass mode without changing the audio input frequency and you should find that the signal reappears at a volume which is close to its maximum. Moving the coarse or fine tuning potentiometers either side will reveal a slight rise in the volume level which will drop fairly sharply if swung beyond these settings.

One final word regarding the installation of this filter in a receiver: the whole circuit should be screened from the RF stages by enclosing it in a metal box.

ACKNOWLEDGEMENTS

THE AUTHOR WISHES TO thank H Whalley, G2HW; D MacKay, G0DKA; C Farmer, G1LDP; and R Schofield, G3RJQ; for practical advice and for putting the filter through its paces on the HF bands. G1LDP, who has also built the filter, obtained identical results using a completely different layout, his assistance with some of the diagrams is greatly appreciated. The many useful suggestions from the RSGB Technical and Publications Advisory Committee's reviewers are gratefully acknowledged.

Further Reading

LMF90 4th Order Elliptic Notch Filter, National Semiconductor Data Sheet TL/H/10354, Feb 1989.

Analog MOS Integrated Circuits for Signal Processing R Gregorian & G C Temes; John Wiley & Sons 1986. This describes the Switched Capacitor Filter in depth.

Supplier

All of the chips may be obtained from The Chip Shop (Semicons) Ltd., 6 Beanleach Drive, Stockport, Cheshire.

COMPONENTS LIST

RESISTORS - 0.25W Rating unless otherwise stated Tolerance 10%

R1 see text
R2,3,4, - 10K
R5 - 8R0, 2W
R6 - 2R7
R7 - 220R
R8 - 680R

RV1 - 10K log
RV2 - 1K0 lin
RV3 - 10K lin

CAPACITORS:

C1 - 470k
C2,3,5, - 220µ
C4 - 6k0+/-10%
C6,8,10,13,14 - 100k
C9 - 4µ7
C11 - 1µ0
C12 - 10µ
Wkg voltages - 30V

SWITCHES:

S1 - 1-pole, 2-way
S2 - 1-pole, 3-way
S3 - 1-pole, 1-way

ICs:

IC1 - LMF90
IC2 - 74LS629N
IC3 - LM380N
IC4 - LM317MP

CONTEST NEWS

RULES

GENERAL RULES FOR RSGB HF CONTESTS 1991

The General Rules for all RSGB HF Contests are given below. For each contest throughout the year, a short set of special rules will be published which must be read in conjunction with the General Rules.

The terms 'UK' or 'British Isles' shall be interpreted as: England, Scotland, Wales, Northern Ireland, Channel Islands and Isle of Man.

1. Licensing: Entrants must operate in accordance with the terms of their licence.

2. Contacts:

(a) Only one contact per band may be claimed *with a specific operator or station.* The practice of assisting a particular competitor by making multiple QSOs (eg by the same operator using more than one location/callsign) is not permitted.

(b) **Duplicate contacts** must be logged and clearly marked as such, without claim for points.

(c) Cross-band contacts may not be claimed for points. Where an overseas station is transmitting on the same band, but outside the UK frequency limits as specified by the licence or by the contest special rules, then a *split-frequency* contact may be made and claimed.

(d) Simultaneous transmissions on more than one frequency are not permitted.

(e) Pre-arranged contacts. Scheduled contacts arranged *before the start of the contest* may not be claimed for points. There is no objection, however, to the arranging of further contacts with the same station on other bands, provided it is done in contest time.

(f) Proof of Contact may be required. The HF Contests Committee reserves the right to approach any station for confirmation of contact, without reference to the entrant in whose log the contact appears.

3. Portable Stations: A portable station must operate from the same site for the duration of the contest and may not be located in any permanent building or shelter, nor may any such structure be used as an aerial support. (Trees are acceptable as supports.) Power for the station may not be drawn from from any public or private mains supply, but must be derived from a portable generator on the site, batteries or solar cells. No equipment or antennas may be erected on the site prior to 24hours before the start of the event, except for the purposes of safe storage of equipment. A portable station may be located in a motor vehicle, or vessel on an inland waterway, provided that the station cannot be operated without alteration whilst in motion (otherwise it becomes a /M station!) and does not derive any of its power from the vehicle's (or vessel's) engine or electrical system.

4. Operators: Unless specifically stated, only single-operator entries will be accepted.

(a) A Single-operator station is one manned by an individual operator, who receives *NO ASSISTANCE WHATSOEVER* from any other person in operating, log-keeping, checking, etc. during the contest period. This restriction extends to the use of spotting nets, packet clusters, ring-round groups and so on for the finding of new multipliers etc.

(b) A Multi-operator station is one which does not conform to the definition of a Single-operator station given above. In those contests where Multi-operator entries are allowed, such entries will only be acceptable if

(i) The declaration is signed by one operator only, who will be regarded as the entrant.

(ii) Each contact or block of contacts in the log has the callsign of the operator concerned shown against it.

(iii) The names and callsigns of all the operators are listed on the summary sheet.

5. Eligible Entrants: Unless otherwise stated, only fully-paid-up members of RSGB resident in the British Isles may enter single-operator events, or operate in multi-operator contests. Entries from aeronautical or maritime mobile stations, or from stations using callsigns with special event or club prefixes (eg GB, GX etc.) will not be accepted unless specifically stated in the contest special rules. Amateurs elsewhere wishing to enter those events which are open to them are not subject to any such restrictions.

6. A Contact consists of an exchange *and acknowledgement* of callsigns and an RS or RST (as appropriate) report together with a serial number and/or other data as specified in the special rules for the event. Points may only be claimed for a COMPLETED CONTACT (ie. if one end is unable to obtain a repeat when required, or loses contact, then the other end will lose the QSO credit also, as the contact cannot be regarded as complete). The full exchange must be sent to every station contacted. No points will be lost if the correct information cannot be obtained in return from a non-competitor provided that at least a report is received, but any additional information sent by the station must be logged.

7. Scoring:

(a) Details of the points scored per QSO and any bonus points or multiplier scheme will be given in each contest's special rules.

(b) Where Multipliers are specified the following will apply unless otherwise stated:-

(i) British Isles Stations score 1 multiplier for each country worked on each band. The DXCC Countries List will apply, except that JA, W, VE, VO, VK and ZL Call Areas (irrespective of prefix) will all be regarded as separate countries.

(ii) Overseas Stations score 1 multiplier for each British Isles County worked on each band.

(c) The Final Score is given by the total QSO points from all bands, either added to the sum of all the bonus points from all bands, or multiplied by the sum of the multipliers from all bands, as appropriate.

(d) For the purposes of scoring, aeronautical and maritime mobile stations will be regarded as being mobile stations in their country of origin, regardless of their actual location at the time of making contact.

8. Documentation:

(a) Log Sheets: - Logs from British Isles entrants must be clearly written in ink or typed on RSGB HF Contest Log Sheets, or if these are unavailable, on one side only of International A4 size paper. Overseas entrants are invited to utilise the log sheets provided by their own National Societies.

(b) SEPARATE LOGS ARE REQUIRED FOR EACH BAND

(c) Format: Each (non-pre-printed) Log Sheet should be headed with the following information: Name of Contest, Date, Band(MHz), Callsign of Station, Page X of N pages.

Each page should contain details of 40 QSOs, grouped in four blocks of ten, and tabulated in columns as below:

(1) Time GMT

(2) Callsign worked

(3) RS(T)/Serial Sent

(4) RS(T)/Serial Received

(5) Other Data (see special rules for event)

(6) Bonus points, or New Multiplier prefix, if any.

(7) QSO Points claimed

Any information to be included in columns 5 will be detailed in the Contest special Rules.

(d) Computer-produced logs are welcomed provided they comply with the above format. Standard fan-fold paper (11"x8.5") is perfectly acceptable. Please use a good ribbon, and NLQ if possible.

(e) Summary Sheet: Each entry must be accompanied by a Summary Sheet (form HFC2 or equivalent) detailing:

Name and Date of Contest, and Claimed Score.

Name, address and Callsign of entrant.

Name of Club or Group (if applicable).

Location of Station, if not as above.

County Code Letters, or other information sent.

Transmitter Power Output.

Details of Transmitter, Receiver and Aerials.

and the following Declaration, dated and signed by the entrant:

"I certify that this station was operated strictly in accordance with the rules and spirit of the contest, and I agree that the decision of the Council of the RSGB shall be final in all cases of dispute. I have no objection to data from this log being entered into a computer for the purpose of contest adjudication."

(e) When a Multiplier scheme is specified, each band's log must be accompanied by a list of the multipliers claimed for that band.

(f) Checklists ('Dupe Sheets'): Entrants making more than 80 QSOs on any band are *REQUESTED* to include with the log a 'Dupe Sheet' .... a list of **ALL the callsigns** (not just the duplicates!!) worked on the band **sorted into alphabetical order** and with, ideally, either **the serial number sent or the time of contact** shown beside each callsign.

Whilst provision of a checklist for RSGB contests remains voluntary, entrants are reminded that a number of overseas contests now have a REQUIREMENT to produce one. An RSGB HF Contest Checklist sheet is available to assist entrants.

If a checklist is compiled in real time (ie during the event) it can be a valuable aid to avoiding unwanted and time-wasting duplicates. Its subsequent use to check the log after transcription and before submission should make unmarked duplicates a thing of the past. It can often aid the adjudicator in deciphering difficult writing, where points would otherwise have been lost. Further, as one can see at a glance whether or not a particular station appears in the log, not having to search through for each callsign can mean a reduction of the time taken to check a large entry from over an hour to a matter of a few minutes. This explains the popularity of the 'Dupe Sheet' with adjudicators, who are all UNPAID VOLUNTEERS. A half-an-hour's extra time from you can save the adjudicator a fortnight of evenings and weekends.

(g) Availability of Forms: Examples of Log-, Summary- and Check-sheets have been printed in various RSGB publications, and sample copies are available from Headquarters or contest adjudicators free of charge on receipt of a stamped, addressed envelope. All may be freely copied for personal use. Larger quantities may be purchased from HQ.

9. Posting

(a) Unless otherwise stated, all entries must be postmarked not later than 15 days following the end of the contest. If acknowledgement of receipt is required a stamped, addressed postcard (or IRCs) should be included with the log, and this will be signed by the adjudicator and returned to the sender.

(b) Entries must be sent to the following address:-

RSGB HF CONTESTS COMMITTEE c/o G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey, CR7 7AF, ENGLAND.

The name of the contest must be clearly shown on the OUTSIDE of the envelope.

Logs sent to the wrong address may not be forwarded in time, and may be excluded from the adjudication.

(c) Entries bearing insufficient postage or for which any payment is due will not be accepted.

(d) All entries become the property of the RSGB.

10. Penalties and Disqualification

(a) Errors in received information are penalized by deduction of points on a proportional basis: one-third off for one error, two-thirds for two and all points claimed for three or more errors.

(b) ANY ERROR in receiving a CALLSIGN results in the loss of all points for that contact.

(c) Unmarked duplicate QSOs are penalized by the deduction of ten times the claimed points, in addition to the points claimed for the QSO, making a total of ELEVEN TIMES in all!

(d) Entries may be excluded from adjudication if

(1) They are posted late or are sent to the wrong address.

(2) Separate logs are not submitted for each band.

(3) The Summary sheet is not completed and signed.

(4) Logs are partly or wholly illegible, incorrectly formatted or do not contain all the required information.

(e) Entrants may be disqualified on any of the following counts:

(1) Failure to observe the Licence conditions.

(2) Frequent reports of poor-quality signals.

(3) The discovery of FIVE or more unmarked duplicate QSOs in the log.

(4) Persistent or deliberate failure to operate within the RULES AND SPIRIT of the contest.

(f) Minor contravention of the rules may result in the deduction of points as a penalty.

(g) In all cases of dispute, the decision of the Council of the RSGB shall be final.

11. Awards are made at the discretion of the Council of the RSGB and may consist of trophies, plaques or certificates. Certificates and plaques are despatched to winners after publication of the contest results. Trophies are normally presented at the HF Convention next following the contest. Entrants should note that trophies will not be sent outside the British Isles and, with the exception of certain commemorative miniatures, remain the property of the RSGB. Full details of the awards for each event are published in the special rules.

GENERAL RULES FOR RSGB HF RECEIVING CONTESTS

The aim of this section is to log contest exchanges made by transmitting amateurs participating in an RSGB contest. Receiving contests will usually run in parallel with an RSGB transmitting event. The General Rules for transmitting contests apply except as detailed below:

1. Single-operator entries only will be accepted. Short-wave listeners or Amateurs holding licences to transmit on frequencies ONLY ABOVE 30MHz may enter RSGB receiving contests. British Isles (excluding Eire) entrants must be members of RSGB.

2. British Isles entrants should use RSGB HF RECEIVING Contest Log Sheets (available as for transmitting events) if possible. Failing this, log columns are to be tabulated as below:

(1) Time(GMT)
(2) Callsign of station heard
(3) Report and serial number sent by that station
(4) Callsign of station being worked
(5) Other Data (see special rules)
(6) Bonus points, or New Multiplier prefix, if any.
(7) Points claimed.

The STATION HEARD may be claimed for points only once on each band. Any further claims for the same station will be penalised as for unmarked duplicate QSOs in the transmitting section. In certain contests (eg where British Isles stations may contact each other for points) it is permissible to log BOTH stations with a claim for points, provided both stations can be heard.

3. In the column headed "Callsign of station being worked" the same callsign may appear only once in any group of three consecutive contacts, except where the "Station Heard" counts as a new multiplier or bonus.

4. Summary Sheet: Entrants should use the RSGB SWL HF Contest Summary Sheet if possible. Failing this, the summary sheet should be made out as for a transmitting entry, but omitting references to transmitters and power and including in the wording of the declaration -- "I do not hold a licence to transmit on frequencies below 30MHz."

5. Awards: Unless otherwise stated, certificates will normally be awarded to the leading three entrants in this section, unless there are fewer than five entries. Additional awards may be made at the discretion of the HFCC, or as detailed in the special rules.

HF CONTESTS CALENDAR - 1991

Jan 5	7MHz Cumulative (Oct 90)
Jan 6	3.5MHz Cumulative (Oct 90)
Jan 7	1.8MHz Cumulative (Oct 90)
Jan 12	3.5MHz Cumulative
Jan 13	7MHz Cumulative
Jan 13	Affiliated Societies (Nov 90)
Jan 15	1.8MHz Cumulative
Jan 19	7MHz Cumulative
Jan 20	3.5MHz Cumulative
Jan 23	1.8MHz Cumulative
Jan 26	3.5MHz Cumulative
Jan 26/27	*CQ 160 CW (Jan 91, p18)*
Jan 26/27	*REF/UBA CW (Jan91, p17)*
Jan 27	7MHz Cumulative
Jan 31	1.8MHz Cumulative
Feb 2	7MHz Cumulative
Feb 2/3	LF SSB (Jan 91)
Feb 3	3.5MHz Cumulative
Feb 8	1.8MHz Cumulative
Feb 9/10	1st 1.8MHz CW (Nov 90)
Feb 16/17	*ARRL DX CW (Jan 91,p17)*
Feb 23/24	7MHz CW (Sep. 90)
Feb 23/24	*CQ 160m SSB*
Mar 2/3	*ARRL DX SSB*
Mar 9/10	*Commonwealth*
Mar 16/17	*Bermuda*
Mar 23/24	1.8MHz SSB
Mar 23/24	*WPX SSB*
April	28MHz Cumulatives, ROPOCO-1

LOW FREQUENCY SSB CONTEST 1991 RULES

1 When: 1500GMT Saturday 2 February to 0900GMT Sunday 3 February 1991.

2 Sections: **(a)**British Isles **(b)**Europe **(c)**North America **(d)**South America **(e)**Africa **(f)**Asia **(g)**Oceania ... Single-operator, Multi-operator and Receiving entries will be accepted in each section.

3 Frequency/Mode: British Isles stations must transmit within the limits 3600-3790kHz and 7040-7100kHz SSB only.

4 Exchange-Other Data: UK stations send County Code.

5 Scoring:-British Isles stations may not work each other for points. Each QSO with a station in Europe scores 5 points, in Oceania-30 points, all others-15 points. Multipliers: 1 per country on each band.

Overseas Stations work only British Isles stations for points. For each QSO, stations in Europe score 5 points, in Oceania-30 points, all others-15 points. Multipliers: 1 per County on each band.

6 Closing Date for logs: British Isles entrants, 24 February 1991; Overseas entrants, 24 March 1991.

7 Awards:

Single-operator:--The 1989 HF Contests Committee Trophy to the leading British Isles station. Certificates of merit to the second- and third-placed British Isles stations, and to the leading entrants in each overseas section.

Multi-operator:- Certificates of merit to the leading groups in each section.

RECEIVING CONTEST

Single-operator entries only are accepted for the Receiving Contest.

5 Scoring: British Isles SWLs log only overseas stations in contact with British Isles stations participating in the contest. Overseas SWLs log only participating British Isles stations in contact with overseas stations. Scoring and multipliers as for the transmitting section.

7 Awards: Certificates of merit to the leading entrants in each section.

ROPOCO-1 1991 RULES

1. Date & Time. 0700-0900GMT, Sunday 7 April 1991.

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

3. Exchange. RST only, do NOT send Serial Number.

4. Other Data: For the first QSO, the entrant's own postcode. For each subsequent QSO, the postcode received from the previous contact.

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

6. Awards. Certificates to the leading three entrants. The Verulam Silver Jubilee Trophy to the highest-scoring entrant with a perfect (or the most accurate) log. The G5MY Trophy to the entrant with the highest aggregate score in this event and ROPOCO-2 (August 1991)

The HF Contests Calendar will in future, be a three-month rolling diary. It will include major overseas contests. The date of publication of rules in RadCom is shown in brackets.

Further details of RSGB HF Contests can be obtained from HF Contests Committee Chairman, Dave Laurley, G4BUP, QTHR.

UK COUNTY CODES for HF and VHF CONTESTS

County	Code
Alderney	ALD
Co Antrim	ATM
Co Armagh	ARM
Avon	AVN
Bedfordshire	BFD
Berkshire	BRK
Borders	BDS
Buckinghamshire	BUX
Cambridgeshire	CBE
Central	CTR
Cheshire	CHS
Cleveland	CVE
Clwyd	CWD
Cornwall	CNL
Cumbria	CBA
Derbyshire	DYS
Devon	DVN
Dorset	DOR
Co Down	DWN
Dumfries & Galloway	DGL
Co Durham	DHM
Dyfed	DFD
Essex	ESX
Co Fermanagh	FMH
Fife	FFE
Mid Glamorgan	GNM
South Glamorgan	GNS
West Glamorgan	GNW
Gloucester	GLR
Grampian	GRN
Guernsey	GUR
Gwent	GWT
Gwynedd	GDD
Hampshire	HPH
Hereford & Worcester	HWR
Hertfordshire	HFD
Highlands	HLD
North Humberside	HBN
South Humberside	HBS
Isle of Man	IOM
Isle of Wight	IOW
Jersey	JER
Kent	KNT
Lancashire	LNH
Leicestershire	LEC
Lincolnshire	LCN
Greater London	LDN
Co Londonderry	LDR
Lothian	LTH
Greater Manchester	MCH
Merseyside	MSY
Norfolk	NOR
Northamptonshire	NHM
Northumberland	NLD
Nottinghamshire	NOT
Orkney	OKE
Oxfordshire	OFE
Powys	PWS
Shropshire	SPE
Sark	SRK
Shetland	SLD
Somerset	SOM
Staffordshire	SFD
Strathclyde	SCD
Suffolk	SFK
Surrey	SRY
East Sussex	SXE
West Sussex	SXW
Tayside	TYS
Tyne & Wear	TWR
Co Tyrone	TYR
Warwickshire	WKS
Western Isles	WIL
West Midlands	WMD
Wiltshire	WLT
North Yorkshire	YSN
South Yorkshire	YSS
West Yorkshire	YSW

HF RESULTS

LOW POWER FIELD DAY 1990 RESULTS

This year's LP FD was once again notable for the excellent weather - some might say too good; flies and mosquitoes caused problems for several entrants. Static levels were low and propagation was excellent on 40m. Perhaps as a consequence of the low power levels and heat, logging standards were poor and all entrants lost points. Take note for next year! The new style exchange was welcomed and had the desirable side-effect of making a number of QRO stations turn down the wick after working their first QRP entrant. Several entrants commented that it was a pleasant change to get away from the "5NN" exchanges of other contests.

Congratulations to Tim G4ARI and Keith G3RPB (op GX6KW/P) who win the Southgate and Houston-Fergus trophies respectively.

Comments received: "14:30z Station closed - too darned hot!" (G4KLQ); "Drop the 10W section and make everyone compete on equal terms" (G4ARI); "QRM from cows licking tent" (G4JBD) [the same cows later dismantled his aerials]; "Started with 170' centre-fed but one feeder connection broke leaving end-fed Zepp" (G3VER); "What happened to GM?" (GW4ENA & G4RCC) [answer: you missed all 5 QRP GM's!]; "Don't change a thing" (G4RCC).

G4IFB

SECTION A (10 W MAXIMUM)

Posn	Call	Total	80m	40m	Club if applicable	Rig
1 *	GX6KQ/P	1303	405	898	East Barnet ARCC	TR7/Homebrew TX
2 *	G4FOX/P	1099	485	614	Melton Mowbray ARS	TS120V
3 *	G3KNU/P	1063	398	665	-	TS120V
4	G3VER/P	935	233	702	Verulam ARC	TS120V
5	GW4CC/P	841	305	536	Swansea ARS	TS130V
6	GW4ENA/P	657	657	-	-	Homebrew/IRDF110

SECTION B (3 W MAXIMUM)

Posn	Call	Total	80m	40m	Club if applicable	Rig
1 *	G4ARI/P	1217	600	617	-	Sugiyama F850
2 *	G4JBD/P	1125	465	660	-	FT77-S
3 *	G4RCC/P	1107	595	512	Radio Caravan & Camping	TS120V
4	G3PDL/P	1064	437	627	-	FT301S
5	G3VIP/P	1014	432	582	-	FT301S
6	G4OGB/P	1009	355	654	-	TS430S/2xIRF510
7	G3VYI/P	982	430	552	-	Howes/BD135 PA
8	G4ECI/P	900	332	568	-	TS120V
9	G4HUV/P	754	379	375	Mid-Cheshire ARS 'A'	TS130S/Cirkit PA
10	G4KLQ/P	684	359	325	-	Argonaut 515
11	G3BPM/P	650	255	395	-	TR7/2N3866 PA
12	G3EAO/P	495	275	220	-	FT77S
13	G0BLD/P	488	150	338	-	FT70G
14	GW3SB/P	464	125	339	-	HW-8
15	G4MWC/P	442	60	382	West Manchester RC	Homebrew
16	G3OEP/P	422	210	212	Gorleston QRP Club	Argonaut 515
17	G3IIU/P	304	139	165	Acton Brentford & Chiswick	Argonaut 515
18	G0LTO/P	265	-	265	-	Homebrew/2N3053
19	G4HKM/P	30	30	-	-	Howes CTX80

Checklogs received from [in descending order of number of entrants logged]: G4JKS*, G3DIT/P, G4CZB, G0HIN, G4IFB, G3VW, G3ZTT/P, G3JJG, G0ATR, G0JIT/P.
* Certificate winners

VHF RULES

RSGB VHF/UHF/SHF CONTESTS JAN/MAR 1991

144MHz CW Single Op Fixed /All other
20 Jan: 1000-1700GMT
General Rules apply.
Three sections: F Fixed station single operator; O Open (all others); L Listeners
Adjudicator: G8XVJ, E Gedvilas, 518 Manchester Road, Paddington, Warrington, Cheshire, WA1 3TZ

70MHz Cumulatives
27 Jan, 10 Feb, 24 Feb, 10 Mar, 24 Mar: 0900-1100GMT
General Rules apply, plus rule 10.
Please include a single 4422 summary sheet, and 427 for each day.
Locator and location (QTH) must be exchanged
Three sections: F Fixed station single operator; O Open (all others); L Listeners
Best three logs of possible five; please send all logs for checking purposes.
Adjudicator: G8HHI J. Pilags 43 Bartons Drive, Dungells Lane, Yateley, Camberley, Surrey, GU17 7DW

432MHz Fixed/AFS/SWL (see Note)
3 Feb: 1600-2300GMT
General Rules apply.
The contest is open to individual entrants (who must be RSGB members), or teams made up of a number of operators who must all be members of the same affiliated society, (but do not have to be RSGB members themselves). All members of a team must operate from within 50km of the normal meeting place of the society. No station may represent more than one society. No operator is allowed to use more than one callsign during the contest. In the case of national societies each team must define a separate meeting place and each team member must operate within 50km of that designated meeting place. Multiple teams are encouraged from both national and local societies. The best three scores of each team will be used to form the entry, all team members logs must be included as the 'best' results may be downgraded if logging errors occur! ie the 4th placed member may well have higher points after adjudication, than those notionally above.
Sections: Single operator fixed; Multi operator fixed; Listeners; AFS team (single operator per station); AFS team (all others)
Please include RSGB Zone letter on each entry.
Each team entry must also include a signed declaration that each operator is a fully paid up member of the entering affiliated society. The address of the meeting place is also required as is a summary of team members, callsigns and respective scores.
Awards: Certificates will be awarded to the following: Leading single operator in each RSGB Zone; Leading multi operator station in each RSGB Zone; leading AFS single Operator group in each RSGB Zone; leading AFS Other group in each RSGB Zone; leading SWL entry
Adjudicator: G4OUT, I.Cornes, 6 Haywood Heights, Little Haywood, Stafford, ST18 0UR

144/432MHz
2/3 Mar: 1400-1400GMT
General Rules apply. Plus rule 24 for low power stations (use Reg1 or VHFreg2 obtainable from RSGB or VHFCC, please register two weeks before contest), This addition is to allow low power stations to compete fairly with other 'Low Power' stations!
Sections: S Single operator portable; F Single operator fixed; M Multi operator portable; O Multi operator fixed; L Listeners; FL Single operator fixed (25W PEP output at Tx); SL Single operator portable (25W PEP out at Tx)
Single operators use same call on each band; each band starting at serial 001.
Single band entries will be accepted as long as the 4422 cover sheet is marked 0 points on the band not used.
Certificates to section leaders and runners up if entries are sufficient.
Adjudicator: GI4KIS, BJ Sheepwash, 204 Donore Crescent, Antrim, Northern Ireland.

70MHz Fixed/SWL
31 Mar: 0900-1500GMT
General Rules apply
QRA and QTH information must be exchanged.
Sections: S Single Operator; M Multi operator; L Listeners
Adjudicator: G4PIQ, Andy Cook, Fishers Farm, Tendring, Clacton-on-Sea, Essex CO16 9AA
Note:
All entries must be postmarked at the latest by the 16th day after the end of the contest ie. if contest ends on a Sunday (say the 1st of October) then the entry must be postmarked on or before the 3rd Tuesday after that Sunday (17th October). For VHF Field Day an extra week is allowed, ie. the 4th Tuesday.
Any late entries can only be accepted at the discretion of the adjudicator.
No recorded delivery or registered post.
Entrants can obtain a proof of posting certificate from the Post Office which we will honour if an entry has been delayed in the post.
QTH information to be exchanged on 70MHz only.
General rules: 1 to 9, 11,12,13, 15 to 23, and 25,26. apply to all contests any changes will be noted in individual contest rules.
Rule 24, please use REG1 or VHFreg2 obtainable from RSGB or VHFCC, this is to allow the VHFCC to inspect, if felt necessary, any station, in any contest. Normally will be used for low power sections or 50 MHz where the incidence of cheating is highest.
Adjudicators will not normally enter contests which they are adjudicating, however if the adjudicator does wish to enter then his entry will be vetted by a sub-committee before entry allowed.
Every contest is open to foreign entrants who will be listed separately from UK stations, certificates will be issued to section winners (and runners-up, if enough entries).
Please note four new contests this year 432 and 1296 MHz short length Fixed and SWL, and Christmas Holiday 4M, 2M and 70 Cm Fixed station contests. Note to SWLs there will be a SWL section in EVERY contest even if not mentioned in rules or write-ups. We still need more SWLs to enter, the currrent leaders can be beaten, just as the top transmitting people/groups have.

G4DEZ

RSGB VHF CONTESTS CALENDAR - 1991

20 Jan	144MHz CW Single Op Fixed /All other (Jan 91)
27 Jan	70MHz Cumulatives (Jan 91)
3 Feb	432MHz Fixed/AFS/SWL (Jan 91)
10 Feb	70MHz Cumulatives (Jan 91)
24 Feb	70MHz Cumulatives (Jan 91)
2/3 Mar	144/432MHz (Jan 91)
10 Mar	70MHz Cumulatives (Jan 91)
24 Mar	70MHz Cumulatives (Jan 91)
31 Mar	70MHz Fixed/SWL (Jan 91)
7 Apr	50MHz Trophy Fixed/Single/Multi
14 Apr	1st 1296MHz Fixed/SWL
4/5 May	432MHz to 24GHz
18/19 May	144MHz and SWL Single/All Others
2 Jun	1.3GHz Trophy
2 Jun	2.3GHz Trophy

A full list of 1991 RSGB VHF Contests appears on page 65, December 1990 *RadCom*. Dates of publication of rules in *RadCom* are shown in brackets.

VHF RESULTS

MARCH 144/432 CONTEST RESULTS

Please see June 1990 Radcom for details of antennas power etc. Due to a mental abberation I managed to completely forget to normalise the scores for this contest. For this I submit my abject apologies, slapped wrist and all that. Any certificates that may have already been sent to the winners and runners up will stand as it is not their fault that I cannot read the rules!However I now print the normalised results, and certificates will be sent to the winners and runners up.

G4DEZ

SINGLE OPERATOR PORTABLE

Pos	Call	144	Norm	432	Norm	Total
1	G0CLP/P	2371	1000	349	1000	2000
2	G0MTV/P	700	295	191	547	842

SINGLE OPERATOR FIXED

1	G4PIQ	4278	1000	703	1000	2000
2	G8HHI	302	70	565	803	880
3	G1LSB	202	47	318	452	499
4	G8MKD	975	228	69	98	326
5	G5UM	90	21	88	125	146
6	GM4AFF	457	107	1	1	108
7	G0HKT	268	63	20	28	91

MULTI-OPERATOR OPEN

Pos	Call	144	Norm	Call	432	Norm	Total
1	G4RFR/P	5858	585	G0FRR/P	2381	1000	1585
2	G4VIX/P	7212	720	G4ZTR/P	1840	773	1493
3	G8LNC/P	10008	1000	G0LNC/P	905	380	1380
4	GW0CDA/P	7722	771	GW3CKR/P	1326	557	1328
5	G4TDL/P	4296	429	G0GJV/P	507	213	642
6	G0KEG/P	3207	320	G0KVA/P	562	236	556
7	G4SIV/P	2785	278	G8ZHP/P	529	222	500
8	G6CTU/P	2195	219	G8MNY/P	561	235	454
9	G4ERG/P	2852	284	G8FEK/P	313	131	415
10	G3KMI	2526	252	G8KMI	230	96	348
11	G3LRS	973	97	G6XRS	129	54	151
12	G1ORA/P	538	53	G1OIB/P	49	20	73

DIRECTION FINDING

RESULTS OF MID THAMES D/F EVENT

The weather was kind for the near record number of teams that arrived at Great Kingshill common, near High Wycombe for the start of the Mid Thames qualifying event organized by Colin Boyce G4XWP.

The organiser took great pleasure in seeing so many old friends who had not been very active in recent years. Competitors were able to hear both signals at the start, each of which was weak but readable and the majority of the teams opted to go for the northerly station first.

This was situated some 18 miles from the start near the village of Cublington. The station was operated by Ron Ray, G3NCL/P who was concealed in a deep cut stream bed in a small wood, a long hike from the nearest road access.

The other station situated some 6 miles to the west of the start was manned by Alan Simmons using the club call sign G4MDF/P. Alan was hidden in a very overgrown old watercress bed which still contained an ample supply of viscous mud and water for the unwary competitors to enjoy. Judging by the amount of splashing heard by the operator, somebody found more than a hidden TX on this site.

The eventual winner was Trevor Gage, G1MPG who, although only 5th at his first transmitter, managed to cover the ground between the two some 10 minutes faster than the others.

Following the contest the competitors were provided with an excellent tea by Colin, XYL and YL at the Great Kingshill village hall.

RESULTS

Positn	Name	Club	Time at TX 'A'	Time at TX 'B'
1	T Gage	Mid Thames	14.54	15.48
2	G Whenham	Coventry	14.47	15.52
3	C Plummer	S Manchester	14.47	15.53
4	P Lisle	Mid Thames	14.47	15.54
5	M Hawkins	Colchester	14.50	16.00
6	G Foster	Mid Thames	15.01	16.16
7	B Bristow	Mid Thames	14.40	16.18
8	D Holland	S Manchester	14.48	16.18
9	D Brocks	Colchester	14.39	16.20
	C Merry	Dartford Heath	14.53	16.20
	J Hall	Ripon	14.53	16.20
	B Gray	Mid Thames	15.21	16.20
13	C Wells	S Manchester	14.49	16.21
	B Pechey	Mid Thames	14.57	16.21
15	S Holly	Salisbury	14.57	16.22
	A Malbon	Mid Thames	15.23	16.22
17	D Newman	Northampton	14.35	16.23
18	G Brightman	Mid Thames	14.47	16.24
	R Goodearl	Mid Thames	15.12	16.24
20	G Nicholls	Banbury	15.01	16.25
21	A Collett	Colchester	14.46	-
22	G Mead	Colchester	15.02	-
23	T Judd	Mid Thames	15.03	-
24	K. Howell	-	15.04	-
25	M Standen	Mid Thames	15.53	-
26	A Williams	Colchester	16.20	-

T Gage and P Lisle qualify for the National Final to be organised by the South Manchester Radio Club on 30th September.

WE'RE ON THE MOVE

AMDAT is pleased to announce the opening of a new shop which is conveniently located for the South West of England and South Wales. We are located 4 miles south of the M4/M5 intersection and 4 miles west of the M4/M32 junction.

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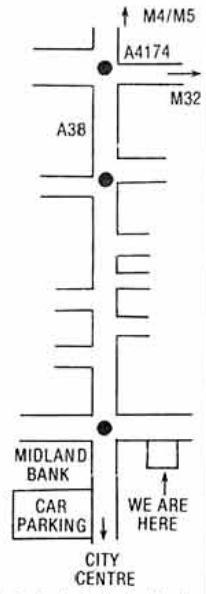

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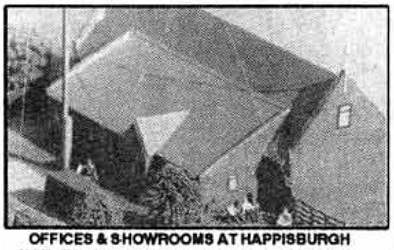

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330 UNWANTED 5.25" disks. New and formatted for C64: 10 for £4.50 + p&p. William (Tetbury) 504884.

40FT SELF SUPPORTING two-section tower, galvanised. Buyer collects: £200. G4FAW QTHR (Stowmarket) 0449 675330.

4CX250B VHF base, chimney, unused, two: £25 ea. Blower, powerful, 6": £7.50. Three 240V transformers, oil, sealed, 600-0-600V 166mA RMS, underated: £10. 6.5V,1A; 6.5V,1A; 6.5V,0.5A; 6.3V,1.2A: £5. 15V/16V/17V,8.5A: £10. Metal case 12"x6"x10": £2.50. 200µF 350V capacitors: offers? G4JCX QTHR (Portsmouth) 0705 599610.

8AMP OPEN-STYLE variable XFRMR, can be used either 0-120 or 0-240 vac: £50. Qty 2 Toshiba 6KD6, new: £25. Carriage extra. (Huntingdon) 0487 841558.

A GOOD HOME needed for a Tiger. The rare G8VB TR60B 60W valve CW/AM Tx still available due to time waster: £45. Ten-Tec Argonaut 515 QRP SSB/CW tcvr and psu: £350. Star Masterkey with twin paddle: £50. Larry G0HTR QTHR (Tamworth) 0827 898024.

AAGH! Change of plans necessitates temporary QRT status. Following items available for disposal (ideal for new licensee). KW2000B: £180. Daiwa ATU: £80. Trapped dipole (homebrew): £10. GEC miniscope c/w wobulator: £50. GDO kit: £40. Lotsajunk (cables and components): £70 (or make me an offer) or package deal £350. Buyer collects or pays postage. All at QTHR Brod Purdy G4RBP (Lee on the Solent) 0705 553551.

ADVANCE 50MHZ digital freq counter/timer TC9B/S. Recently checked and recalibrated: £50. Analogue multimeter, 20Kohm/V, similar to AVO model 8. Supplied with AC current adaptor: £25. BC221 heterodyne freq meter with mains psu: £25. Communications Rx in mint cond. ICOM R70 fitted with cw filter and FM option. Supplied with h/book and service manual: £425. Double beam oscilloscope and trolley, Telequipment type D53, 30MHz bandwidth: £75. Prefer buyer inspect and collect York area, otherwise carriage extra at cost and buyer's risk. G3WXI QTHR (York) 07595 8172.

AKAI 4000DB R/R stereo dolby tape deck, three heads, perfect: £50. Thirty years Practical Wireless: £30. Wanted 2M hand held. (Crewkerne) 0460 77292.

ALINCO DJ-120 2M handheld complete with nicads and charger, mint condition: £140. G1WMV QTHR (Milton Keynes) 0908 660089

ALTRON SM30 telescopic mast, head unit, HD rotator, with 9ele 2M, 19ele 70cms, 3ele 6M Yagis: £300. Buyer collects, Walmsley (Bishop's Waltham) 0489 893112.

AMSTRAD CPC464 green screen, assembler/editor ROM, twin RS232 serial port, 8bit parallel port, user, firmware, service manuals: £150. SEM Z-match: £50. CAP's 5µF 3KV DC oil filled: £5. Variac 115/135V in, 0-135V out, 6 amps: £10. PMO5 (0459A/URT) 2-8MHz 19in ovened drive unit: £20. PSU 115V AC in, 5V DC 70A out (S/mode): £20. Advance 150W mains stabiliser: £25. G3RFI QTHR (Potton) 0767 260800.

AMSTRAD SDX100, 60cm satellite dish, No.LNBIRX: £35. (brand new). 3 Pye HBFM base stations. Currently on 143.900MHz, working but sold as spares etc. So no demos - sorry: £25 each £70 lot. MML144.50"s 10W in, 50W out: £40. 2 off HBAM mobiles unxtaled. Spares etc: £20. Pair working Simplex: £60. Guitar practice Amp: £10. Chris G1EZJ QTHR (Stoke-on-Trent) 0782 46570.

ANTENNA HYGAIN TH3 10,15,20M, balun, 35M UR67, HAM3, HD rotator, control, 35M cable, all h/books, working well, demo help dismantle beam, no split, delivery GM negotiable: £380. GM4AGS QTHR (Newport on Tay) 0382 543113.

APARTMENT in Benidorm. Top floor, 17 2ele beam on roof, satellite tv, telephone, 2 bdrms, large glassed-in terrace, residential area, Olympic pool, set in beautiful gdns, panoramic views, partly furnished: £50,000ono. EA5GFV, PO Box 63, Benidorm, 03500, Spain. 010 346 5865599.

ARGONAUT 515 QRP HF tcvr with Ten-Tec psu, ex cond: £350. ICOM IC210 VHF FM 10W base station plus IC21 EXT VFO and desk mic: £135. BC221 freq meter with psu: £15. Star Masterkey and paddle: £50. Larry G0HTR QTHR (Tamworth) 0827 898024.

BABY ARRIVES! Shack departs! YAESU FT102 HF Tx/Rx with MD1B8 mic: £600. Kenwood TR751E 2M multimode with MC-60 mic: £500. YAESU FT-203R 2M h/h (needs slight attn) and NC-15 charger: £135. Daiwa NS-660 cross needle meter: £85. SMC 8amp psu: £20. 100W dummy load: £15. YAESU quartz world clock: £30. G4ZPY straight morse key, unused: £20. YAESU MH1B8 h/h mic: £15. 17ele met, 70cms, crossed antenna unused: £35. Butternut HF5B 5 band mini beam assembled but not used: £195. CDE AR40 small rotator: £45. Jaybeam 10XY 2M crossed Yagi, first ever antenna, much use, free to good home Jon G6ASK QTHR (South Molton) 07697 566.

BBC COMPUTER Series 7, complete cassette player, 17 games, introduction tape, manual. A1 condition: £210. G4WUP QTHR (Broadstairs) 0843 63898

BBC-B & IBM h/ware, s/ware, books - SSAE Tono Tuna rtty tuning aid (6 shifts): £40. Al G4CVZ QTHR (Liverpool) 051 220 5470.

BBC.B, Issue 7 board 1.2 Op Sysem. Fitted acorns standard DFS. Twin disc drive unit with inbuilt mains PSU Toshiba colour monitor: £250 or exchange whu. Model maker's lathe BGSC 3.5ins throw, 12ins between centres, SP 0.25 hp motor, 3 step V belt drive, 3 & 4 jaw chucks, change wheels, tail stock, cross slide, on stand, quite old but serviceable: £225 or whu. G3BDK (Towcester) QTHR. 0327 52309.

BP40 two section 40ft lattice tilt over tower, brand new, incl head and bearing rotator, if reqd, with fixings and base bolts, unassembled price: £400. May swop for HF radio telephone. Dave G1LBE on Walsall 414796 after 5.30pm, any time weekends.

CALLBOOKS, international '89, USA '88: £10 pair. Quad 303 amp, control unit, matching fm tuner, pair Goodmans 'minim' spkrs, OK: £50. Pentax 'ME Super' camera, case, F1.8 50mm lens, 28mm lens: £90ono. G0AHC QTHR (Birmingham) 021-458-2946.

CAPCO Magnetic Loop 30, 40 80 metres, mint condition. Sell or swop older solid state HF rig, or WHY. G4WXF QTHR (Hereford) 056884 580.

CLEARING SHACK need some space. SMC Oscar 10FM, vgc: £25. Pye pocketphone PF2UB, vgc, plus instructions for conversion 70cms: £12. Datong Morse Tutor, boxed, as new: £35. MFJ-910 Mobile Antenna Matcher, boxed, as new: £15. SPC Transmatch using CAP-CO parts, vgc, load up the proverbial bedsprings: £100ono. Prefer buyer to collect or pay carriage. G0KRL QTHR (Bury St Edmunds) 0359 70527 (after 6pm).

COLLIN 390A table model receiver, good condition: £475. NRD515 receiver with key pad speaker manual: £575. HF225 AM dector fitted boxed, few months old: £325. RA17MkII as new: £150. Panasonic SW RCVR DR49 digital, first class: £150. (Middlesex) 081-571-5759.

COLLINS 325-1 75S-1 complete, Collins 30L-1 Linear: £1100 or might split. KW2000: £220. 5" computer fans: £5 per pair. Z6" fibreglass whip aerials: £22.50 ea. UHFR reel to reel portable recorder stereo 4200: £120. 5V computer psu: £5. AVO Mk7: £30. 50ohm coax: £2 per 10mt. IBM golfball typewriter: £60. ICL computer 2 disk drives: £180. BBCB 32k twin disk drives: £220. Juki daisywheel printer: £250. Cuyma single disk drive: £50. Astrolite headset & boom mic: £35. Levell millivolt meter: £40. G3WDK (Devon) 0647 21631

COLLINS 75S3 rcvr, ex cond: £275ono. Collins 75A4, specimen cond: £375. No offers. HF linear 2x813S 10/15/20/40 military spec components new tested unused. Separate EHT/PU matching cabinets. Space shortage forces sale. Make an offer, carriage paid UK. (Kirkby-in-Furness) 0229 89635.

COMMODORE C-64 GAMES. Assorted games and programs for use on the Commodore 64, some disks, mostly tapes. £30ono the lot - no split! Marcia, 0707 58236.

COMPUTER EXPERTS! Microsoft mouse and Microsoft windows 3. Serial interface version for IBM PC's and compatibles, incl 3.5 and 5.25inch disks, brand new, unopened shrink wrapped box: £69. Two 24inch stand-off heavy duty galvanised wall brackets for that tall mast: £15 the pair. Despatch at cost or would deliver 100 miles Fleet, Hants, for petrol cost. G1JPP QTHR (Fleet, Hants) 0252 617962.

DAIWA 144MHz antenna tuner, 200/20W range, model CNW-919, 2 antenna inputs, new, unused, bargain: £70. Datong morse tutor model D70: £35. Tonna 19ele 70cms antenna, new, unused: £25. (Royston) 0763 262443.

DC-18GHz miniature coaxial relays, new, surplus, single pole c/o, SMA female, 1.5:1 max, 28V coil charge pump circuit incl for 12V. Ideal 10GHz: £35 each incl post. No traders. G6CMS QTHR (Chelmsford) 0245 76801 after 6pm.

EDDYSTONE 830/7 Gen.Cov HF Rx AM/SSB, mint, box, manual: £225. Eddystone 960 solidstate GC Rx: £150. National HRO's: three for £95. Hallicrafters S-10 C1938 Rx: £25. New unused YAESU FT4700 2M/70cm dual band: offers. Clearing collection 1930's domestic radios. Wanted 1920's wireless, early valves, Drake L7 linear, pay cash or swop. Jim G4ERU, 5 Luther Road, Winton, Bournemouth. 0202 510400.

EDDYSTONE S640 hf Rx C1948, gwo, no mods, plus round LS phones SG Brown type 'F', original manual. Offers around £100. G1EEH QTHR (Crewkerne, Som) 0308 68598.

EDDYSTONE VHF receiver model 770R MK11 with workshop manual. gwo: £90. G3TAR QTHR (Rugeley) 0543 685694.

EG2000 COLOUR Genie computer complete with technical manual, also with rtty send/receive tape CW tape (receive only) QSO log tape: £35. G4DZV QTHR (London E4) 081-524-3193.

EPSON MX80 printer: £45. Smith Corona L1000 daisywheel printer: £45. YAESU FRT-7700 atu and FF5 filter, both new and boxed: £55. Transverter, Spectrum Comms TRC 2-10, built and tested but never used: £40. GM6JOD (Irvine, Ayrshire) 0294 217383.

FREE! EL-40X 3.5/7MHz End Loader to buyer of TET HB 443DX 4EL4Bander with KR-600RC Rotor. Reasonable offers considered. (Warrington) 0925 61127.

FT102. All filters, mic. ex cond: £470. RS90877 (Harwich) 0255 554612.

FT101, fan, 12V/230V, new p.a's, used daily on 40/10, prefer inspect and collect: £150ono. Now got ZDMk3. Don G0MDO (Bradford) 0274 567570.

FT101Z with FM: £375. FT101E: £300 cash. (Stourbridge) 0384 892858.

FT101ZD Mk 3 9 band FV101DM external VFO: £475ono FT290: £185ono. FT790 10W linear: £240ono. GM0HBT QTHR (Glasgow) 041-334 6823.

FT101ZD MK3 FC902 ATU, YD148 mike, fan, CW filter, FM, superb condition: £580. G4RPA QTHR (Bognor Regis) 0243 862629.

FT225RD, mint cond Mutek Board: £600ovno. 9 ele Tonnas: £12.50 each. 21 ele Tonnas: £15.50 each. Gordon G8TPR not QTHR (Harrow) 081-864 8261 any time.

FT23R complete with soft case, belt clip, spkr mic, 2 battery cases and set of nicads, boxed and as new: £150. FT690R, as new with nicads and charger: £200. MET 3ele 6M antenna, brand new: £25. Buyer collects. G0DGV QTHR (Walsall) 0922 493994.

FT290R, good condition with case, charger, helical, 1/4 wave whip and mic: £200. FT707, good condition HF rig with spectrum comms FM kit (not fitted): £295. FT208R, good condition, boxed, with speaker mic: £120. DRAE Morse tutor, mains powered, new: £30. Megger Wheatstone Bridge in yellow case: £50. Eprom programmer for CBM64 and large erasing box, rtty/Morse interface plus other bits: £50 the lot. Roland TR505 rhythm composer: £100ono. Paul G6DQK (Stalybridge) 0457 833577.

FT290R, nicads, charger, carry case and manual. No mods. Ex cond: £220. G0DZU QTHR 0794 884286.

FT480R 2M multimode: £250. FT23 2M h/h, nicad + charger: £150. FT711RH, 70cms, high power mobile: £250. G4IUT 0952 79235, evenings.

FT707 fitted CW-N filter, FC700 antenna tuner: £400 or exchange VHF multimode G0AQT QTHR (Hastings) 0404 425897.

FT727 dual band 2M/70cm h/h, high power pack, with s/case, charger etc, mint cond: £250. Sony ICF7600D compact portable 150KHz-30MHz am/ssb plus b/cast fm, s/case, mains psu, perfect travelling companion: £100. G3TCO QTHR (Bristol) 0272 681068.

FT767GX HF/GenCov, immac, little use, latest spec: £1000, save £500. TL922A linear 2KW, unused: £1200. FT736 VHF/UHF multimode, 6 months old, immac: £1000. 3KW atu: £200. Collect or pay carriage. Genuine reason for sale. G3TRK QTHR (Nelson) 0282 603031 evenings/weekends.

FT77 100W HF tcvr, FP700 psu, with CW narrow filter, FM board, mic, boxed: £450. No split. Ivan, G0BON QTHR (Nr. Windsor) 0784 482832.

GOING QRT on HF trio 430s PS430 at 230 MC80 desk mike DL1000 dummy load LF30A filter Tasco CWR600 telereader SP520 speaker. All mint in original boxes: £795. Buyer collects. G4LJP QTHR (Gloucester) 0452 721510.

HEATHKIT SB401 receiver and matching 300 transmitter plus Heathkit 2M transverter, ssb cw, 80-10 metres 100W, 2M 50W, with matching speaker and vswr meter. Ex cond: £270ono. Tokyo atu model HC400L, 400W capacity as new: £150. SEM qrm eliminator as new, qrm now gone: £50. All of above with manuals. G0HNZ QTHR (Nottingham) 0623 752888.

HEATHKIT SB401 Tx. Offers. G3NXQ QTHR (Worcester) 0905 20264.

HIGH POWER linear, microwave parts, electronic parts, components test gear, high power

valves, UHF valves, psu's for lists: £CALL. G3XWZ QTHR (Mansfield) 0623 643355.

HIRSCHMAN 20.50 rotator control box lower support bearing approx 20ft three core cable: £30ono. Vince G0JNC (Oldham) 061 652 9127.

HYGAIN AR40 rotator and controller, new: £120. Kenwood AT230 tuning unit, vgc: £100. G4BXR QTHR (Stony Statford) 0908 566266.

IBM/PC compatible monitor Thomson 451W 14" paperwhite, high resolution, swivel tilt base, as new, boxed: £60. Also Smith Corona electronic typewriter, dual pitch, auto centre, full line word and letter correction, as news, boxed c/w, new spare ribbon and extra font daisywheel, too touchy for owner: £60ono. Would accept portable in PX if good quality. John (London) 081-857-8096 after 11.00.

IC-730 boxed, manuals, little used, genuine reason (IC-735): £425. Also telequipment scope, sig gens. Marconi TF1370 10Hz - 10MHz. TF801C 10MHz-470MHz: £100 the three. G4BIN (Wincnanton) 0963 32549.

IC751 with FM unit and extra filters, Histab xtal oscillator, vgc, boxed: £895. Amstrad PC1512 HD20: £500. Star LC24-10 printer: £250, incl four spare ribbons, paper etc. Brother EP44 portable typewriter/terminal incl ribbons: £25. GW3FKO QTHR 0874 2772.

ICOM 02E 2M Handie with spare battery pack, speaker, mic & soft case. Good condition: £180ono. G1PRM QTHR (St Albans) 0582 841643.

ICOM 725(FM) SM6 and hand mic: £550. AT150: £CALL. AH3 mobile auto ATV: £160 or £795 the lot. G3IKN (Bracknell) 0344 485635.

ICOM IC-275E 25W 2M base station, internal psu, mint condition. Imminent wedding forces sale: £650ovno. G0FCV QTHR (Buckingham) 0280 813744.

ICOM IC-475H 70cms all-mode base stn, 75W, 500Hz CW-narrow filter, high stability xtal unit. As new, with orig packaging: £890ono. G4WVX Bruce, not QTHR tel: (Bucks) 0628-664415 anytime.

ICOM IC-R7000 Receiver 25MHz-2GHz, boxed as new: £650ono. YAESU FRG8800 SW Receiver, VHF converter fitted: £450ono. Spectrum 128 Computer: £60. ICOM IC-255 2M 25W tcvr 144-145MHz Tx 143-148MHz Rx: £140. AOR2001 Scanner in 2002 case (tuning knob, key pad LED's), boxed: £250ono. (Luton) 0582 668648.

ICOM IC22A FM Transceiver, 12 channels, mic, mobile mount: £75. 50W mobile linear: £45. Trio JR310 receiver, narrow filter and FM detector fitted: £80. Spectrum RS232 interface: £10. Advance 81A LF signal generator: £20. G8DYK QTHR (Newark-on-Trent) 0636 86421 (evenings).

ICOM IC290D multimode 2M transceiver, complete with mobile bracket and Heatherlite mobile microphone, excellent condition: £395. G0IIQ (Grimsby) 0472 750480.

ICOM IC2E two off at £95 each. Trio TR2200G: £45. Pye M294's hi-band FM: £90. Each as new. Pye UHF base station: £50. Epson PX4 and PX4+ laptop computers CPM, basic, and viewdata, ideal for packet or to control your RS-232 radio: £120 each or WHY or exchange for low band PF85's Pye Pegasus, SSB210 or SSB220 Marconi TF2015 with lock box! frequency counter etc to set up hundreds of ATC radiophones wessies also available. Phone Vic (Blyth) 0670 355170.

ICOM IC2SE Handheld with case and headset. Mint. Boxed: £200ono. Dave G4ODK not QTHR (Ilminster) 0460 57684.

ICOM IC720A tcvr 160-10m incl WARC bands, FL36 250Hz CW filter, AM/SSB filters fitted, C/W PS15 PSU, HM17 hand mic, SM2 table mic & w/shop manual. Just serviced at Icom. Details incl: £550. ICOM PS55 PSU for IC725, 735 etc, 13.8V at 20A: £100. Daiwa variable regulated PSU 0-15 at 12A max: £50. Standard C500 dual-band 2m/70cm h/h tcvr with nicads: £195. Philips d/beam scope, 10MHz, needs attn: £20. Amstrad s/ware on plug-in ROM for CPC6128 for use as comms package, Honeyterm, Viewdata etc: £10. G3XNE. (Bude, Cornwall) 0288-354564.

KENWOOD TRIO, mint, boxed, with receipts, TS930S AT930 built-in tuner, SP930 speaker: £1350. MC60 microphone: £40. HS5 headphones: £20. KR600RC heavy duty rotator & controller: £120. Cushcraft A3 beam: £140. Complete HF station: £1500. Reluctant sale. Nigel (Lewes) 0273 478264.

KENWOOD TS530S tcvr with 1.8kc SSB and 500Hz CW filters. DFC230 digital VFO with memories, allows split operation: £625obo. Will ship if necessary. Kelly G0MKT not QTHR (Newmarket, Suffolk) 0638 666596.

KENWOOD TS530SP with hand mic, narrow cw filter, h/book and service manual. In superb cond, boxed, complete with boom mic headset: £575. Spare valves available if desired. Martin G0HRZ 081-590-5490.

KENWOOD TS680S with filter YG455C1 plus MC-60 desk mic. Mint boxed: £700. CAPCO AMA5 loop (80/40/30): £300. GW6XII QTHR (Abergavenny) 0873 831954.

KENWOOD TS830M, WARC bands, orig packing, service manual etc: £525. ICOM FM module for IC740, new: £35. G3JTQ QTHR (Christchurch) 0425 277767.

KW2000B. PSU/LS. E-ZEE match. swr meter. LP filter. Mic. gwo: £250. G3XON QTHR (Guildford) 0483 36953.

KW1000 LINEAR amplifier: £375. KW108 monitorscope: £75. KW109 supermatch: £95. All with manuals or £500 for all three. YAESU FT757GX, boxed, with manual: £475. (Romsey, Hants) 0794 516007.

KW2000B VFO4B power supply unit/speaker, shure mic, handbook, spare valves.: £175. G4RTL (Greenford, Middx) 081-997-0271.

KW2000E vgc, with KW psu/spkr lpf Shure 201 mic h/book, spare set valves, unmodified but with mod details and service sheets: £220ono. G4YKA QTHR (Boston) 0205 350108.

L COUPLER ATU 80-10 Metres: £35. Spectrum 48K TNC Interface: £12. Spectrum plus computer, late model with PSU and S/ware: £60. ST5 RTTY Receive TU for Spectrum: £35. DC40P 1W Tx/Rx: £40. G3KZU QTHR (Oxford) 0865 63000.

LATTICED MAST 35ft telescopic wall mounted (Allweld): £150. Jaybeam tribander 3ele: £175. ICOM (2M) 25W E/E with Mutek F/E, superb contest rig (won RSGB Fixed): £450. BNOS 2M linear 180W: £150. Packet TNC (Tiny2) with Commodore 64 s/ware: £100. G0BUK. (Nr Uckfield, E Sussex) 082581-3356.

LINEAR Amplifier builders: Parts for 3kv psu incl new toroidal transf and computer grade HV electrolytics slow start module etc: £100 the lot. 4-250A unused with holder, toroidal filament transf and bifiler choke: £50. Take both lots will include new plate grid meters and sundry other new parts. Prefer buyer collect or carriage extra £15. G3DPR (New Milton) 0425 615676.

LOWE HF 225 Rx with whip ant pre-amp loudspeaker, headphones, owner swl died after two months use, as new: £350. (Soham, Cambs) 0353 720583.

LOWTHER PM6 Cabinet speakers, 1960 vintage (two pairs); also Leak Stereo Valve equipment and spares; Garrard 301 turntable: Offers. G4NDF QTHR (Thornbury) 0454 415768.

MARCONI high spec power unit ZA55704 complete with 4 full wave rectifying valves and auxiliary power unit ,s about 200lbs weight, some 3-4000V. Also Marconi RF amplifier ZA55661 with two CV2130 output valves, air cooled. Also large Marconi AMU and heavy duty dummy load, sufficient equipment to build 1KW power amplifier for 3.5Mcs upwards. Can arrange carriage at cost after purchase: £250 the lot. No haggle, no split. Illness of XYL forces sale. G2AVI QTHR (Herne Bay) 0227 37 4774.

MICROWAVE Modules 144/28-30 converter complete with miniature reg. psu: £25. 13.5V @ 40a reg. psu (ex computer): £40. Creed workshop manuals a choix! G8LT QTHR 0327 860321.

MML432/100: £200. PK-88 and BBC-ROM/cable: £80. MML 432/100: £200. MML 144/30LS: £80. 40ft versatower complete, buyer collects: £250. Apple!! Europlus twin drives: £100. KR600C rotator: £100. KR800: £150. QTH, 5 bedrooms, quiet location, planning permission & existing 40ft mast, detached in own grounds: £CALL. 480/780 mobile mount: £15. YU3UMV framestore: £140 for meteosat only framestore: £100. G3UJB QTHR (Bideford) 0237 478808 or G4PTT QTHR 0271 860530.

MMT 144/28 transverter: £65. Also collectors item Osram "music magnet". Offers please. G3WEX QTHR (Birmingham) 021-354-4265.

MMT144/28 tsvtr, little used: £80. BARTG STS MCD rttty decoder, part built with all components, cabinet and BARTG books for decoder: £30. Storno CQM614 146-174MHz, can be re-crystalled for 2M, with wkshop manual: £30. Storno CQM634 68-88MHz, just needs crystals for 4M band, with wkshop manual: £30. Control unit for both the above Storno units: £10. 5.25in disk drive: £10. G6XZM (Banstead) 0737 350421, weekends only.

MUTEK TVVF50a 10/6M transverter: £120. Tonna 6M 5ele antenna: £20. Datong PC1 general coverage converter plus 2/10M Rx converter free if required: £90. SEM QRM Eliminator (unused): £40. 2x20M H100 cable: £20. Carriage at cost. G2BUP QTHR (Bath) 037-387-432.

NASA VIDEO Navtex with aerial and home PSU: £150. G.B.Phillips (Ilfracombe) 0271 867149.

PACKET PAC-COMM TNC320, visual display: £130. NEC PC-8201A Portable Computer, thermal printer, moden: £140. SMC 12V PSU, 35A Peak: £90. Dewsbury Star - Masterkey CMOS Memory Keyer: £60. G3RCE QTHR (Portsmouth) 0705 752618.

PC COMPUTERS Tulip AT compact 3 IMB 14" VGA, 40MB HDD 1.2MB 5.25" 1.44MB 3.25" FDDs, d/covers, u/guar, boxed, under 10hrs use, MS-DOS 4.01, windows-286, manuals (list £2150) quality machine as new: £935. Opus PC3-XT 640KB 14" Amber, 2x360 FDDs MS-DOS 3.21, GWbasic, manuals, little used: £335. Procomm glassfix 2M aerial, unused: £18. Icom IC32E 2M/70cms handheld transceiver, with SP/mic, carcord, PWC/Ad BP3, charger case, boxed, manual, as new (under 2hrs use): £260. ICOM IC27SH 100W 2M transceiver with voice synthesiser, as new, boxed: £750. (Dunstable) 0525 222163.

PMR WESTMINSTER W15FM C/S 25kHz channel fitted S8 S9. S20 S23 Raynet channel O/P 10W with toneburst B Band: £50. Rye Europa MF5U T.Band 3 channel fitted RBO Raynet channel toneburst: £50. G1NOL QTHR (Bishops Stortford) 0279 506996.

PRESTEL modem monochrome monitor, STC Novatel, incl keypad, PO jack, h/book. Just plug in for Prestel or use as computer monitor. Cost hundreds new. vgc: £35. G3HKH QTHR (Weybridge) 0932 847112.

PYE L470 UHF-FM link Tx/Rx in two 19ins x 2U cases, with leads, info, ex-70cms conversion project, never started: £30 pair. G7ETN (Biggleswade) 0767 314804.

QRP 80m CW transceiver 5w. Contains Howes boards CVF80, DCRx80, CTx80, ST2, CSL4, one home brew relay switching board. All very carefully made. Housed in steel instrument case, with digital freq read-out. Almost professional appearance: £125. No offers. G0ANX. (Wantage) 0235 868498.

QTH near Hatton station. Contest winning location at HF and VHF. 3 bdrm detached bungalow, 1/3 acre. Separate brick and timber wkshop and shack. BP80 h/d versatower 6 months old. Understanding neighbours. Offers near to £92,000. for immediate possession. (Warwick) 092 684 2541.

RACAL CABINET incl RA17 Rx, professional digital display, ssb converter, VLF converter, Infotech M7000 data communications Rx, as one unit: £1200. Will split Infotech from RACAL. G4ZVD QTHR (Keighley) 0535 663203.

RACAL RA218 sideband converter: £90. Racal RA17L receiver: £185. Okidata microline 83A printer serial and parallel: £60. Geoff G7FRU QTHR (Birmingham) 021-327-2880.

RACAL RA98 ssb adapter, ex condition with handbook and leads: £80. Racal MA79G drive unit with handbook, ex condition and working but slight intermittent electrical fault. Buyer must be able to fix: £125. Buyers collect both items. Also 8ele and 4ele 2M beams, used but good condition. (Soham, Cambs) 0353 720583.

RADCOMS complete years, unbound, since April 1936. Also QST magazines from 1928. Offers please. (Basingstoke) 0256 471274.

REALISTIC DX300 Rx, 10KHz-30MHz, am cw ssb, digital display, owners manual: £80ono. G0JOX QTHR (Nottingham) 0602 604807.

RN ELECTRONICS 144/50MHz transverter, only few hours use: £145 ono. G3JAV QTHR (Bournemouth) 0202 514078.

ROTATOR on heavy duty base mounting, will support and rotate complete mast: £70. Buyer collects. G3BDH (Ilford) 081-554-8012.

RTTY: TX/RX C64 with data cassette, joystick, manual: £100. MF2 interface incl psu: £35 (cost £80). Grosvenor s/ware (tape): £5. G3HKH (Weybridge) 0932 847112.

SEM QRM Eliminator, used once only, no longer needed due to change of QTH: £40. DRAE VHF Wavemeter: £20. G4YWB QTHR (Liskeard) 0579 83934.

SEM TRANSMATCH 5 months old, almost unused, mint cond: £60. G3MYU QTHR (Marlow) 0628 486477, evenings.

SHACK CLEARANCE. Complete HF station, TS430S with matching PS430 and speaker. Also Daiwa CNW-419 atu. Also MC50 desk mic with hand mics, 10M multimode radio, Pussers morse key, Pye pocket phone set with charger. All equip in ex cond. Will separate, sensible offers only. G0GPS QTHR (Kidderminster) 0562 754120 or 0860 892886.

SILENT KEY G5IG. FT101EX transceiver, mic, key, SWR meter: £300. G3YJJ QTHR (Southampton) 0703 894200.

SILENT KEY SALE G3CNV. Trio 510, Trio 2200G, Datong morse tutor, Marconi TF2220 dual trace scope, Marconi 1100 VOM, Marconi TF668 universal bridge, C&N receiver, advance VM78 voltmeter, Class D wavemeter, assorted valves. Plus many interesting items. Please ring G3YAP (Birmingham) 021-429 3268.

SILENT KEY sale YAESU FT101ZD FV101 SP901 IC240 psu's rotators, many useful items, sae detailed list. G4JFZ QTHR (High Wycombe) 02402 43698.

SOMMERKAMP FLDx500 FLOR500 Tx/Rx, lovely cond, boxed, manual, good first time rigs: £250. Must collect. G0LRH QTHR (Bungay) 098681 582.

SONY ICFPRO80 receiver. Covers 150kHz to 225MHz. Excellent condition, never used: £190 (Silent key). Phone Alan G1EBH QTHR (Basildon) 0268 545573. After 6pm.

SPECTRUM ZX48K computer with interface 1, 2 microdrives. S/ware for packet, rtty cw sstv. Terminal Unit for cw & rtty. Complete with all connections diagrams. Incl data recorder and leads. Other s/ware supplied incl wordprocessor, database, graphics and many games tapes. Also incl 12ins b&w tv: £140. G0AUW QTHR. (Chestfield) 022779 2273.

STORNOPHONE 500 gear. One rig on 145MHz FM, one low band FM, both need attention. Four nicads with storno charger, leather carry case: £35 the lot. No offers. No splits. Includes delivery. G4SDZ QTHR (Leicester) 0533 387259.

TELESCOPIC lattiged mast. Wall mounted, Allweld 35ft, tilts over: £15. With detached 3/4B house, large gdn if required. Emigrating to N.Zealand. £CALL. G0BUK (Nr Buxted) 082581 3356

TEN-TEC Corsair II 1.8MHz, 500Hz, 250Hz filters. Matching psu/spkr. V little used: £950 (Edinburgh) 031-665-7287.

TR7010 2M SSB/CW 8W pep plus PS-5 base stand/psu. Good cond, covers 144.1 to 144.325. Orig packing and manual: £125. Phone 0234 217717 (ansaphone) (Bedford).

TRI0 9R-59D Rx with manual. Ideal first Rx: £60. YAESU FRT-7700 atu: £40. Oskerblock SWR200B vswr bridge/meter 1.8-250MHz: £35. Soundair model 008, 8 channel h/h scanner with 6 145MHz crystals and 2 airband crystals fitted. With nicads and charger and rubber duck: £35. Microwave modules, 2M rf-switched gasafet pre-amp (not masthead): £30. Microwave modules, 2M 100W linear, 10W of drive needed, (no preamp) an "oldie but a goldie": £50. PP3 driven homebrew airband Rx, ideal if you live near an airport: £5. Akai 4000DS reel-to-reel stereo tape deck, ex cond, requires one tape reel clip (cheap!) hence £50. Now for the bargain of the month. For all you packet freaks out there, who needs a printer, star ND-10 80-column 180cps 9-pin printer, mint, never used: £100. Laurence G1SWL QTHR (New Malden) 081-949-5099.

TRIO 530SP MC50 base mic SP230 spkr, ex cond: £500ono. G0LRH (Gt Yarmouth) 0493 668328.

TRIO 9130 2m multimode with base unit B0-9A: £320. No offers. JST135 HF tcvr, Gencov Rx.Tx WID, 300Hz CW filter, mint: £950. G4AGE QTHR (Bolsover) 0246 823728.

TRIO R2000 with VHF converter: £400ono. G4NMR QTHR. 0905 20002.

TRIO TL911 2KW linear: £200ono. Racal 409 mod meter: £50. AVO8 for spares: £5. Buyer arranges collection. G3OXS QTHR (Biggin Hill) 0959 74872.

TRIO TR7600 2M-FM mobile with RM76 remote keypad/display. 10W/1W, 6 memories, scanning, repeater-shift, mounting, original packing, manual: £89ono. Heathkit 5in oscilloscope IO-18U, vgc, h/book: £35. Heathkit volt-ohm-milliammeter IM25, good cond, h/book, boxed: £9ono. Pair KT66s, Marconiphone, mint, boxed: £12. RadCom Handbook, Fourth Ed, Admiralty Handbook of Wireless Telegraphy, vols 1 & 2 (1938): offers. Bound volumes Wireless World, 1952, 1954, 1955, 1956, 1957: £5 each. Valradio Inverter, input 12V DC o/p 240V AC, 120W sinewave, 50Hz +/- 10%: £25. Raymart, wavemeter 1.8-35MHz: £5. TAVSASU mobile whip loading coils, set: Offers. Buyers collect or convey. G3UTG QTHR 061-491-0688.

TRIO TS120S HF transceiver: £350. KW107 Supermatch ATU: £100. National Panasonic DR49 8 band top band to 30MHz, vgc: £120ono. ZYCOMM h/h 2M charger microphone xtra batt: £85. DXTV band 1 & III UHF service manual: £65. Dummy load Toyo T100: £30. All items plus carriage. GW8YJN QTHR (Haverfordwest) 0437 781265.

TRIO TS430 with PS430 psu and AT230 atu in ex cond. FM board and 500Hz cw filter fitted: £695. G0DGM (Blackpool) 0253 594282.

TRIO TS430S vgc with fm, am, ssb filters: £575. Trio TR-9130 2m m/mode, vgc: £310. M/mods, 100W linear: £85. Trio PS-430: £95. All items boxed. Also Sony IC-7600DS: £95. VHF rotator: £18. 14EL para-beam: £25. G7FHV QTHR (Sussex) 0444 417509.

TRIO TS520 Kenwood mic receive only last 2 years, gwo: £300. BNOS LP 3-50W amp, v little use, as new in original box: £100. No offers. G1OAP QTHR (Mkt Drayton) 0952 78262.

TRIO TS711E 2M multimode base station 25W output, immaculate condition incl SP430 extension speaker and microphone: £650. Also fluke .8024B multimeter with leads: £150ono. Talor capacity/resistance bridge, model 110A: £20ono. Jim G1SET QTHR (Northampton) 0604 713394.

TRIO TS9305, mint condition, one careful owner: £975. G4EVS QTHR (Guisborough) 0287 636464.

TRIO VFO230 and manual: £175ono. SX200 scanner: £125. MM2000 rtty to tv converter: £20. G4PNC QTHR (Blackpool) 0253 35764.

TS520 MIC, manual, original packing, beautiful nick but no cw filter: £280 or twist my arm. G3VIJ QTHR (Aspatria, Cumbria) 06973 21874.

TS520 plus VFO520. gwo. Prefer buyer collects: £300. G3YJH QTHR (Tamworth, Staffs) 0827 284211.

TS530S New bands, spare valves, MC50 mic: £575. Swan Cygnet need attn, spare valves: £80. Shure 401D mic: £20. Buyer collects. Noel G3ZLN (Ipswich) 0473 749139.

TS780 2M/70Cm Multimode 10W output, vgc: £650. Consider p/ex. IC202S RN Electronics, 6M tvtr, 144IF 25W: £145. 4 ele 6M Jaybeam: £25. G4ATA QTHR (Huddersfield) 0484 865772.

TS820 HF transceiver with cw filter, external vfo and manual, ex cond: £290. G0DZU QTHR 0794 884286.

TS930S Extra CW filter SP930 MC43S both h/books, ex condition, original boxes,. offers above £1000. Details G2HKU QTHR 0795 873100.

TX-3 RTTY. cw, ASC11 transceive s/ware for Spectrum+3 disk, adapter board, TIF7 interface, virtually unused: £18 pp. G0EBV not QTHR (Chester-le-Street) 091 3886057.

VALVES transformers components. Sae for list or sensible offer for lot. (Bridgwater) 0278 455613 evenings.

VALVES, hundreds, brand new, many original box metal, B7G, B9A, B9G, Loctal, 1616, PT15, TZ40, UX. All £2 each plus postage. All must go in one month. AR88 RF section screens plus w/c switch (no coils). Offers. G3ION QTHR (Southampton) 0703 769706.

VIDEO CAMERA, colour, vhs Akai VC80E, zoom, gc, boxed mains, adaptor works with most vcr's: £120. 14ins monitor with vhs player, gwo: £100ono. Prefer buyer collects. G0FJY QTHR (Worthing) 0903 40072 after 6pm please.

VIEWDATA Philips Videotex/Prestel. Full keyboard/graphics generator terminal. Keyboard viewdata SP8001, computer SP8000, Philips Viewdata 14 colour VDU: £150. G3MOL QTHR (Brighton) 0273 777716.

WATT METER Heath HM2103, .5KW & 2KW 50 ohm dry dummy load, overload indicator, manual. P. Craw, 117 Sea Lane, Rustington, W Susex 0903 783953.

YAESU FL2100Z Linear amp, hardly used: £525. YAESU SP767 extension speaker: £45. 70cms colinear antenna: £25. Buyer to collect. G0GQD QTHR (Harrow) 081-423-6159.

YAESU FRDX400 Rx with 2M/4M converters: £100. Uniden 2830 allmode 28MHz tcvr: £250. Akai 4000D reel-to-reel tape recorder: £80. Kenwood VFO240: £80. Eddystone 680X Rx: £60. Teleprinter Creed 444 45/50 baud: £25. Lenco 77 turntable: £30. ZX81: £25. G3ITH QTHR (Dudley) 0384 273879.

YAESU FRG7 HF receiver, mains battery am/ssb, original spec, little used: £90ono. Close to M23 Junc 8. Call Andy (Tadworth) 0737 833428.

YAESU FRG7700 & FRT7700, complete with two converters 144MHz & 432MHz, coax SWHH & filter: £280. Eddystone Com-Rec 30MHz to 240MHz, model 990R, solid state: £80. Marconi TF2002, MF/HF AM signal generator complete with digital synchroniser type TF2170B: £300. Walker & Leach VHF/UHF calibration rec complete with four tuners 57MHz to 850MHz: £80. All in good working order. (Bicester) 0869 244166.

YAESU FRG9600 receiver, Raycom modified 200KHz to 950MHz, plus video board, incl psu and discone, immaculate condition, used only twice: £430ono. BBC master computer, colour monitor, twin 80 track disk drives, has 512 board installed to be IBM compatible - incl mouse and Gem s/ware, all reference and user manuals: £525ono. G1YGY QTHR phone evenings and weekends (Swindon) 0793 487412.

YAESU FT-101ZD fan, mic, manual etc. Matching atu FC-902 and dummy load/wattmeter YP-1502. All in as new cond: £550. G4DGB QTHR (going QRP). (Sunderland) 091-534 4847.

YAESU FT-230R 3/25W FM 2M Tx/Rx: £130. Trio TM-411E 5/25W FM 70cm Tx/Rx with digital coded squelch: £185. Trio TR7010 10W ssb/cw 2M Tx/Rx: £75. Trio VFO 700S remote VFO 8.2 to 9.2MHz, suitable for VFO control of TR7010: £35. PSU to suit: £8. All manuals. Decca KW E-ZEE match atu 80-10: £35. G3LNW QTHR (Radstock, Bath) 0761-32248.

YAESU FT-770RH, 25w fm 70cms Tx/Rx. Complete and in excellent working condition: £250. Peter, G3YXZ. (Watford) 0426 915264 any time.

YAESU FT101ZD: £400. Jaybeam tribander TB2: £120. Akai VC40E colour camera: £60. G0DVZ QTHR (West Kirby) 051-625 2271.

YAESU FT102 all filters 5 band vertical FL2100Z amp SP102 2M mobile antenna morse key spare valves: £1200. G0JLI QTHR (Bristol) 0272 892627.

YAESU FT203R 2M handheld, charger: £125. Tono 2M-90G 2M amp, 10W In, 90W Out: £80. 2M SMC polarphaser, controls A crossed Yagi polarisation: £35. Icom SM8 desk microphone, as new: £60. AT1000 SWL ATU 0.2-30MHz: £45. G3ZJK QTHR (Rugby) 0788 810535.

YAESU FT211RH 2M 45W Extended cov Rx, good cond, boxed etc: £260. Jim G4WXZ (St Helens) 0744 38165.

YAESU FT221R Mutek frontend variable power output, vgc, manual, boxed: £325. 5ele Yagi 2M: £15. Datong morse tutor D70: £25. 5/8 wave mobile whip 2M antenna: £10. Eddystone S640 Rx: £30. Realistic DX200 Rx: £30. GM1JWW QTHR (Ladybank) 0337 30477.

YAESU FT290 Mk 2 multimode, less than one year old, ex cond with box, book, strap, softcase and Eveready high capacity 2.2AH nicads: £350. Possible P/X late mint 70cms mobile. G4PHC QTHR (Minehead) 0643 706939.

YAESU FT290R11 with nicads microphone mobile mount, boxed, with Manual, matching YAESU FL2025 Linear: all for £350. Trio 3ins Oscilloscope: £49. Taylor 172A Valve Voltmeter: £49. DNT MB40 10FM Rig: £49. 5/8 70cm/2M Antenna with Mag Mount: £15. G3ZKS QTHR (York) 0904 625798.

YAESU FT290RII 2.5W multi mode 2 metre with 25W linear soft case and car mounting bracket: £450. ERA BP34 audio filter: £50. Met 2 metre 7 ele beam: £15. Hansen SWR3E SWR/power meter 3-150MHz: £15. Telex Hygain 10-80 metre vertical: £30. AMA 3 magnetic loop antenna 20/17/15/12/10 metres: £150. G1YNY QTHR (Christchurch, Dorset) 0425 276205.

YAESU FT2GOR Mutek nicads charger case, vgc: £225. Tokyo HyPower HL30V 30W linear: £25. Together £240. G0CZB (Hitchin) 0462 434552.

YAESU FT575GX: £575. FG-757AT: £285. FP757GX powerunit: £CALL. Trio TR2400 2M tcvr: £80. All with original packing manuals. Psion XP organiser speller & finance pack power unit, interface books: £85. Texas 59 programmable calculator & printer & manuals: £80. G4IJS 0925 64075. Immaculate.

YAESU FT707 100W tcvr with SMC FM board and YD148 desk mic: £350ono. FT690R 6M tcvr: £250ono. Both with manuals, boxed. Belcom 2M h/h, covers 140-169 m/cs, with spkr/mic, case, chrgr: £95ono. G1BWW QTHR (Hitchin) 0462 711722.

YAESU FT707 complete with 500Hz CW filter: £350ono. Phil G4UDU QTHR (Steyning) 0903 814516.

YAESU FT707: £330. All manuals and mobile mounting bracket included. Power lead, fist mic etc. FTV107R Transverter with 2M and 6M modules: £140ono. All in good working condition. Phil, G0HSS (Dartford) 0474 4563.

YAESU FT726R 2M 70cms & Sat modules: £675. MM432/50 linear amplifier: £95. G0FQG QTHR (Northwich, Cheshire) 0606 74776.

YAESU FT747GX, brand new fitted FM Board hand microphone, technical handbook etc: £450ono. Three 10ft lattice mast sections: £60. New marine band all channels handheld nicads charger etc: £100. Sony CD player, full remote control: £100. 6UHF Sharphones: £25 lot. (Skegness) 0754 86427.

YAESU FT757GX Mk1, vgc, MH1B8 mic, h/book, original packing: £500ono. GM0AEY QTHR (Falkirk) 0324 841652.

YAESU FT757GX: £450. FC757AT, automatic atu: £150. G4UVJ QTHR (Canvey Island) 0268 697978.

YAESU FT980 tcvr, all bands gen & cov Rx, mint cond, mic, manuals, boxs: £1060 incl insured interlink. Delivery. GW4RLP QTHR (Caernarfon) 0286 5264

YAESU FTONE HF Rig, good condition, extender boards, service and operations manuals: £900. ERA microreader: £100. PK232 swap dualband handheld. (Leeds) 0532 483597.

WANTED

23CM SOLID STATE linear, 50W or 100W output. (Stoke-on-Trent) 0782 44237.

AKAI OR IKEGAMI open reel video recorder or some other early VTRs, eg Wesgrove(?) May also buy 1/2" and 1" video tapes. Need service manual for Rank Nivico KV800 series VTR. Also require electric impulse clock slave devices, such as time switch programmer by Gents, synchronome etc. WHY. G8UDJ QTHR (Oxford) 735821.

BENCH MOUNTING trays for R1475 and psu. All letters answered. Dick Fixter G0DIC, 18 Linley Drive, Boston, Lincs PE21 7EJ.

BRAUN T1000CD portable radio. Condition of case unimportant but must work. Also book on above. Wanted book on 651S-1 and anything to do with 651S-1 Collins. I want to buy an original copy of 390A manual. B. Pollard, RS91997 (Fulham) 071-736-6581.

CIRCUITS SCOPES Dartronk M381. Unilab 032-601. Telequip 533A. Bush TV350. Pye Rambler 196. Fidelity FTV12. Racal DVM 9077A. G0IPT QTHR (London) 081-883-3474.

CMB8 mobile cradle, CPB58 linear to match standard C58 trsv. Must be working condition. Possible to inspect and collect. G0GRI (Trowbridge) 0380 830383.

COLLINS 51J4 Rx, rough or non-worker OK but must be complete and contain at least the 3kHz and 6kHz mechanical filters. G8LIU QTHR (Uxbridge) 0895 30006.

COLOUR GENIE, VIC20, or Dragon wanted with Amtor/rtty Rom Prom or Cartridge, other progs if available. G3BDK QTHR (Towcester) 0327 52309.

COMMAND SETS published by Cowan 1957. Also circuit or manual US Marine Rx C1H-46159 and matching fender part TCS-6, buy or borrow. Ted GW4EJT QTHR (Aberdyfi) 065472 7705.

DATONG audio filter model FL1. Lionel Leek G0NOB, 16 Riverside Drive, Solihull, West Midlands B91 3HH. tel: 021-704 9689.

EDDYSTONE 730/4 Circuit or handbook, 24 hour loan. £5 plus expenses. G8DLM, 1 Huttles Green, Shepreth, Royston, Herts. 0763 260490.

ELECTRO-CARDIOGRAPH and brain-wave meter. Laboratory physics equipment including electroscope, Van de Graaff machine, dip circle, magnetometer, induction coil or any large coil, infra-red binoculars, seismograph, geophone, defunct x-ray tube. G3MFW QTHR (St Austell) 0726 73608.

ELECTRONIQUES General coverage coil pack and information on Ambit CV2 2M converter. Tony (Worcester) 0905 641759

ELECTRONIQUES Transistor IF strip 1.620MHz, complete with 1/2 lattice filter, agc control bfo injection. G3GRB QTHR (Wolverhampton) 0902 20322.

ENTHUSIAST requires 9.5mm cine projector, preferably talkie (damaged or faulty may be suitable). Also films. Grahame Newnham G7EOH QTHR (Southampton) 0703 865086.

EQUIPMENT or offers of help for Novice Prep School station location Hemel Hempstead. G4BVS QTHR (Plymouth) 0752 873030.

FDK 725X 2M mobile, must be mint. G7HCV (York) 0904 793915.

FL2025 LINEAR for FT290Rz desk microphone HF wavemeter SWR/power meter for VHF/UHF, good working order only please. (Wilmslow) 0625 531154.

FOR FT726 70cm, 2M, HF modules, also satellite board for FT101, FV101, FTV650 or FT250. Peter G8EUX QTHR (Towcester) 0327 53522.

FT243 XTALS 775° 7775 7800 KHz. G3MCK QTHR (Staines) 0784 450600.

HANDBOOK/SERVICE info for Philips VR2020 vcr. Also back numbers of QST, Ham Radio, 73, BBC Acorn User, The Micro User, A&B Computing, Beebug, RISC User and any monthly computing disks. Tim Makins, Coupland Farm House, Coupland, Northumberland NE71-6TQ 06686275.

HEATHKIT SB610 Monitor scope. Must be in A1 cond. For best price phone G4ZOY QTHR 0670 811950.

ICOM 240 mobile mount, any condition considered. G7CFC QTHR (Newark) 0636 74362.

ICOM IC24ET 2/70 dual band h/h with accessories. Also wanted Icom TVR7000 TV receive converter for R7000 comms Rx. All goods must be receipted and in gwo. Also wanted pass band tuning unit and FM unit for Icom IC551 50MHz tcvr. Also wanted 2M polaphaser n.conns and AEA packratt PK-232 complete with s/ware for Amiga computer. G6DTW QTHR (Ashtead, Surrey) 0372 277945. **wKENWOOD/TRIO** speaker unit SP230. G3UZB QTHR (Redcar) 0642 470623.

KOKUSAI filter type MF45510CK and carrier crystals for KW2000E. G3OHE QTHR (Hartlepool) 0424 261186.ts

LINEAR 1.5Kw 2x3-500 or SB-230. gwo. Can accept without final tubes and psu - for around £250. Also preamp 2M for FT290R. 6M TVTR. (London SW5 0JR) 071-373-3949.

LOST AT LEICESTER SHOW on 27 October in car park. 4-way mains distribution block with filter. Will the person who picked up box behind yellow Volvo and left a note on windscreen please contact M Dale G6AGI QTHR (New Romney) 0679 64060. Will pay postage for return and £10 reward for its return.

MANUAL, terminating unit and attenuator for Marconi TF995/5 S/gen, also require rtty/cw etc s/ware for Tatung Einstein. G4CDP QTHR (Bury St Edmunds) 0284 810769.

MORSE COURSE Rhythm method tapes & documentation (new, s/hand or copy). Contact Chris (Chatham) 0634 849112.

PHILIPS G11 tv chassis maintenance h/book. Purchase or loan (costs reimbursed). G1EEH QTHR (Crewkerne, Som) 0308 68598.

POWER SUPPLY 117X for Swan 500. Also power supply for Heathkit HW32A. G3XAK (Cambridge) 0223 424027.

R1155. Good price paid working or not. (Leeds) 0943 74794.

RACAL panoramic adaptor for RA17/117, Racal MA79 transmitter. Manual for RA137 converter. RA17 tuning capacitor. Manual for TEK454 'scope and scrap scope for spares. Marconi instruments catalogue late 1970s. Any Marconi test gear or Racal comm's gear. W.H.Y? G4FIT QTHR (Tadworth) 0737 241491.

RACAL RA217 or R1217 Rx or similar variant, non working or vgc. Good price paid. Collection arranged 5 to 8pm. (March, Cambs) 0354 741168.

REALISTIC 2021 Scanner mobile base wanted. Handheld model must have air band. (Huddersfield) 0422 379023.

TELESCOPIC aerial for Kenwood h/h. Ray G3MWE, 63 Church Road, West Kirby, Wirral. 051 625 8945.

TRIO TS830S tcvr, first class condition essential. G3WEX QTHR (Birmingham) 021-354-4265.

TRIO TS930S with CW filters and fitted AT930 auto ATU and also SP930 ext speaker. Lionel Leek, G0NOB, 16 Riverside Drive, Solihull, West Mids B91 3HH, tel 021-704 9689.

TS440 IC735 or similar. Hornsea ARC. Jeff (Hornsea) 0964 533331.

VALVES 6BZ6 6BA6 6AW8A 6EA8 12BY7A 6DK6 NSP1 swops with waveguide bits X-band wavemeters isolators flanges WHY. G3XMB QTHR (Chelmsford) 0245 320747.

VERTICAL multi-band antenna ie HF6V, 18AVT or similar. Also rubber duck for FT290 R1. Dave G7HWW (Norwich) 0603 745512.

YAESU FTDX 401 tcvr. Must be in working order, accessories if possible, ie Ext ufo, psu etc. (Cumbria) 0229 838744.

EXCHANGE

BENCHER BY-1 Iambic paddle, little used, boxed as new, for Vibroplex bug in good condition. G3TSS QTHR (Corbridge, Northumberland).

ICR70 Rx, fitted fm, FL44 and 12VDC. This is a quite remarkable Rx: £450. Mint, gwo, manual and original box. Required - automatic atu for IC735. Derek G4GVM (Langport) 0458-252848.

KAM TNC Handles rtty ASC11 CW Fax AMTOR packet: £200 or swop Fairmate HP100E or similar. Malcom G0EBD 0743 67087.

STILL REQUIRED: EDDYSTONE BRITISH 7-pin round style valve holders, chassis mounting. Plenty alternatives for exchange. Bernard Litherland, G4IMT QTHR. (Chippenham) 0225 891254 any time.

SWAN HF TxRx 80-10M, matching Swan 230XC PSU, photocopy handbook, unused, complete valves, £160. Exchange all mode 2M mobile valued £250. Cash adj. (Shipley) 0274 598706

CLUB NEWS

DEADLINE - Items for inclusion in the March 1991 issue must be sent to HQ marked "Club News - DIARY", to be received by 11 January 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.

AVON

BRISTOL ARC - ***NEW SECRETARY*** Steve Alder, G0HTS, St Aidan's Scout HQ, Firetree Lane, St. George, Bristol, tel: 0272 583441

GORDANO ARG - 23, talk "The Right Weather for Propagation" by Tony Target of the Bristol Weather Centre; Feb 27, talk "/MM on a Narrow Boat". Details 0272 853849 (evenings) 0272 857102 (office hours).

SOUTH BRISTOL ARC - 02, photographic equipment evening; 09, pottery hands on; 16, Bristol Rally planning evening; 23, soldering iron evening; 30, top band activity; Feb 6, video evening; 13, vhf activity evening. Details Whitchurch 832222 on a Wednesday evening.

THORNBURY & DARC - 16, hf activity evening.

WESTON-SUPER-MARE RS - 7, Annual General Meeting; 21, constructors night; Feb 4, surplus equipment sale. Details 0934 514429.

BERKSHIRE

BRACKNELL ARC - 9, Annual General Meeting; Feb 13, tune & blow-up? - hands on experience of how to handle valve amps effectively

BURNHAM BEECHES RC - Jan 21, talk "'OSCAR', amateur radio satellites"; Feb 4, talk "Amateur Radio Software"; 7, quiz vs MADARC at Red Cross HQ, The Crescent, Maidenhead. Please note not the normal day. Details 0628 25720.

MAIDENHEAD & DARC- 4, new equipment evening; 16, talk "Operating from East Germany". Details 0628 25952.

NEWBURY & DARS - ***CHANGE OF VENUE*** Bucklebury Memorial Hall, Broad Lane, Upper Bucklebury. Meetings now held on the fourth Wednesday in the month. 23, junk sale. Details 0635 63310.

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 9, New Year meal. Details 0280 817496.

MILTON KEYNES & DARS - ***CHANGE OF VENUE*** North Bucks Youth Sports Hall, Haversham Road, Wolverton, at 8pm, every 2nd Monday of the month. Details Burt, G6WXM.

CHESHIRE

CHESTER & DARS - 8, Annual General Meeting. Details G2FVA.

CLWYD

DELYN RC - 15, talk "The Work of the British Legion"; 24, talk "Amateur Satellites"; Feb 12, talk and demonstration by MGR Communications.

RHYL & DARC - 7, annual junk sale; 21, talk "Cartography. The Road to Russia"; Feb 4, talk "Computers in Amateur Radio". Details 0745 336939.

WREXHAM ARS - 8, talk "You, too, can be a Weather Forecaster"; 22, talk "True or False, Identify Objects from Wrexham's Past". Details 0978 261482.

DEVON

AXE VALE ARC - Feb 1, talk "Automation in the Manufacture of "Glass Pipettes". Details 0297 33756.

TAUNTON & DARC - Feb 1, talk "Air Traffic Control". Details 0823 680 778.

CO DURHAM

DARLINGTON & DARS - ***CHANGE*** Now meets on Monday evenings only. Details G0DTV (Secretary).

CUMBRIA

EDEN VALLEY RS - 24, club dinner. Brantwood Hotel, Stainton. Projected price under £10 per head; Feb 28, bring & buy auction. Details G0MDV.

DERBYSHIRE

DERBY & DARS - 2, junk sale; 9, The Year in Retrospect. Tel: 0773 852475.

DEVON

EXETER ARS - 14, any questions night; Feb 11, talk "Power Supplies". Details 0392 78710.

PLYMOUTH RC - 8, construction night; 19, Christmas Dance, Elfordleigh; 22, talk on Station set-up. Details 363607.

ESSEX

CHELMSFORD ARS - 1, film show; Feb 5, talk "Installing Mobile Equipment". Details 0245 260831.

VANGE ARS- 3, junk sale; 10, talk by RSGB rep; 17, talk by G3ASH; 24, discussion on club project; 31, talk by G3JWI. Details 0268 524453.

GRAMPIAN

ABERDEEN ARS - 4, New Year's junk sale; 11, talk "DF on Top Band; 18, mini lectures; 25, talk "visit to USSR"; Feb 1, junk sale; 8, beginners lecture; 15, on the air Club Contest Nr 1. Details GM0CSZ.

GREATER LONDON

ACTON BRENTFORD & CHISWICK ARC - 15, Annual General Meeting

COULSDON ATS - 14, mini lectures "Weather Satellite Update", "Weather on the Air". Details 01-668 7004.

CRYSTAL PALACE & DARC - 19, talk "Test Equipment and Filters"; Feb 16, AGM and club constructional contest. Details G3FZL.

ECHELFORD ARS - 31, Mystery Talk by G0BZF. Details G0JSP.

EDGWARE & DARS - 10, Annual General Meeting; 24, informal: club archives, GX3ASR on Air. Details 09274 22776.

SOUTHGATE ARC - 10, trip to Kings College; 13, AFS. Details G8YNC.

SUTTON & CHEAM RS - 3, committee meeting at 35 Great Ellshams, Banstead; 13, 3.5MHz AFS team contest; 17, talk "Linears"; Feb 21, talk "Wireless Before Radio"

WIMBLEDON & DARS - 11, New Year resolutions; 25, R(F) Burns Night (Working GM). Details 081-397 0427.

GREATER MANCHESTER

ECCLES & DARS - 1, talk "NICAM"; Feb 5, discussion "Club Stand at the Norbreck Rally". Details 061-773 7899.

SOUTH MANCHESTER RC - 4, mini lecture competition; 11, talk "HF Propagation Predictions"; 18, talk "Switched Capacitor Notch Filter"; 25, talk "Propagation".

STOCKPORT RS - 9, talk "Test and Measurement Equipment for the Amateur"; 23, Kent Morse Keys - visit by Robert Kent. Details 061-439 3831.

GWYNEDD

DRAGON ARC - 7, talk "Question Time with Allison"; 21, discussion night & QSL competition; Feb 4, video evening. Details 0248 600963.

HAMPSHIRE

HORNDEAN & DARC - 3, talk "High Tech Test Equipment"; Feb 7, talk "Police Communications Control". Details 0705 472846.

HEREFORD & WORCESTER

BROMSGROVE ARS - 8 night on the air; 22, talk & demo "Weather Fax"; Feb 12, night on the air. Details 0527 503024

WORCESTER LIONS ARG - are running a coach to London AR Show, Picketts Lock on Saturday 10 March 1991. Pick-up points Redditch, Evesham, Worcester, M42 Junction Bromsgrove. Details 0527 79636.

HERTFORDSHIRE

HARPENDEN ARC - 30, annual dinner at Rose & Crown, Sandridge. 7.30 for 8pm; Feb 20, talk "Oxidation and the Rusty Bolt". Details 0582 713970.

HUMBERSIDE

GOOLE R&ES - 4, talk "Airshows"; 11, ATV Repeater progress report; 18, video evening; 25, talk "BC Radio". Details Goole 769968.

KENT

BROMLEY & DARS - 15, Annual General Meeting. Details 081-462-2689.

MAIDSTONE YMCA ARS- 8, dummy Morse test; 11, AFS dummy run CW; 13, AFS; 18, EMC problems, with Colin, G3VTT; 19, Morse test; 25, RAE & CW tuition. Details 0622 676776.

SOUTH EAST KENT (YMCA) ARC - 9, discussion evening "The Novice Training Course"; 23, talk "50MHz - A Valuable Resource"; 30, security marking evening. Details G1PJJ.

LANCASHIRE

THORNTON CLEVELEYS ARS - 7, talk "Is your Antenna Matched?"; 14, club stand planning for rallies; 21, talk "Classes of Emission & dBWs"; 28, club on air. Details G4BFH, QTHR.

WIGAN & DARC - 3, general discussion and review of 1990; 17, SWL talk and demonstration; Feb 7, talk "Home Construction (Measurement). Details 0942 47416.

LEICESTERSHIRE

LEICESTER RS - 7, RSGB video; 14, hf/vhf activity night; 21, Annual General Meeting; 28, hf/vhf night on the air; Feb 4, hf/vhf night on the air; 11, hf/vhf activity night. Details G3TQF.

LOTHIANS

LOTHIANS RS - 9, mini talks; 23, talk "How to Survive Without Chips"; Feb 13, talk "Air Traffic Control".

MERSEYSIDE

WIRRAL ARS - 2, talk "Old Time Radio"; 9, committee meeting; 16, radio problems night; Feb 6, President's night. Details 051 644 6094.

NORFOLK

NORFOLK ARC - 2, talk "The New Technology"; 6, 80m AFS; 9, INICAM; 16, talk "Baptism by Radio"; 23, talk "The UFO Phenomenon"; 30 informal; Feb 6, "Real Radio" evening; 13, talk "The Construction Business". Details 0362 850591.

YARMOUTH RC - 3, contest plans for 1991; 10, informal. Details Yh.721173.

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM - 3, forum followed by activity; 10, talk "Why Diodes go Pop"; 17, shack activity and construction evening; 24, talk "GD6CW Expedition Part 1"; 31, activity evening; Feb 7, forum followed by activity; 14, talk & demo "How to Use Club Equipment". Details 0602 733740.

MANSFIELD ARS - 3, talk "India - Overland from Delhi to Ladakh". Details 0623 755268.

ORKNEY

ORKNEY AR GROUP - 9, RSGB video "DXpedition 4J1FS Maliyotskii Is"; Feb 6, video "Amateur Radio's Newest Frontier". Details GM3IBU.

POWYS

SOUTH POWYS ARC - Jan, demonstration TS940 by GW3ECH; Feb, Travelogue by GW4FKW; 8, Club Dinner. Details GW6RUE QTHR.

SHROPSHIRE

SALOP ARS - 3, slide show on the art of collecting "Sheepskins"; 17, talk "IF and RF alignment of radios". Details 0743 790457

TELFORD & DARS - 2, informal; 9, video "1990 in Retrospect"; 16, committee 4/6M on air; 23, talk "Getting Planning Permission; 30, club shopping list discussion; Feb 6, club station on 2M. Details Telford 255416.

SOMERSET

YEOVIL ARC - 10, talk on RTTY; 17, talk "Simple PSV's; 24, discussion night; Feb 7, talk "A Simple ATU". Details G0NMM, QTHR.

SOUTH GLAMORGAN

CARDIFF RSGB GROUP - 14, talk "Delta Loop Antennas and DX"; Feb 11, quiz night. Details 0446 773212.

STRATHCLYDE

MILTON OF CAMPSIE ARS (MOCARS) - meets every 2nd Wednesday, 9th January onwards, in Red Cross Hall, Kirkintilloch. Regular guest speakers, as well as chat evenings. All interested are cordially invited to attend. Further details from Mike Hind, Secretary, GM6FOC QTHR.

THE TELEGRAPH RADIO CLUB - meets every Tuesday evening at 27 Telegraph Road, Longriggend, Nr Airdrie at 7.45pm. RAE and CW. Contact GM4LDU.

SURREY

DORKING & DARC - 8, informal at Falkland Arms; 22, Annual General Meeting. Details 0306 77 236.

TAYSIDE

DUNDEE ARC - 8, construction and talk "Building the White Rose Receiver". Details GM4FSB, QTHR.

WARWICKSHIRE

MID WARWICKSHIRE ARS - 8, HF night at Warwick School; 22, talk "My Year as Young Amateur of 1990 - How it Went" by Ted, G0KAQ. Details Kenilworth 513073.

RUGBY ATS - 1, no meeting. New Year's Day net at 7pm on 80m and 2m; 8, free bring'n'buy; 22, test gear evening. Details G0JEW.

STRATFORD-UPON-AVON RS- 14, projects evening (bring your projects along); 28, New Year social, Gay Dog, Lower Quinton; Feb 11, talk "10GHz the Easy Way". Details 060 882 495.

WEST MIDLANDS

COVENTRY ARS - 4, computer night - bring your own if you can; 11, night on the air and Morse tuition; 18, members slide/video show; 25, Annual Dinner; Feb 1, night on the air and Morse tuition; 8, quiz night vs Tamworth ARS; 15, night on the air and Morse tuition. Details 0203 523629.

MIDLAND ARS - ***NEW CONTACT*** Norman Guttenidge, tel: 021 422 9787.

STOURBRIDGE & DARS - 7, on the air; 21, talk "Sound of Yesteryear"; Feb 4, on the air. Details G0HTJ.

WOLVERHAMPTON ARS - 8 committee meeting; 15, talk "Printed Circuit Boards"; 22, night on the air; Feb 5, committee meeting; 12, talk "The Valve".

WEST YORKSHIRE

HALIFAX & DARS - 15, talk "Vintage Domestic Radio and Audio"; Feb 19, junk sale/surplus sale. Details Halifax 202306.

NORTHERN HEIGHTS AR&ES - 2, videos; 16, Annual Dinner; Feb 6, constructors clinic. Details 0274 673116.

PONTEFRACT & DARS - 3, on the air; 10, talk "PA Sound Systems"; 17, committee meeting; 24, junk sale; Feb 7 AGM.

TODMORDEN & DARS - 7, Antenna Design; 21, antenna construction; Feb 4, AGM and construction. Details 0422 882038.

WILTSHIRE

TROWBRIDGE & DARC - 2, open evening; 16 Annual General Meeting. 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'.

20 JANUARY

OLDHAM ARC Rally - Queen Elizabeth Hall, Civic Centre, Oldham. Details from Kathy, G4ZEP, tel: 061 624 7354.

27 JANUARY

UNIVERSITY OF LANCASTER ARS & CENTRAL LANCS ARC. The Lancastrian Rally - Lancaster University. Details from Sue Griffin, G1OHH, tel: 0524 64239 or Mike Sherlock, G4ZYN, tel: 0257 452287.

3 FEBRUARY

SOUTH ESSEX ARS Mobile Rally - The Paddocks, Canvey Island, Essex. Trade stands; bring & buy; boot sale etc. Inexpensive refreshments available; free car parking. Talk-in on S22 by G4RSE. Details Dave Speechley, G4UVJ, tel: 0268 697978.

10 FEBRUARY

CAMBRIDGE & DARC Rally and Car Boot Sale. Details from Nick Ash, G6ASH, tel: 0223 836670.

17 FEBRUARY

KIDDERMINSTER & DARS Rally - Harry Cheshire School, Habberley Lane, Kidderminster, Worcs. Details from 0746 780255 or 0562 746207.

23 FEBRUARY

RAINHAM Radio Rally - Parkwood Community Centre, Deanwood Drive, Rainham, Gillingham, Kent. Entrance fee £1; doors open 10 a.m.; traders; bring & buy; refreshments. Talk-in by GB4RRR. Exit No. 4 on M2 motorway and follow the signs. Details 0634 362154.

24 FEBRUARY

EAST COAST AR & COMPUTER Rally - Clacton Leisure Centre, Vista Road, Clacton-on-Sea, Essex. Doors open 10.30; restaurant & bar, bring & buy, free car parking. Talk-in on S22. Details from Terry, G7DNS, tel: 0255 222207 or Tony, G0MBA on 0255 422843.

4th TAW & TORRIDGE Rally - BAAC Halls, Bideford, North Devon. Doors open 10.30 a.m. (10.00 for disabled visitors). Trade stands, bring & buy; refreshments; bar; car parking. Details John G0GFK, tel: 0237 476402 or Keith, G0AYM, tel: 0805 23776.

2 MARCH

TYNESIDE ARS Rally - North Eastern Exhibition Centre, Gosforth Park Race Course (2 miles north of Newcastle upon Tyne). Usual trade stands. Morse tests; bring & buy; refreshments and ample free parking. Talk-in on S22 and SU8. Details from Terry, G6VEG, tel: 091 2648196.

3 MARCH

Welsh Mobile Rally - Barry Leisure Centre, off Holton Road, Barry. Details from Ceri, GW0JCB, tel: 0446 721304.

17 MARCH

NORBRECK AR, Electronics & Computing Exhibition organised by the Northern Amateur Radio Societies Association (NARSA) at the Norbreck Castle Exhibition Centre, Blackpool. Details from Peter Denton, G6CGF, tel: 051 630 5790.

WYTHALL RC 6th Annual Radio Rally - Wythall Park, Silver Street, Wythall, Worcestershire. Details Chris Pettitt, G0EYO, tel: 021 430 7267.

24 MARCH

BOURNEMOUTH RS Annual Amateur Electronics Sale - Pelhams Community Centre, Kinson, Bournemouth. Details from Vic, G4PTC; tel: 0202 516593 - evenings.

CUNNINGHAM & DARC DARC Magnum Rally - Magnum Leisure Centre, Irvine, Ayrshire. Details from Bob Low, GM0ECU, tel: 0294 72233 or 0563 35738 (home).

PONTEFRACT & DARS Components Fair, Carleton Community Centre, Carleton, Pontefract. Details 0977 615549.

31 MARCH

CENTRE OF ENGLAND Easter Amateur Radio Rally - Motorcycle Museum, Bickenhill, nr NEC Birmingham. Details from Frank Martin, G4UMF, tel: 0952 598173.

EVENTS DIARY

7 APRIL

LOUGH ERNE ARC 10th Annual Mobile Rally - Killyhevlin Hotel, Enniskillen. Details from Alwyn Magee, GI0BFD QTHR tel: 0365 323802.

LAUNCESTON Launceston 5th AR Rally - Launceston College. Details from Maggie, tel: 040921-219 or Rodney & Joy, tel: 0566-775167.

WHITE ROSE Rally - Leeds University. Details G4DXA, PO Box 73, Leeds LS1 5AR.

14 APRIL

TRAFFORD Rally "The Great Northern Rally" - G-Mex, The Greater Manchester Exhibition and Events Centre, City Centre, Manchester. Details from Graham Oldfield, G1IJK, tel: 061 748 9804.

21 APRIL

SWANSEA ARS Rally - Swansea Leisure Centre (on the Swansea-Mumbles coast road, A4067). Details from Roger Williams, GW4HSH, tel: 0792-404422.

28 APRIL

BURY RS Annual Rally - Castle Leisure Centre, Bolton Street, Bury. Details from Lawrence Jones, G4KLT, tel: 061 762 9308

5 MAY

BATC Rally - Harlaxton Manor, Nr Grantham. Details from Paul, G8MJW; tel: 0522 703348.

6 MAY

MID CHESHIRE ARS Rally - Civic Hall, Winsford. Details from David, G4XUV, tel: 0606 77787.

12 MAY

DRAYTON MANOR Mobile Radio Rally - Drayton Manor Park, Nr Tamworth. Details from Norman, G8BHE, tel: 021 422 9787 or Peter, G6DRN, tel: 021 443 1189.

YEOVIL ARC "The QRP Convention" - Preston Centre, Monks Dale, Yeovil. Details from Mr David Bailey, G0NMM, QTHR as G1MNM.

18 MAY

SWINDON Radio Rally - The Oasis Leisure Centre, North Star Avenue, Swindon. Details from Jim, G7GEA, tel: 0793 611859.

26 MAY

MAIDSTONE Mobile Rally. Details Mr A Judge, G0NCW, tel: 0622 750709.

PLYMOUTH Radio & Electronics Fair - Plymouth Radio Club Plymstock School, Church Road, Plymouth, Devon. Details from Jan Fisher, G0IVZ, tel: 0752 340946 evenings/weekends, 0752 262826 (daytime).

2 JUNE

SPALDING & DARS Mobile Rally - Springfields Arena Spalding. Details from T Kettlewell, G4TWR, tel: 0775 722940.

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, G3WFU, tel 0332 700265 (evenings).

ROYAL NAVAL Annual Mobile Rally - HMS Mercury, Nr Petersfield, Hants. Details from Cliff Harper, G4UJR, tel: 0703 557469.

SOUTHEND & DRS Annual Rally and Boot Fayre - Rocheway Centre, Rochford, Southend-on-Sea, Essex. Details from Steve, G1XGP, tel: 0702 712595.

16 JUNE

DENBY DALE & DARS Rally - Salendine Nook High School, Huddersfield. Details from J D Chappell, Secretary.

30 JUNE

LONGLEAT Amateur Radio Rally. Longleat House, near Warminster, Wiltshire. More details from Shaun, G8VPG, tel: 0225 873098.

7 JULY

YORK Radio Rally - Tattersall Building at York Racecourse. Details from Dave Moreland, G7FGA, tel: 0904 790079.

14 JULY

SUSSEX AR and Computer Fair - Brighton Racecourse. Details from Ron Bray, G8VEH, QTHR, tel: 0903 763978 or 0273 415654 (office hours).

28 JULY

RUGBY AR Car Boot Sale - venue to be advised. Details from either Kevin, G8TWH, tel: 0203 441590 or Peter, G0JEW, tel: 0455 552449.

SCARBOROUGH ARS Radio, Electronics & Computer Rally - The Spa, South Foreshore, Scarborough. Details from Ian Hunter, G4UQP QTHR, tel: 0723 376847.

18 AUGUST

WEST MACNHESTER RC Winter Rally - Bolton Sports & Exhibition Centre, Silverwell St, Bolton. Details from G1IOO, tel: 0204 24104.

1 SEPTEMBER

PRESTON ARS 24th Annual Rally - University of Lancaster. Details from Godfrey Lancefield, G3DWQ, QTHR, tel: 0772 53810.

14 SEPTEMBER

WIGHT Wireless Rally - Wireless Museum, Arreton Manor, Nr Newport, IOW. Details from Douglas, G3KPO, tel: 0983 67665.

15 SEPTEMBER

BRISTOL Radio Rally - Brunel's Great Train Shed, Temple Meads Station, Bristol. Details from David Farr, G4WUB, tel: 0272 839855.

22 SEPTEMBER

CENTRE OF ENGLAND Autumn Amateur Radio Rally will be held at the British Motorcycle Museum, Bickenhill nr The NEC, Jct 6 M42. Details from Frank Martin, G4UMF, tel: 0952 598173.

29 SEPTEMBER

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

24 MARCH

VHF Convention - Sandown Park. Details, G3FZL, QTHR.

27/28 APRIL

wRSGB National Convention - NEC Birmingham. Details from Norman Miller, G3MVV., QTHR.

25 JULY - 28 JULY

1991 AMSAT-UK Colloquium - University of Surrey. Details from G3AAJ.

28/29 SEPTEMBER

RSGB HF Convention - Penguin Hotel, Daven-

SILENT KEYS

We have been notified of the deaths of the following members.

G0FYK	**Mr L Hare**	
G0JTS	**Mr J Goodwill**	**12.11.90**
G2FWI	**Mr CF Scott**	**02.11.90**
G2UZ	**Mr CV Stead**	**23.08.90**
G3BZM	**Mr K Barrett**	**04.10.90**
G3HRO	**Mr CT Salvage**	
G3ST	**Mr SE Langley**	**25.12.89**
G3ZN	**Mr FB Holt**	**16.03.90**
G4ADW	**Mr AL Brown**	
G4KEC	**Mr E Cookson**	
G4UNN	**Mr TH Smethurst**	**08.10.90**
G5JF	**Mr CE Jefferies**	**17.11.90**
G6RYT	**Mr EB Beard**	
G8DDI	**Mr JS Young**	**21.10.90**

Mr EL Gardiner BSc, G6GR

Past President of the RSGB died 11 October 1990

This remarkable and kindly man passed away after a very full and pioneering life, finally cared for by his daughters and their families.

In the twenties he founded London Television Club with Dr Robinson and AA Waters, and pioneered slow scan television techniques. A regular contributor to magazines, he was licensed as G6GR in 1933 and proceeded to open up the 56 and 28MHz bands

In 1934 he became an RSGB Council Member, was Executive Vice President from 1941 to 1943, and President 1944/45.

During the war he was in the forefront of developments in re-transmission, fine filtering and highly accurate instrumentation in measuring techniques.

Later, with his own development and manufacturing company, he was instrumental in introducing the Quartz Bandpass Crystal Filter into communications receivers throughout the world. With Dr Robinson, he perfected 'boosting', ie receiving a very weak signal and then retransmitting the same signal on the same site and frequency without feedback!

His electronics development and manufacturing work continued until the early sixties. G6GR made his mark on industry as well as on his beloved communications activities right up to the time of his retirement.

Many will miss Ernest, always ready with advice and a helping hand, no-one more than the writer, who enjoyed his companionship and friendship for more than fifty five years.

Bill Bartholomew, G8CK

Correction:

In the December *Silent Keys* we listed Mr RR Hughes under the callsign of G4EZI. This should have been G4DZI, and we apologise to his widow Mrs Diana Hughes, G4EZI for the error.

HELP LINES

HAM RADIO 1976

Mike Grierson, G3TSO, is looking for a copy of an article which appeared in Ham Radio January 1976. He requires the circuit diagram from the digital frequency counter which appeared in that issue. Please contact Mike direct on tel: Coln St Aldwyns (028 575) 532 if you can help.

BUTTERNUT HF6 VERTICAL

Peter Bacon, G3ZSS, is looking for information on how to convert his Butternut Vertical for operation on the 18 and 24MHz bands. Can anyone provide the construction details so that he can DIY the necessary loading coils. Please contact him at 'Swingate', Evelyn Way, Cobham, Surrey, KT11 2SJ.

SEA OF ASOV REQUEST

Sergei, UA6LTC, in East Ukraine, has built a transceiver loosely based on the Trio TS430S, which works very well but he would like to add bells and whistles. Peter, G3ADV (QTHR in Nantwich) would be grateful for a photocopy of the circuit diagram to send to him. To avoid possible duplication, please ring Peter first on tel: 0270 627149. He will refund expenses.

RACAL DF METER

Alan Strong, G3WXI, is seeking information, circuit diagram etc for RACAL digital frequency meter type 9024. Costs will be reimbursed. Please contact him on tel: Wilberfoss 8172.

HISTORY MYSTERY

Stourbridge and District ARS has sent in a plea for the return of the club's history book borrowed some years ago by a then member, entitled 'For the Record'. The return of this book would be appreciated and the contact is Dennis Body, G0HTJ, tel: 0384 423938.

MANUAL HELP

Mr Mant, G4WWX is looking for the manual for the Redifon GR-479F military HF SSB transceiver and for a book on the Mullard SL56 RF amplifying equipment. He also needs a set of EMERs of the Larkspur control harness type B. Any reader who can help may contact him on tel: 051 722 1178.

DRAKE 7

Stanley Casperd, G3XON, is trying to make up 13 PCB extenders to service his Drake TR7 transceiver, but he needs half a square foot of copper stripboard with copper strips having centres of .156" (American size). He has all the connectors at hand ready, and is just waiting for the elusive stripboard to be located. Any help to him at 14 Dagden Road, Shalford, Guildford, Surrey, GU4 8DD.

ALPHA TRANSCEIVER

Peter Bramidge is looking for a circuit diagram/construction details for his Alpha 160M transceiver from WPD Communications. Any expenses would be refunded. Please contact him on tel: 0543 264586.

PHILLIPS TAPE RECORDER

Frank, G4END, would much appreciate information on types of valves and circuits for the old Phillips reel to reel tape recorder, type EL-3527, circa 1958. Please contact him on tel: 0782 614309.

OLD MORSE KEYS

A radio amateur friend of Jim Taylor, G4REU, is making a collection of CW keys, and is sending him an Air Ministry key, part No.10F/2533, and has embossed on the base 'WER 1940'. Can anyone tell him what the 'WER' means please. His address is QTHR, if you can help.

DENTRON USER SOUGHT

Ron Bennett, G4DIY, is trying to contact another Dentron GLA1000 linear amp user if possible. He is experiencing problems with this and would like to discuss them with another owner. Expenses would be reimbursed and he can be contacted on tel: 0744 57471.

FT 102 MODS REQUIRED

Pat, G4YBP, is looking for information on how to modify his FT102 to drive an FTV-107R transverter. He knows it is possible to modify the later 102's but the very early rigs are wired differently. Please ring him on tel: 0543 250963 if you can help.

PANASONIC COMPUTER

Vernon Davies, G3MSK, has hit problems repairing his Panasonic Computer JD-840U which has twin 8in disc drives, and is looking for a repair/service manual. His address is 16 Newmarket Road, Furnace Green, Crawley, West Sussex, RH10 6NB.

Helplines is designed to help put people in touch with each other. If you have a problem, it's more likely there's someone out there who has the solution; if you are looking for an old colleague or amateur friend, there could be a reader who has some news of their whereabouts; if you have solved a particular problem, write and tell the rest of us. 'Helplines' is there to help you and to give you the opportunity of helping others. Write to us marking your envelope 'Helplines' and we'll do what we can to get the message out.

GB CALLS

The list below shows all special event stations licensed for operation during this month and up to 19 February. It was taken from the HQ computer on 6 December. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

1 JANUARY
GB2WLC Whitehaven Lions Club

5 JANUARY
GB0CDQ Coastal Defence "Q"

6 JANUARY
GW0KPD Gower Wales

1 FEBRUARY
GB2EHG Ewyas Harold Group

3 FEBRUARY
GB0GW Gower Wales

5 FEBRUARY
GB0CDQ Coastal Defence "Q"

14 FEBRUARY
GB4SGB Sanderstead Guides/Brownies

15 FEBRUARY
GB0FBG Ferndown Brownies and Guides
GB5BG Bodmin Guides

16 FEBRUARY
GB2RBP Rettendon Brownie Pack

17 FEBRUARY
GB2BUH Barton upon Humber

18 FEBRUARY
GB2HGB Hazel Grove Brownies
GB8GGS Guildford Guides and Scouts

19 FEBRUARY
GB8BG Beaconsfield Guides

The Last Word

HIGH POWERED ARGUMENT

The following commentary appeared in the September edition of the Thames Valley Amateur Radio Transmitters Society's newsletter and received favourable comment:

"Gloom and doom? Has anybody read the top half of p6 Sept *RadCom*? OK for some, but what about those irresponsible yobs that we hear every day on our frequencies. QRO on 160; 400W CW on the HF bands; vertical on six. Permits for the abusers to perpetrate more abuse. Do we really need QRO on 160, or 400W input to communicate by means of the morse code on the HF bands?

Amateur radio is a hobby. It should entail more than just going to the favoured retail emporium and purchasing a black box and accessories with detailed instructions on how to fit them together and operate them.

Amateur radio is defined by international treaty as "A service of self training, intercommunication and technical investigations carried on by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest".

A second, simpler, definition preferred by radio amateurs might read as follows: "The practice of two-way, short-wave radio communication not as a business or means of profit but as a spare time hobby pursued for the pleasure to be derived from an interest in radio technique, construction and operation and for the ensuing friendships with like-minded individuals throughout the world".

By dint of experience and expertise, it is entirely possible to achieve world-wide communication on 160M using only 10W input. Again, by utilising experience and expertise, it is possible to achieve world-wide communication at any time of day or night on the HF bands using 150W or less input.

Where is the self training if contacts can be virtually assured when using the proposed new power limits? As I have already said, amateur radio is a hobby. It is also a challenge. So why the higher power? The direction in which our hobby is nowadays proceeding has meant that many genuine, self respecting, radio amateurs that we can ill afford to lose have bowed out from the rat-race and gone QRT. Some struggle on but have lost their enthusiasm. Others are adaptable but nevertheless retain and maintain the limits that were laid down in the original licence conditions. Conditions that I suspect were arrived at after long discussion and negotiation with the RSGB and Post Office authorities. Both sides fielded men with considerable experience in radio communications; the RSGB team had the benefit of self training and experience, the Post Office team were radio engineers and inspectors. Together they arrived at a balanced set of rules and conditions that gave radio amateurs some, but not too much, advantage. They knew what could be achieved with the means being authorised. Wise men, all. Only now is the balance being upset . . . . in the guise of 'progress'.

It is realised that some conditions were imposed because of factors that could not be ignored; for example, the Amateur Service was permitted on 160 alongside the coast station allocations, etc. but as a secondary service and on condition that no interference was caused to the primary users. Thus a limit of 10W input was imposed to assist in the limiting of sideband interference that might otherwise have been heard by the primary users on their channels. These limitations, however, have not distracted radio amateurs from accomplishing some of the notable achievements that have been recorded in the past.

RSGB take note.

RD Muir, G3LHN

WHAT PRICE RADCOM

In a future edition of *RadCom*, could the significance of £3.50 appearing on the front cover be explained please?

BWN Harris, G3GTF

[Certainly, Mr Harris. To members the price is academic because RadCom comes free as one of the many benefits of joining. To non-members it costs £3.50 which is high enough to prevent a year's worth of RadComs being cheaper than the membership fee. - Ed]

CHAT LINE

Many of one's contacts, whether on key or mic, are so interesting if one has time for a chat, rather than the rapid exchange of name, QTH and RST, that I feel there ought to be a Q signal meaning "I would like to have a chat. Are you willing?". How about QCH? If that sounds too much like QTH try QRCH (Ragchew).

J Allison, G0LYY

LACK OF SPACE

I have just read what I thought was *RadCom*, but I was wrong, what I read was an advertising magazine which contained a few items of RSGB news.

Reading the report on one of the RSGB's biggest events, NFD, I was looking for the comments and quips from the groups, what equipment the winning groups used, aerials etc only to be greeted with the now familiar words "time and space has once again limited the contents of this report"!! Will you please tell the readers of this magazine how you can have a lack of space when 48.8% of the magazine is taken up with adverts? Counting the front and back page there were 84 pages, 41 of these pages were adverts, plus another 20 pages for the Leicester Show. If the RSGB cannot fully report it's own events due to a 'lack of space' something must be very wrong.

Enough is enough, let us have more space devoted to RSGB, more of what the local groups are doing, comments and views from the ordinary down to earth, run of the mill members. Members who the RSGB could not do without, but are never recognised, and pay their subscriptions to prop up the advertisers.

I wonder if you have the guts to publish this letter or will it suffer because of 'lack of space".

J R Hooper, G3PCA

The Editor replies: *Following a year when the RSGB made a substantial trading loss and had to put the subscription up again, we need all the cash we can get. A glance at the Report and Accounts (November RadCom) shows that the RSGB receives considerable income from advertisements. Turning down a six-figure income would have a very significant affect on the members' subs. Frankly, it is not a question of RSGB members propping up the advertisers; it is the reverse. When the Society is once again making a profit, I will be delighted to increase the size of RadCom to ensure a greater ratio of editorial to advertising; in the meantime we need all the advertising we can get.*

165 YEARS

With reference to G3AK I am sure that his letter will evince lots of interest amongst senior citizens.

I am 83 years of age, and had a QSO with Herman, W5IJQ of Amarillo who is 82, making a combined total of 165 years, but I am quite sure that there must be many more octogenarians on the bands who can equal and in fact better the above total. Quite an interesting thought!!

D Myers, GM4XVX

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.

CQ CONTEST

I am heartily weary of these vacuous and tiresome outbursts against contests. The latest one from G4NJH says nothing new, except to label contestants as lunatics. Previous letters on the subject defending contests have clearly had no effect on this gentleman.

CQ is a radio amateur magazine, and it seems reasonable enough to this source to sponsor a major contest; more reasonable than, say, for a cigarette manufacturer to sponsor a snooker contest. Why does G4NJH not avail himself of the facilities provided by the WARC bands during these major events?

I have experienced very little bad operating during these contests, and indeed have been impressed by the very high operating standards and courtesy shown during these brief exchanges.

For the DX chaser, the CQWW contests provide a wide variety of new and interesting prefixes, not to be found in such profusion in any normal 24 or 48-hour period.

Finally, I would ask Mr Boot and his similarly orientated buddies to cease hurling insults at other amateurs, and display instead a little more of the ham spirit.

J Robson GM3CFS

[. . . . by calling people vaccuous and tiresome? - Ed]

UNITY IS STRENGTH

I think that all the hams complaining about the RSGB should, instead of bickering, do something about it. The best way to do this is from the inside, ie get elected - but of course you must accept becoming a member first.

Yes, I know membership is £30, but come on honestly we do get value for money. Subscriptions for other magazines average £20 per year. That leaves £10 per year for membership to the only National Society representing us all in the UK and abroad, and gives numerous other services eg, QSL bureau, EMC help, planning help, contest organisation, technical help, and committees for HF, VHF, UHF, Microwave, Data, SSTV, Morse, Satellites, Repeaters, etc etc. Not bad for £10 per year.

If every ham in this country was to become a member, then no doubt the above figure could be lower, and they would no longer have to shout over the fence, but could climb over and persuade from this side as 'one'.

To all RSGB Council members, please listen to all the members criticisms and act upon them. You are after all our elected representatives.

The above and perhaps a subscription without *RadCom*, could persuade more to join the RSGB. Those that are left - well you can't please everybody all of the time.

Regarding the RSGB being an exclusive London club, I don't think so. 1990 President from Scotland, 1991 from Wales, zone members from seven different zones in the UK.

In the hope that we can all join together and become one.

S Instone, GW0NPL

PIONEERS GONE?

It is interesting to look at *Radio Communication* for October 1965 which carried 26 pages of advertisements placed only at the front and back of the journal. That issue carried a total of 11 technical articles, including articles on an HF SSB transmitter, a 10W top band transmitter, two aerial designs and other items including a microwave amplifier and a frequency marker. An excellent technical radio journal that well represented a vigorously innovative hobby.

The October 1990 journal carries 39 pages of advertisements, scattered throughout, only one design and construction article and, apart from Technical Topics, only one other technical article, which was a review of a commercial transceiver. What has happened to the innovators and designers?

This comparison, I feel, reflects the changed state of amateur radio, a hobby that, like so many others today, has been moved in on and dominated by the warping interests of big business and its 'cargo cult', plastic technoglitter.

In the 1965 journal, NH Sedgewick, G8WV, wrote "the days of the pioneer are over; no longer does the ham explore the medium with the commercials following up". What might he think of the hobby today?

I have largely transferred my efforts to more original interests, to those that remain free from domination by profit-driven marketeers and their tinsel-clad toys. Is this where most of the designers and builders have gone?

D Appleton, ZL2DA, ex G3NRA, VS2ET, VR1O

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continued on next column

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