Radio Communication

The Journal of the Radio Society of Great Britain

March 1991

Volume 67 No 3. Price: £3.50

THE VOICE OF AMATEUR RADIO FOR 78 YEARS

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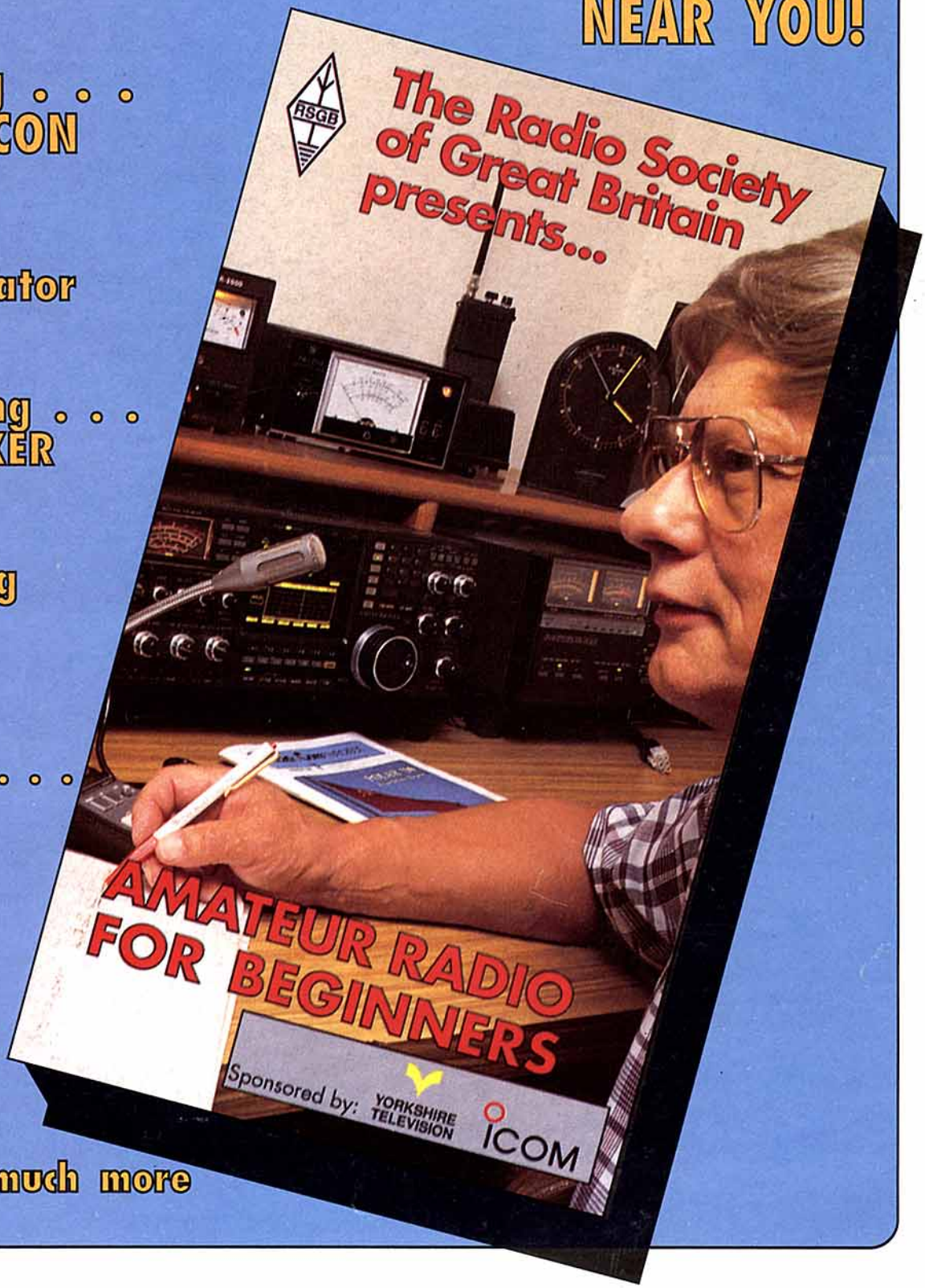

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Is this the best HF transceiver in the world?

When a reviewer of the stature of Peter Hart uses phrases such as: "The quality reports received on transmit with the DSP were superb." Or "The PA intermodulation performance was much better than the average rig." "The reciprocal mixing or oscillator sideband noise performance was also excellent, one of the best radios I have measured, and substantially better than the TS-930S or TS-940S even with the Lowe modification," you can begin to understand why we really do believe that Kenwood have set new standards for others to attempt to emulate.
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See the TS-950SD at our Matlock head office if you can. We can't at the moment put one in every branch simply because of the demand for this definitive new transceiver, but a fully descriptive brochure is available on request.
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N.B. for all other RSGB telephone numbers see page four.

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Radio Communication

This month's extra 16-pages

NEWS AND REPORTS

TECHNICAL FEATURES

COVER PICTURE:
The RSGB's recruitment video which has been sent to all UK radio clubs.
See pages 4, and 5.

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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0707 49805 - Subscriptions queries
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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

PROJECT YEAR IN PLACE

Excitement is mounting as more parts of the Project YEAR jigsaw fit into place and the reality of the Novice Licence approaches.

There is a special feature in this month's issue of *Novice News* which attempts to answer all of those questions which you might have on obtaining a Novice Licence. HQ expects to be bombarded with questions and so the article is to be made into a hand-out. Why not photocopy *Novice News* yourself and use it to help friends or relatives who are interested in amateur radio. It would also be helpful to radio clubs around the UK - why not put it on the club noticeboard or in the newsletter?

The main question on everyone's lips is "what's happening?" Well, the first vital ingredient of Project YEAR, the recruitment video has been completed and duplicated. We have Yorkshire Television to thank for their sponsorship of the video and ICOM UK for sponsoring the production of the copies. By the time you read this, a copy of the video tape will be en route to affiliated clubs, societies and groups in the UK (except contest groups unless they specifically request a copy). There will be instructions on how to get the best from the video, but basically it is all about recruiting for amateur radio. The video will be a marvellous tool for clubs to use.

The next step of the scenario is that anyone who has seen the video, and who is interested to learn more, is asked to contact RSGB HQ. We will supply some introductory material and recommend one of our new books as essential reading. We hope that beginners will be spurred on by their local clubs or individual amateurs to go for a Novice Licence. HQ can supply details of all registered Novice Licence instructors in a given area. Once a beginner is on a course, the instructor will be able to provide a wide range of practical help and advice.

The next step for the beginner is to take the C&G Novice RAE (subject 773) and, for those who want to use the HF bands, the RSGB five words per minute Morse Test.

The RSGB has recommended that clubs show the promotional video to their own members first. However, it is important to stress that the video is not intended for licensed amateurs or committed SWLs. It really is intended for the absolute beginner so do bear that in mind when you watch it.

For UK amateur radio to have a bright future it is essential that even more instructors come forward to pass on their skills to the next generation of radio amateurs. We need more instructors all over the UK, but especially in Counties Londonderry, Fermanagh, Armagh and Tyrone. Also in Orkney, Shetland, the Western Isles, Borders and Dumfries and Galloway, Powys, South and West Glamorgan. In England, only three counties are currently without Novice instructors: Durham, Somerset and Devon.

If you have found the hobby captivating and stimulating there is no finer gift than helping to ensure that amateur radio lives on in others.

David Evans, G3OUF

Support Project YEAR and the Novice Licence
and
WIN A CAR!
Apply for your lottery tickets now.
Use the form enclosed with February's RadCom, or get another by ringing 0707-49855.

NEWS & REPORTS

RSGB's Project YEAR has come to fruition with this handy recruiting tool.

HQ News

YOU NOW HAVE a chance to look at the financial results for the first half of this year (see pages 57-58). As indicated in February *RadCom*, these are not good. However, this is a snapshot at 31 December 1990 and does not reveal the satisfactory trend in expenditure which for the last few months has been downwards.

To make sure that our expenditure is kept within our likely income for the next year, I have laid off two more members of staff, making a total of six in the last five months. This is an exceptionally painful experience both for the remaining staff and those that have had to leave, some with many years experience.

I have had to adopt this somewhat ruthless approach to demonstrate to our members, creditors, committees, Council and staff alike, that I am determined to replace some of the reserves lost over the last seven years of deficits.

The year has started off well, with good figures for January and an encouraging response to the lottery. From an administrative point of view, the lottery is highly efficient and we have detailed figures on screen day by day. It has needed more explaining than a conventional lottery, but once the idea has been grasped, there seems to be no problem.

At 11 February 1991 we have a little over £7787 in a separate lottery bank account. Once the lottery has been drawn, on 28 April 1991, I will publish an Income and Expenditure account for this activity.

I am currently negotiating with

continued on page 56

The Video Is Here!

Yorkshire Television's Peter Smales (left) with newly installed RSGB President, John Case, GW4HWR, at Cardiff Castle.

FOLLOWING ITS premiere at Cardiff Castle in January, the RSGB video *Amateur Radio For Beginners* has been sent to hundreds of radio clubs nationwide. The video, from an original script by Victor Brand, G3JNB, has been produced for us free of charge by Yorkshire Television, and a very professional piece of work it is. Copying has been funded by Icom (UK) reflecting their confidence in the film as a way of reversing the decline in the number of radio amateurs, and hence boosting the country's pool of self-trained electronics and communications engineers. The video comprises two films, each more than twenty minutes long. The first, *Amateur Radio - the Hobby of the Space Age*, presents amateur radio as a pastime which can be enjoyed by any age group. The second, *How to Become a Radio Amateur* introduces the practical aspects of the hobby, together with operating and the ways of obtaining a licence, with particular emphasis on the Novice Licence available this summer.

Any member who would like to see the video should contact his local club to find out when it will be shown. It is, of course, aimed at those not already involved in the hobby so this would be an appropriate time to take along other members of your family, your neighbours, or perhaps a teacher or youth leader. In order to strengthen the case for retention of our bands, each member should aim to recruit at least one new radio amateur during 1991. As an extension of this, clubs are being encouraged to use the films as part of their public presentations of amateur radio.

Donations

The video is not for sale, but a limited number is available to individuals. These may be obtained by making a donation of not less than £10 to the Project YEAR Fund, and will be dealt with on a first come, first served basis. Cheques should be made payable to 'RSGB' and should be addressed to The Secretary, RSGB, Lambda House, Cranborne Road, Potters Bar, Herts, EN6 3JE.

As with the money raised by the Lottery, these donations will be used to ensure that the Society is able to promote the growth of amateur radio at minimum cost.

Project YEAR Lottery

THERE IS STILL a chance to apply for lottery tickets which you can use to win a car, a holiday of a lifetime, or a TV/Video. Even if you sell all of your tickets to others, you could still win a prize for having sold the most tickets, or for having sold the winner's ticket.

Apply *now* for tickets using the form enclosed with last month's *RadCom*. If you have lost the form, simply ring 0707 49855 and a replacement will be sent to you. **It is *vital* that you send back the ticket stubs**, *even if you have purchased the tickets for yourself.* The address is 'Lottery', RSGB, Lambda House, Cranborne Road, Potters Bar, Herts, EN6 3JE.

Tickets will be available at a number of events, including the RSGB's National VHF Convention on 24 March (see pages 20/21) and, of course, on the first day of our National Exhibition at the NEC on Saturday 27 April. The draw takes place on the show's second day Sunday 28 April. All profits from the lottery go into a fund set up to support Project YEAR, the Society's major initiative aimed at rejuvenating amateur radio.

Credit Card Holder Wins Holiday

OUR RECENT RSGB Credit Card promotion, sponsored by Bank of Credit and Commerce, had a prize draw for new applicants for the card.

Congratulations go to A Goode, G2DTQ of Wolverhampton who goes on a one week trip for two to the USA, to visit the 'Hamvention' in Dayton, Ohio, and ARRL HQ, in Connecticut.

The second prize, a four-day trip to the Ham Radio Convention at Friedrichshafen in Germany, was won by W J Watkins, GM0IHX. An Icom IC2SE, 144MHz transceiver goes to third prize winner M E Harding G7DHJ.

The RSGB Credit card not only has a very competitive interest rate but it directly benefits the RSGB as BCC donate £5 for each new account holder.

The Society also receives a small percentage of all money spent using the card.

● Further to last month's article, Jim Smith, VK9NS, sent a fax to the RSGB *DX News Sheet* regretting that there is still no amateur radio activity in Bhutan, despite Sherab Dorji (featured on our Feb cover) being licensed as A51SD. He expects to be in Bhutan during May.

Christian Amateurs in Conference

THE WORLD Association of Christian Radio Amateurs and Listeners Conference was held last November at Cliff College, near Sheffield, where members gathered for a weekend of spiritual, social and technical fellowship. The full programme included presentations by Manfred Kusterer, DL8SBB (who was for eight years the radio man aboard the 'Operation Mobilisation' vessel Doulos), a demonstration of packet for beginners by G0MHD and a fascinating lecture by Rev. Keith Ranger, G0KJK (VS6US), on his work in the Far East. Working to RSGB guidelines, the Conference adopted a new Constitution and warmly approved of the growing links with continental Christian radio groups. The WACRAL club callsign GX3NJB was operational on HF plus VHF packet.

Founded as long ago as 1957 by the Rev Arthur Shepherd, the Association has more recently benefited from the world-wide Christian revival and membership is currently approaching one thousand. The main aim of WACRAL is to promote, and spread Christian friendship throughout the world via the medium of amateur radio. Open to both licensed amateurs and shortwave listeners, the subscription has been held for a further year at £4 to cover the cost of a quarterly newsletter and a WACRAL members' callbook.

Readers may be interested to learn that there are several WACRAL nets here in the UK, the most popular of which can be found on 3764kHz every Sunday morning at 0815-0900GMT. Net controller Harold Turner, G4YRH, is ready to welcome all who care to call into this nationwide net.

For full details, call in on the Sunday net or contact membership secretary, Derek Chivers,

Seen at the 1990 WACRAL Conference (l to r): Harold Turner, G4YRH (Chairman); Bert Ralfs, G3HIH (Treasurer); Erich Ubelhor, DL5GBU (Editor *FCF News*); Manfred Kusterer, DL8SBB/P29VMK; Garth Martin, G3IER (General Secretary) and Derek Chivers, G3XNX (Membership secretary).

No Gulf Third Party

MEMBERS RECEIVING requests from the press for information on the Gulf war obtained via amateur radio are reminded that the licence does not permit the passing of amateur radio messages to third parties. Anyone receiving such a request is advised to point this out, together with the fact that amateur radio exists worldwide strictly on the basis of being non-political.

If a third party message is received which requires passing on, the correct procedure is to seek advice from the Radiocommunications Agency.

Codeless Licence in US

IN FEBRUARY, it became possible for the first time to obtain a USA licence without taking a morse test. The UK has had a 'codeless' licence (Class B) since 1964.

The Technician Class licence will permit operation above 30MHz to anyone who has passed the technical examination, but a 5WPM test must be passed before using HF.

The US Novice Licence which requires a less comprehensive written exam, but compulsory 5WPM morse, is an alternative entry point into amateur radio.

RadCom Christmas Quiz

The Answers

For those who didn't get round to posting their entries, here are the answers, all of which could be found in the last year's *RadComs*:-

1 A Competant Body is a term used in the field of EMC and it is connected with the EC EMC Directive.

2 The HQ book order and enquiry line is 0707 49855. Contact your Zonal Council Member for information on RSGB policy.

3 Peter Blair, G3LTF, reportedly took part in moonbounce tests during the eclipse, but it was an April 1st spoof.

4 The DARC was founded in Bad Homburg (several entrants lost half a point by spelling this wrongly).

5 There were two possible answers to this one, either of which counted. Alex Anderson, GM4VIR, was awarded the MBE for his Raynet work at Lockerbie, and Jack Hargreaves, G5VO, for work with Bridlington School CCF.

6 International Marconi Day (IMD) was on 21 April 1990 and 14 special event stations were operational.

7 Brazil the DOVE satellite transponder.

8 International QRP Day was on 17 June and was sponsored by IARU Region 1, *not* the G-QRP Club.

9 QSLs for 7J1AB should have gone to the US Embassy in Riyadh, Saudi Arabia. When the competition was devised, this was still possible!

10 The *Radiant Catalogue* was published by the British Meteor Society, though Feb 91 *RadCom* reported its demise.

11 Terence Langdon, used the callsign U9W/W6/G3MHV whilst in the USSR.

12 According to Jan 90 *RadCom*, the principle differences between LDF5-50 and LDF4-50 are that 4-50 is smaller and less rigid (hence a smaller bending radius). It is also slightly lossier.

13 ROPOCO is a contest which has the unusual procedure of sending one's own postcode for the first QSO, then repeating the postcode sent by the last station worked. It was not necessary to know that ROPOCO stands for Rotating Postal Codes.

14 Young Amateur Of The Year 89/90 was Ted Walker, G0KAQ, and the 90/91 winner was David Martin, GM0NVE.

15 Sredniy Island has the Locator NQ59OM.

16 HQ Despatch Manager, Bert Mair, is in the picture (*not* Ron Glaisher, G6LX). He is rotating the drum used for the *RadCom* Readers' Survey Grand Draw at the National HF Convention. No-one got this second part precisely right, though the poor photo didn't help.

17 16,554 carrier pigeons were dropped on Western Europe during WWII; 1722 returned.

18 G3SDL was the first to use 50MHz in Turkey; his XYL is Susan.

19 The RSGB QSL Bureau address is PO Box 1773, Potters Bar, Herts, EN6 3EP. QSLs for special club GX calls go to the manager for the normal club callsign.

20 We did not have to use the tie breaker, but several entrants got very near to the correct weight of *RadComs* sent out by Presstream in March - 6353.6kg.

The winner

By the tiniest of margins, C J Langley, G3XGK, of Lowestoft wins the ERA Microreader.

Honorable mentions go to the runners up who had equal scores; R A Parrott, G3HAL, of Chard in Somerset, and W A Coates, G3WAC of Stafford.

Congratulations to all, and thanks for entering.

That's Lowe Business

LOWE ELECTRONICS, long associated with the North of England, now has a new communications centre near Heathrow serving licensed amateurs, shortwave listeners and air band enthusiasts.

The new shop is at 6 Cherwell Close, Langley, Slough, Berks, which is adjacent to the A4, 200 yds from the M4, Jcn 5.

It was opened on 16 January by Patrick McLoughlin, MP, Parliamentary Under Secretary of State for Transport.

SAREX flies at last

THE LONG-AWAITED launch of SAREX II (Shuttle Amateur Radio Experiment) took place on 2 December, carrying Astronaut Ron Parise, WA4SIR. Amateur radio activity included speech and packet and, despite an enforced early return to earth, over 2000 QSOs were made. The orbit was not suitable for European stations.

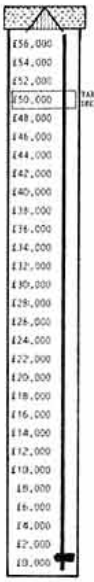
Say YES to Colloquium

THE AMSAT-UK Satellite Colloquium will be held as usual at the University of Surrey from 25 to 29 July. AMSAT-UK Secretary, Ron Broadbent, G3AAJ, needs to know the likely attendance, and asks anyone intended to attend simply to send him their QSL card with the words "Colloquium Yes" written on the back. This will help the planning of the event and will ensure you get an early copy of the booking form. This applies equally to members and non-members of AMSAT-UK.

QSL Bureau News

SOME 15kg of cards arrive at HQ every day and all are opened the same day. All incoming (UK) cards are up to date, but there is a small backlog of outgoing cards awaiting sorting into their overseas destinations. The bureau has been refurbished and reorganised following a year's trial period which should improve throughput still further. Newly appointed full-time Bureau supervisor Jan Mair reports that 'thank you' letters outnumber criticisms.

Frank Ellesmere, W0/G8CJ, has written from the USA saying that it is possible to obtain a G licence plate there simply by showing an FCC reciprocal permit. The photograph shows Frank's Jeep suitably adorned with the callsign plate G8CJ.



President's 'Roof Fund'

IF A CHURCH ROOF is in need of repair, the vicar calls for a fund raising campaign. The roof over amateur radio - the RSGB - is in need of repair and so I am appealing to all members to support my 'roof fund'.

If you would like to help, individually or in groups, why not organise schemes, seek sponsorship for Project YEAR and the Novice Licence, make or obtain donations - there are many ways in which the income of the Society can be increased.

The barometer shows the pointer just a little above zero. This modest start has been provided by a number of donations including one of just over £200.

In order that progress can be monitored and entered on the 'barometer', please make cheques etc payable to the RSGB - crossed 'a/c payee' and with the words "President's Roof Fund" on the reverse side.

Watch out for signs of my own scheme and together let's try to put the 'barometer' pointer through its own roof! Thanks,

John, GW4HWR, President

Terry Barnes, GI3USS, presenting a gift to Joan Case, wife of GW4HWR, at John's installation as 1991 RSGB President at Cardiff Castle.

Instructors Needed

THE MAJORITY of counties throughout Britain have entered into the spirit of the Novice Licence Training scheme in a big way. Humberside at present tops the league, having the most instructors, with the West Midlands close behind. At the other end of the scale, there are areas with no instructors at all!

In England, we are still looking for instructors in Somerset, Devon and Co Durham; and in Wales, Powys, West and South Glamorgan.

Scotland swings from one extreme to another with Strathclyde being very well served, while Dumfries and Galloway, Borders, Western Isles, Orkney and Shetland have no instructors at all.

Northern Ireland needs instructors in Armagh, Fermanagh, Londonderry and Tyrone.

Anyone wishing to become a Novice Licence Instructor should turn to this month's *Novice News* column for information on what is involved.

● Cambridge University Wireless Society (CUWS) and its Oxford counterpart (OURS) organises an annual reunion dinner. Any former member of either society wishing to receive notice of future dinners is asked to send their current address to Martin Atherton, G3ZAY, 41 Enniskillen Rd, Cambridge, CB4 1SQ.

Operate in Sweden

FROM 1 JANUARY, CEPT Class 1 licensees (= UK Class A) may use the HF bands under the TR 61-01 agreement while visiting Sweden. A special reciprocal licence is no longer required.

. . . and Italy

UK AMATEURS MAY operate in Italy without a special reciprocal licence following that country's signing of CEPT TR61-01. Class A licensees should use the prefix IK, and Class B licensees should use IW. No mobile operation is permitted below 144MHz, and those using a Class B licence - equivalent to CEPT Class 2 - are restricted to 10 watts input.

● Keighley Amateur Radio Society thanks all who contributed to their sponsored radio event for the BBC's Children In Need Appeal. The event raised £602.55.

The World Radiosport Team Championship

HF Contest Committee Chairman, Dave Lawley, G4BUO, presents his personal account of representing the UK in this unique event, and gives a fascinating insight into the world of top contest operators.

THE MOTTO OF THE 1990 Goodwill Games, in Seattle last July was "Uniting the world's best". About two years ago Danny Eskenazi, K7SS, a well-known DXer and contester, had the idea of bringing together the world's best contesters, on 'level ground', in the first World Radiosport Team Championship (WRTC), an exchange programme of the Goodwill Games.

Two years of hard work by Danny, Steve, K7LXC, and their committee culminated in the championship event on 20 July 1990. Twenty-two teams of two operators competed in a 10-hour contest from 2100z until 0700 on the five main HF bands 80-10m. These included four USA teams, four from the USSR, two from Japan and one each from DL, EA, F, G, HA, I, LZ, OH, OK, PY, VE, YU.

Steve Dove, G3YDV, and I represented the UK. Although all other expenses would be met by the organising committee, the air fare had to be paid for by the competitors, so it helped that Steve lived and worked in Pennsylvania, and is better known under his US call-sign NM2Y.

WRTC was sponsored by a number of dealers in the US: MFJ, Ham Radio Outlet, US Tower Corporation, *CQ* Magazine and, principally, Icom. Every station competing in the event would be using brand new Icom equipment, an IC765 and IC735. I contacted Icom(UK), and they were happy to let me try out an IC765.

The publicity department of the Woolwich Building Society (my employer) was very interested in my participation in the event, and gave a much appreciated £250 towards the cost of my air-fare.

This was my first trip to the US, and an opportunity to visit the beautiful Pacific northwest. I arrived in Seattle just as it got dark and was met by Dave N7MYO who immediately took me to a party at the home of Danny K7SS. The place was full of contesters I have worked over the years, and my tiredness was forgotten in the thrill of chatting with contest regulars N2AA and W2GD. We were joined by someone with an almost perfect American accent but wearing a T-shirt with 'KGB' on it and carrying a bottle of vodka - Willi, UW9AR. It is a testament to the great advances in international relations in the past two years that there were twelve Russians partying in a house in Washington State with contesters from around the world.

Dave, N7MYO, hosted the UK team and in the early hours of the morning we were joined by G3YDV. We were then taken to our operating site, the home of KA7MCX, and Marcia. Having set up the keyer etc, we started to check the bands. Each of the 22 teams would be using an existing amateur station, and while with the help of Icom and MFJ it was possible to equalise the equipment, existing antennas were to be used.

Element of Chance

In order to introduce an element of chance, teams were assigned to stations at random. We found out after the event that John's station was originally on the reserve list, being considered marginal. When Steve and I arrived we felt we would have problems working JA, VK and the Pacific, as we were some way down the slope of a hill. Conversely, the take-off across Lake Washington, from the six element TET tribander mounted on a 24ft pole on the roof, looked promising towards the rest of W and Europe. After the contest we had reports that ours was not amongst the strongest signals from Seattle.

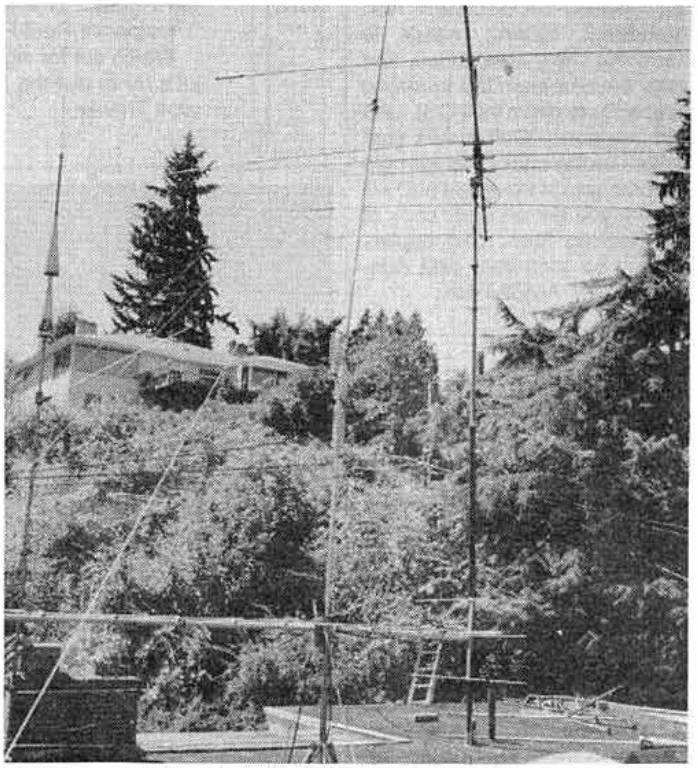
At 4pm on Thursday we met all the competitors for the first time at the pre-contest reception. It was a great treat to meet top operators such as UA1DZ, RB5IM, YT3AA, OK1RI, VE7CC, VE7SV, K7JA and JE1JKL (the organisers also made an impressive line-up K7SS, OH2BH, K3EST, OH2MM, UW3AX, W6OAT), which made us realise the magnitude of the challenge. It was all very well to say that coming 22nd out of this prestigious 22 would not be a disgrace, but we contesters don't see it that way!

The adjudicators announced their intention of being able to announce all placings at the awards banquet on Monday night, a mere 66 hours after the competition.

During that evening's buffet there was a noticeable lack of drinking compared with the previous night. We were all fired up and taking it very seriously, but having tuned the bands we all felt it would be likely to be a 'QSO party' - a slow contest, with 400-500 contacts possible in 10 hours.

By eleven the following morning we were at John's QTH. The bands were in poor shape so we set about making 'dup' sheets, so that if the contact rate was slow we would be able to 'search and pounce' for new contacts. Steve and I agreed to operate each hour alternately, with the second op. using the IC735 to check the other bands and mode for activity and especially for 'counters' - like contest multipliers but adding points value, rather than multiplying the total score. The receive antenna was a Butternut vertical which we had tuned 'on the nose' the previous day. The drawback was that it was only about 10ft from the transmit antenna, which with modern synthesized rigs isn't enough.

Forty-five minutes before the start, call-signs were assigned to each station. We were lucky to be allocated a good call-sign: K7SS/WG. All twenty two competing



Aerials used for the UK entry. The Butternut vertical connected to the second receiver is on the left.

The winners: K1AR and K1DG (right).

stations would sign /WG to make them attractive to others in the contest.

They're Off!

Because we expected a slow QSO rate, I put into the IC765's memories the frequencies of other /WG stations who were 'warming up', planning to get ahead by picking up these local QSOs first. The countdown was given on a 2m repeater, and we were off.

I started calling the stations in the memories, but they went back to piles of other callers. After four minutes, I only had three contacts in the log, and it was clear that this wasn't going to be a slow contest at all. Throwing the 'dup' sheets to one side, I started CQing on 14MHz CW and worked 15 stations in 7 minutes, followed by a move to SSB to work a 9Y4 which Steve had found on the IC735. I then sat on 14.238MHz and had no trouble 'running' Ws such that the serial number after the first hour reached 137. It was warming up nicely, and Steve needed a large crowbar to lever me out of the operating position for his turn.

We continued running W for most of the contest, filled in with occasional surprises such as HP, CX and TF for valuable counters. Overload on the receive antenna limited the effectiveness of the IC735, but we pressed on, passing counters to the first operator who would key in the frequency to the second VFO to pick it up, then switch back to the pileup. We also used the IC735 to keep track of serial numbers given by the other /WG stations, and although the K1AR and K7JA teams were ahead, we were still well in touch with the rest of the pack. US and European stations went for this contest in a big way. Non-/WG stations could work each other for one point, but if they worked a /WG they scored fifty points, and double on CW. This was why, with only 100W, we could run such pileups.

DX propagation remained poor for most of the contest, so we followed conditions to optimise W QSOs, and switched mode or band as soon as the rate dropped. I had a spell on 21MHz CW working three per minute, and Steve had a similar experience once 7MHz opened for W QSOs, around 0430z. It always seemed to me that the pileups would 'hot up' on the hour, just as it was my turn to hand over. I finished one hectic hour to find a cameraman and sound recordist making a documentary about the championship, and gave them an interview while still 'high' from the thrill of the pileup.

In our pre-contest planning, we had identified Europe as a rich source of counters, and I began to get concerned at the lack of propagation. I was picturing the DX and contest fraternity in the UK obligingly staying up on Friday night to work us, and wondering where we were! The first worked was G0MFO at 0058, followed by G4ELZ. There were no more until G3NKS at 0250, then nothing until G4BUE at 0512, after which came G3XTT, G3ZAY, G3WPF, GU0ELF, G3RZP, G0BMU, G0DQS. We know many others were looking for us, but our paths didn't cross. Mention should also be made of Bob, EA8/G0KPW, our best DX on 21MHz.

An ancient Chinese curse is "may you live in interesting times". The last half hour was interesting! 14MHz had at last opened to Europe and we picked up a few counters, including ZS off the back of the beam. Then I heard a VK and got Steve to turn the beam, at which point I heard CT1BOH call someone else, so we left the beam on Europe and, with two minutes to go, OH0BDA gave us a welcome counter. We worked UA0 near the end, but no JAS. At 0700z (midnight local time), the contest finished.

For the logs to be processed in the next 66 hours, they were to be submitted on disk. As we completed each page of log paper, John keyed it into a modified version of the K1EA software. He was also responsible for taping the contest. At 0700z John finished keying in the last page, then we called in our approximate scores. We reported 1224 QSOs and 60 counters, both good figures.

Our work, however, was not over. After a very welcome meal, we returned to the shack to check the entry of each of the QSOs on the computer which we felt to be essential. John had experienced trouble with our writing so there was a large number of 'typos' to be corrected. We were both dead tired, and at one point I fell asleep between reading out successive QSOs from the computer. We then re-checked the counters, which yielded one we had missed, making a claimed score of 757 SSB QSOs, 464 CW and 61 counters. We finally crashed out at 5am, only to have to wake at seven for the journey to the Northwest DX Convention in Portland, Oregon.

The date of the Northwest DX Convention had been changed to coincide with the WRTC and we were the guests of honour. The Convention was much like the RSGB HF Convention at Oxford. There were two lecture streams, but the main interest was socialising, putting a face to the many familiar callsigns from W7.

Steve Dove, G3YDV, operates KA7MCX's station.

After the speeches, I renewed an acquaintance with Dale, K5MM/7 (active as GU5CIA a few years ago). He introduced me to Joe Rudi, NK7U, who used to be a top professional baseball player, equivalent to, say, Geoff Boycott being a prominent and active contester and RSGB member - an enormously positive image for ham radio.

The judges were W6OAT, UW3AX, OH2BH, OH2MM, K3EST, K6NA and N6AA who, between them, had visited all the stations during the contest. They got little sleep that night, spending all their time analysing the logs and identifying busted calls.

Next morning, the high claimed scores were announced. The team of brothers-in-law K1AR and K1DG were ahead, followed by K7JA/W9RE, LZ2PO/LZ1MS, KQ2M/KR0Y, DL5XX/DJ6QT, VE7CC/VE7SV, then G3YDV/G4BUO. So, subject to checking, we had just scraped into the top third of the world's contesters represented in Seattle.

The following day we returned to Seattle by way of Olympia City where we were introduced to the State Governor, and given lunch by the Olympia Radio Club. The award dinner and ceremony was held in the reproduction Indian Village on Blake Island, Seattle.

The Results

The LZ team had lost points due to a larger number of busted calls than the other teams, resulting in a 'clean sweep' for the USA, with K1AR/K1DG being declared World Radiosport Team Champions. VE moved up to fourth, DL fifth, LZ sixth, G seventh. The atmosphere was very positive: most of us wanted to have another event straight away! The Russians had committed to host another WRTC at the next Goodwill Games in Leningrad in 1994, but several felt that if a suitable international event could be found in 1992 to which the WRTC could be tied, the interval of two years would be about right.

The following evening there was much leave-taking, with plans laid for DXpeditions, schemes for bigger antennas, and wishes of luck for the next contest.

There will undoubtedly be more WRTC events, but it was a special honour to be involved in the first, made possible by the hard work of our W7 hosts. Although coming 7th out of 22 is very creditable, like all true contesters Steve and I want to have another go, because we *know* we can do better.

Dayton Hamvention 1990

A pilgrimage by Erwin David, G4LQI

FOR YEARS, I HAD heard on the air and read in the amateur press about that biggest and gaudiest of all the radio rallies, the annual 'Hamvention' in Dayton, Ohio. Being a flea market addict of long standing, I may be forgiven for scheduling a long-planned holiday in the USA so that my non-addicted XYL Esther, G7EOE, and I would be close to Dayton during the last weekend in April.

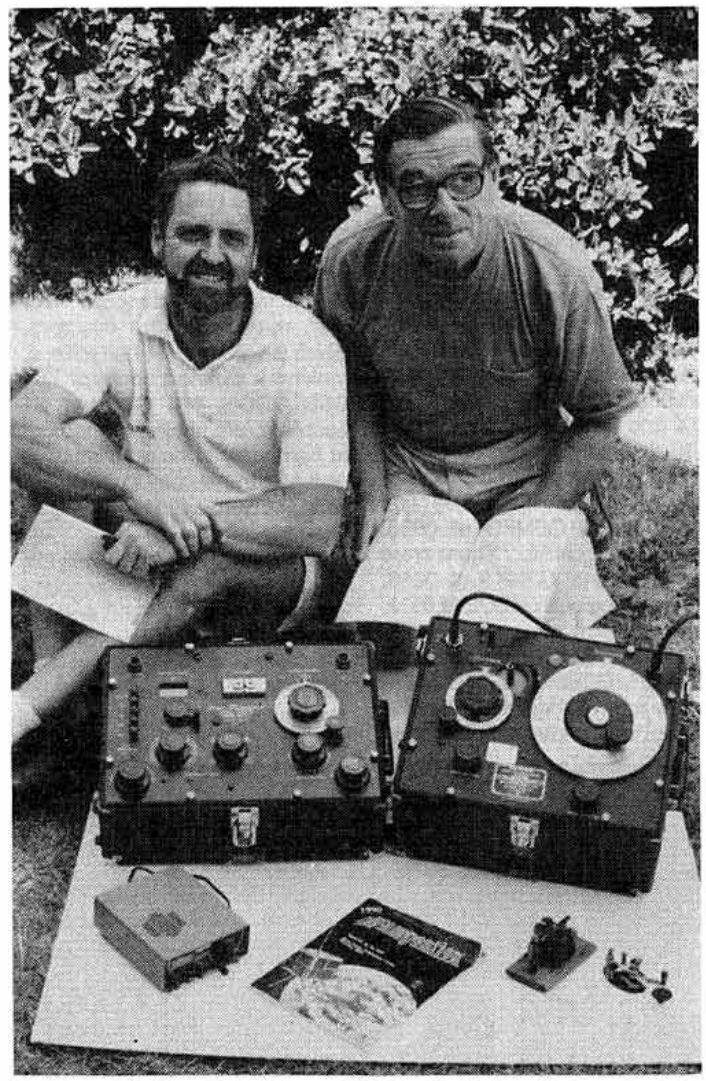
The arrangements were easy. From frequent QSOs with my old Toronto friend Peter, VE3JPP, I knew that his South Pickering Amateur Radio Club arrange an annual expedition to Dayton to which non-members are welcome if space is available. Having done it for years, SPARC can be relied upon for a perfect job of organization. The price was right too. One hundred Canadian dollars per person for the coach trip of nine hours each way, and two nights in a motel in a double room.

Reservations having been made several weeks earlier, I was one of 42 boarding the coach, and by 10pm Thursday we were on our way. First stop, and the most eventful one, was at the international bridge which linked Windsor, Ontario, with Detroit, Mitchigan. Two members of the coach party could not satisfy US customs and immigration, and the coach was forced to turn back and drop them on the Canadian side of the border. For UK visitors, a full British passport and US visa are required.

After 10am on Friday we finally arrived at our motel from where, upon checking in, we took the Hamvention shuttle bus for the half-hour ride to our destination. The arena, designed for ice hockey or basket ball, was now packed with the stands of the most prestigious manufacturers of radio gear. Three other major halls were filled with the stands of manufacturers, organizations, publishers and caterers. In all, there were 657 indoor stands. In seven lecture theatres, the states of the many amateur radio arts were being expounded non-stop.

The UK was well represented. On the RSGB stand David, and Rosemary Evans (G3OUF and G0NDB) were doing brisk business. The G-QRP club had a stand manned by Rev George Dobbs, G3RJV, Ian Keyser, G3ROO, and Dick Pascoe, G0BPS. All three featured in the QRP lectures, and the sales of Kanga kits were said to be most satisfactory. G3ROO boasted of his flea market acquisition, an 1890s morse key.

Outdoors, along 16 aisles, there were 2000 flea market pitches occupied by over 1200 small dealers, individuals selling their surplus, clubs operating bring and buy stalls for their members, vendors of trinkets and toys, and a whole marquee where an incredible variety of hardware was sold by weight at $1.25 per pound. At first, I spent several hours walking five flea market aisles with Canadian friends, then went inside for the antenna lecture series. That, after the night on the coach, was my quota for the Friday. A good meal, albeit with terrible beer, and an early night refreshed me for the 6am(!) opening of the flea market on Saturday. All morning I 'worked' the outdoor stands, only coming into the halls during a spell of rain. I returned to the flea market in the afternoon.



The author (right) and Ian Keyser, G3ROO, with their spoils from the 1990 Dayton Hamvention.

In the penultimate aisle it happened. There, under a table which seemed to have been sold almost bare, I spotted the cases of two General Radio RF bridges, the kind I had used professionally in the Canadian Arctic in the 1950s; These were the finest instruments of their day, and so expensive at the time that an amateur could only dream of owning one. A quick inspection under the mouldy lids showed immaculate instruments, connection cables in their clips, and a last calibration sticker dated 1968! Still doubting my luck, I tried to hide my excitement and asked "how much?" - "Fifty bucks the pair" if I would take them both! Scared that the vendor would come to his senses I plonked down my $50, picked up the cases and ran - at least a little way as they weighed 65lbs between them - then staggered on to the shuttle bus for my final departure from the scene.

The rest is almost an anticlimax. The Dayton to Toronto return trip took all of the Sunday but passed without incident. All heeded the 'friendly suggestion' from the organizer not to try to smuggle any purchases over the $300 duty free allowance.

My two instruments, strapped together with strong tape, neatly fitted within the transatlantic baggage limits of size and weight. I now only have to contend with the XYL who also has set limits. For every black box I bring in to the house I have to take one out, and I doubt that she will count the two for one just because they arrived taped together!

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RSGB 1991

National Convention

and

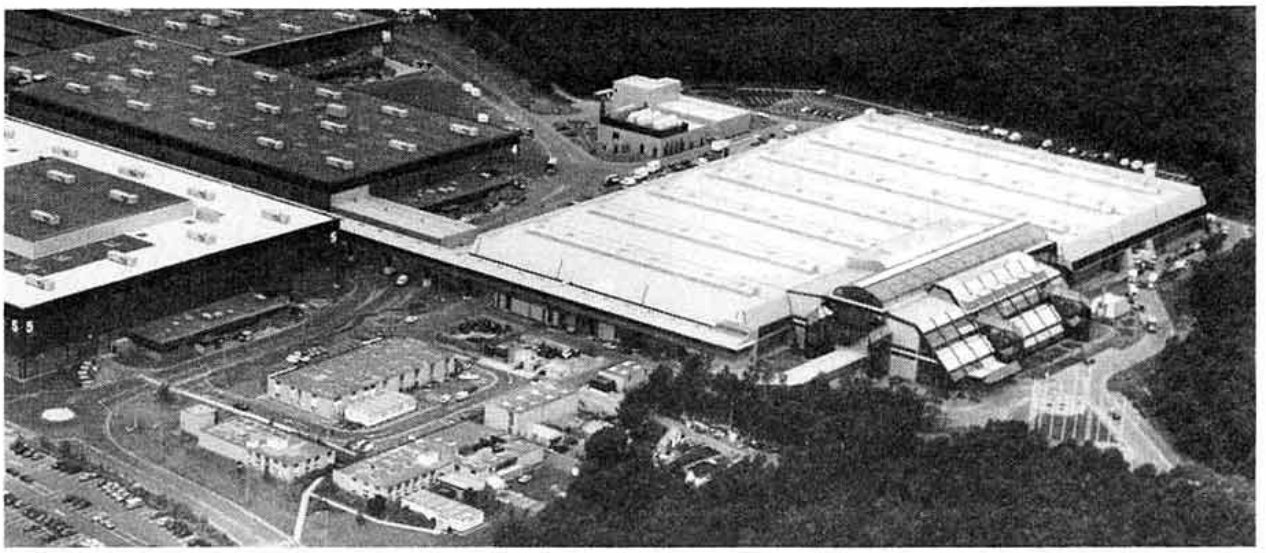
Amateur Radio Exhibition

at the

NEC

Saturday 27 April - Sunday 28 April

HALL 7, NATIONAL EXHIBITION CENTRE, BIRMINGHAM



RSGB 1991 LOTTERY PRIZE DRAW!

- Launch of Novice Licence
- RSGB Committee Representation
- Lecture Programme (Saturday only)
- Large Component Stand Area
- Large Trade Exhibition
- Morse Tests (Saturday only, by appointment with RSGB)

Opening times:

Saturday 27 April, 10 until 6
Sunday 28 April, 10 until 5

Talk-in on 2 metres, S22

Entrance fee: £3. OAP's, disabled and children: £1.50, (includes free parking and shuttle service to Hall 7).
Children under 12 years of age accompanied by an adult are free of charge.
Concessionary rates for groups of 25 or more.

Organised by the RSGB Exhibition Rally Committee.

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

HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham
B17 8QB

A NON-MEMBER of the Society has passed along information that there is a blind and severely disabled amateur in Germany who is looking for UK stations who can talk with him in his own language. He is Hans, Y72TG, and he frequents 7.085MHz in early mornings and at weekends. Here is a chance to make someone else happy.

The **1990 28MHz Countries Table** finished with three entrants working more than 200 countries during the year. Congratulations to **G4VVP** who contacted 208 and beat nearest rival G4MUW by one! G4MUW actually *heard* another 22 so the top score *could* have been higher. The first 1991 table appears below - but will 200 be possible this year?

THE DX COMPANION

OR HOW TO WORK YOUR FIRST 100 COUNTRIES

I OFTEN WONDER how many newcomers become disillusioned when they listen around some of the HF bands and I wish that they could get more encouragement. This is a new book - written by Jim Kearman, KR1S, and published by ARRL. It is 124 pages (A5 size) of valuable and practical information on how to get infected with the DX bug ! It shows that you *don't* need state-of-the-art equipment to chase DXCC and that it can - and should - be fun. The first sentence of Chapter 3 - 'What do I need to be a DXer ?' illustrates what I mean. It reads "Exotic set-ups are much more photogenic than a barefoot transceiver in the basement, so they get better coverage in the magazines. Believe it or not, even if you don't yet own a radio, you already have the most important ingredient of an effective station. You, the operator, with an interest in the subject and a willingness to learn. If you maintain this attitude, I guarantee you will be successful, even if you don't have a cover-story station". The book is available from ARRL, 225 Main St, Newington, Conn, 06111, USA, price US$6.00 plus US$2.50 for postage. I strongly recommend it for newcomers.

AWARDS

AGCW-DL HAS notified that it now has a new manager for **AGCW-DL Diplomas and Awards**. This is Tom Roll, DL2NBY, Alter Ansbacher Berg 5, 8805 Feuchtwangen, Germany. I can supply a list of awards available (SASE please).

PANAMA INTERNATIONAL AWARD

Sponsored by LPRA and available to all licensed amateurs who have confirmed contacts with all nine HP call areas since 1 January 1978. Up to three call areas may be substituted by cards from the club stations HP1LR - HP9LR. Send copy of log extracts or full details of QSOs, plus US$3.00 or six IRCs to LPRA QSL Bureau, PO Box 175, Panama 9A, Panama.

EUROPEAN WORLD WIDE AWARD

For 200 contacts with different countries on the official EWWA countries list on or after 1 January 1980. CW, phone, or RTTY (separate awards). There are five-band (100 on each of 3.5, 7, 14, 21, and 28MHz) and nine-band certificates (which include the WARC bands), and the Top List HF EWWA needs 292 confirmed countries. The last three include a mixed class. For full details please write to: Conseil de l'Europe, Services Audiovisuel - CERAC, Mr Kremer Francis, F6FQK, BP 431 R6, 67006 Strasbourg Cedex, France.

CONTESTS

G4FRE/WG3I - after reading the December column - has written to say that he did in fact enter the QRP section of the **1989 CQWW SSB Contest**. It seems that in the results table there is a G4RFE listed with almost the same points total as he made - obviously a case of confused identity by the contest checkers ! A second correction has been received from Andy, **GM0ECO**. He entered the **ARRL SSB DX Contest** last March and sent in an 80-page log (on disk) listing 3,200 QSOs and claiming 2,213,931 points - which got mislaid in the contest checking department! All has now been resolved and he is in fact leading UK station and fifth in Europe in the single-operator multi-band section.

JUBILEE HELVETIA CONTEST 1991

1300 27 April to 1300 28 April

CW and SSB - mixed mode only. 1.8 to 28MHz (no SSB on 1.8MHz) following IARU contest preferred segments on 3.5 and 14MHz. Exchange RS/T and serial number from 001. Each QSO with Switzerland counts three points and a station may only be worked once per band. The multiplier is one for each of the 26 cantons worked on each band. Final score is points multiplied by total cantons worked on all bands. Special certificates will be given to those scoring at least 20% of the score of their country leader. Use separate log sheet for each band, enclose a summary sheet and a signed declaration that all rules have been observed, and mail before 1 June 1991 to Walter Schmutz, HB9AGA, Gantrischweg 1, CH-3114 Oberwichtrach, Switzerland. In the 1990 contest **G3ESF** scored 16,128 points, G4IQM 14,700, G0HZX 5,586, and G4RTO 2,592.

BERMUDA CONTEST

0001 16 March - 2400 17 March

Operating time must not exceed 36 hours, and off periods must be logged and be of not less than 3 consecutive hours in duration. Single operator and stations *must* operate from their own private residence or property. Top winners from 1986, 1987, 1988, 1989, and 1990 are eligible for area awards only this year. 3.5 to 28MHz phone and CW but no cross mode. Stations exchange RS/T plus UK county, Bermuda parish, US state, and VEs their province or territory as appropriate. UK stations work only Bermuda, Canada and the USA. Each QSO counts five points and a station may be worked on CW and SSB on the same band provided that more than one hour has elapsed between the QSOs - in this case a multiplier of two may be claimed. Each VP9 worked counts as a multiplier on each band and QSOs with Novices (VP9Ns) count as two multipliers. The top scorers in Canada, the USA, UK, and Germany will receive a trophy - the top US/Canadian and UK/German stations receive trophies to be presented in Bermuda in October during an all expenses paid visit to the island. Top scorers in each UK county will receive awards provided that a minimum of 100 QSOs (including five VP9s) are worked. I have copies of the rules, and if you are entering this contest seriously I strongly recommend that you ask me for a copy (SASE please).

Tanya and Nick Troshinsky, UA4NBH (centre) with Sue and Dave Lane, G3VOM, outside one of the Kremlin towers.

DX NEWS

CT3DJ IS THE callsign being used by OH2SX in **Madeira**. He leaves next month. If you need **Franz Josef Land**, 4K2OIL seems to occupy 10.105 or 18.072MHz after 2000, and 4K2BCA has been worked on 14.195MHz at 1230. 4K2/UV3CC is due to leave this month. During March IJ4R will be on the air to celebrate the 140th anniversary of the birth of Marconi's assistant A Righi.

DX-NL says that VK6HD now has a new 1.8MHz antenna following his recent change of QTH. Mike is said to be on 1.827 or 1.832MHz at sunrise (in VK6) and following this he moves to 3.502MHz or slightly higher. SM5BQB will stay in **Fiji** as 3D2QB until May. He likes CW and 21.011MHz (or 21.170MHz SSB) are mentioned as good places to look for him.

If you are looking for **S Georgia** try 21.215MHz on Monday or Thursday when VP8CDJ meets QSL manager GM4KLO. ZS8MI on **Marion Is** is now to be found

on 14.226 or 14.260MHz at 1300, 21.246MHz at 1630, and 7.047MHz at 1900. V51KC in **Namibia** alternates between 18 and 24MHz and has been on 18.149MHz at 1000. Married duo ZD9BV and ZD9CO, on **Tristan da Cunha** can be found most days on 28.450MHz at 1300 according to the *Long Island DX Bulletin*. The same news source says that Iris and Lloyd Colvin were scheduled to be back home in the USA by 22 February. Their Walvis Bay operation produced over 8,000 QSOs with 152 countries and they hoped to visit 9U and TN on their way home.

XF4F on **Revilla Gigedo** seems to like 14.030MHz around 0200. There are rumours that an expedition to **Navassa Is** is being planned by WA4JQS, W5IJU, and others late this month. This seems to be a group of those who tried unsuccessfully to get to South Sandwich. The callsign may be W5IJU/KP1. To commemorate the 100th anniversary of Ukranian settlement in Canada special prefixes may be used between 1 March and 30 April. These are VO1 = VO7, VO2 = VO8, VY1 = VC1, VY2 = VC2, VE1 - VE8 = VA1 - VA8, and VY9 = VC9. A special event station, VA1OOU will be on the air on all bands.

FT4WC, on **Crozet Is** often appears on 14.160MHz at 1900 and 2100 joining in list operations and he is also to be found on 28.510MHz around 1500 and 21.270MHz at 1530. If you hear TJ5CW or TJ5YL these will be F6EEM and F6FYP respectively who were due to show up in the middle of February from **Cameroon**. ZS8MI, **Marion Is** has been found on 7.047MHz around 1900, 18.132MHz at 1600, 14.226 or 14.260MHz at 1300, and 21.246MHz at 1630. There is a new operator at HF0POL in the **S Shetland Is**. This is Henry, SP3FYM. He has 500W available on CW, SSB, RTTY, and packet and a Yagi beam as well as a rhombic which works from 1.8 to 28MHz. 8J1RL and 8J1RM are located in Japanese Antarctic bases - according to **DX-NL** there are 11 amateurs in the present crew of 55. K2BPP is now on **Ascension Is** and will be there for several years. His callsign is ZD8DX and he should soon be on all bands. Meanwhile, he seems to appear quite often between 28.450 and 28.500MHz around 1300.

DJ4OI, DJ1UJ, and DK7UY should still be on the air from **Cocos-Keeling Is** as VK9YD, VK9YE, and VK9YB respectively when this reaches readers, but about to move on 6 March to **Christmas Is** to become VK9XC, VK9XE, and VK9XA. The operation is scheduled to finish on 7 March and uses mostly CW near lower band edges and, on SSB, .195 or .495MHz. Another expedition just about to finish is that by DJ5CQ and Y21RM who should be on **Lord Howe Is** until 6 March as VK9LA. VK9LM, and AX9LM - mostly on CW just above the lower band limits. *DX News Sheet* notes that computer logging will be used and that 'insurance' QSOs are therefore not recommended. N4QMX will probably be on the island this month also. 1991 is 'Visit Indonesia Year' and special stations 8A6's INA, NIN, ONE, VST, and YER will be on the air on all bands/modes. XW8KPL in **Laos** is said to be found on 21.230,, 21.260 or 28.470MHz between 1100 and 2000 particularly on Fridays.

For some of the above items I would like to thank the *Lynx DX Group Bulletin* (EA2KL), *DX'press* (PA3CXC), *DXNL* (DL3RK), the *Long Island DX Bulletin*, the *RSGB DX News Sheet* (G4DYO), and the *Ex-G Radio Club Bulletin* (WA8TGA).

Please let me have everything for the **May** issue by **27 March**.

EIGHT-BAND TABLE No 5

Call	1.8	3.5	7.0	14	18	21	24	28	Total
G3KMA	138	256	311	322	215	321	200	312	2075
G3XTT	161	220	270	309	156	301	130	278	1825
G3GIQ	70	210	272	321	140	319	119	304	1755
GM3PPE	68	164	178	240	162	234	128	211	1385
G3NOF	5	100	104	320	115	321	104	288	1357
G3TXF	69	167	213	289	11	284	9	246	1288
G4OBK	124	156	203	279	34	252	11	227	1286
G3JJG	51	102	186	226	131	253	114	199	1262
G3JXN	33	84	138	218	99	218	80	244	1109
G4NXG/M	1	32	64	210	49	227	77	216	876
Average	72	149	194	274	111	273	97	253	1422

Next deadline - to reach G3GIQ by 8 April - *and please remember to delete all countries which no longer count e.g Y, 4W, and 7O*

28MHz COUNTRIES TABLE - 1991

G4MUW	55	G4XAH	18	(RTTY)
G4DXW	40	G0DUS/M	16	
GM4CHX	35	G4NXG/M	3	

FINAL 1990 28MHz COUNTRIES TABLE

G4VVP	208	(SSB)	GM4OBK	131	
G4MUW	207	(SSB)	G0MXU	115	
GM4ELV	201	(QRP)	G2AKK	113	(CW)
G0JZU	196		G4SJG	104	
G4DXW	193		G0DUS/M	94	
G4ZYQ	165		G0CKP	79	
G4NXG/M	155		GM4CHX	75	
G0KDS	144		GM4ZIL	63	

QTH CORNER

VE7DGM/A7 via DA2CF, G.H.Newman, CFPO 5000, Belleville, Ont, K0K 3R0, Canada.
ED0BOD EA4BOD, Delfin Vall Muniz, Ronda del Sur 107 7, 28018 Madrid, Spain.
FT4WA (see FT4WC)
FT4WC F6GVH, Box 35, Villemandeur F-44700, France.
RC2CB (see UC1AXI)
UC1AXI M.S.Terentev, PO Box 166, Minsk-114, Byelorussia 220114, U.S.S.R.
VS6VO P.O.Box 12727, Hong Kong.
XQ0X CE3ESS, Mickey Gelderstein, Box 9834, Santiago, Chile.
YA0RR Roman Stapenenko, Box 812, Sofia 1000, Bulgaria.
ZL0AAD/ZL7 DJ1ND, Klaus Dittmar, Huehlweg 45, D-8580 Bayreuth, Germany.
ZS9Z ZS6BCR, Chris Burger, Box 4485, Pretoria 0001, S.Africa.
3X1US Box 603, Conakry, Guinea.
5R8GN IK2GNW, A.Premoselli, Via Rossini 2, I-20080 Cisliano, Italy.

BAND REPORTS

More requests for this section to continue were received than against it - so it stays, at least for the time being. Virtually no reports of 10, 18 or 24MHz this time and with the present method of presentation I have left them out to save space.
Thanks to the following for sending in logs:- G2HKU, GM3CSM, G3's GVV, KSH, LPS, YRM, GM4CHX, G4's DXW, GW4KGR, MUW, NXG/M, VVP, XAH, ZYQ, G0KDS, the UK Packet Cluster Network, and Jim Bertram - who forgot to give his callsign! As usual CW stations are in italics:-

1.8MHz
0000 *TF4LB, PY1RO, VO1NA, 9L1US*
0800 *AD6C, HI8DMX, N6DX, V73AZ*
1700 *UH8ET*
2000 *U0AG, VK3IO, VK3LC*
2200 *JA4CQS, VE1ZZ, VK6HD, W2QD, 4X4NJ*
2300 *FG5R, HV3SJ, OY9JD, YA0RR, ZB2FK*

7MHz
0000 FG5FC, HK0DEP, *YA0RR*
0200 FY5EK, XQ0X
0800 KL7XD, N6DKP, PZ1DZ, UA0FF
0900 *P40Y, XE1TD, ZL0AAD/ZL7*
1500 *K6DC, KV0Q* (Col), *N7UA, 9N1HMB*
1600 *FO0CC, VE7SV, W6TC, YC0HML/3, 9V1WW*
1700 AP5HQ, *V85AA, 3W8DK, 4K4QQ*
1900 A92BE, *JA, VS6BI, ZS5BK, ZS6ANL, VK2AXR,* 4S7RO
2000 *C9EC,* EA8PP, UG7GWG, *YA0RR, Y90ANT*
2100 *HL1CG,* PY0FF, TJ1MR, VU2TEC
2200 BV2AL, FM5BH, *HI8A,* YA0RR
2300 *VS6BG, 3B8FP, 4K2OIL, 6W1PZ*

14MHz
0700 *FK8FG, 3C1EA, 4K2/UV3CC*
0800 KL7, V63NW, VR6KY, YJ8RN, 3D2FH
0900 FO0IGS, T31KY, *OE8NOK/ZL5, 4K4POL*
1100 ZL0AAD/ZL7
1200 HH4MB, V63NW, V63WB, *4S7CF* (LP)
1400 *FK8PS, P29AC*
1500 ST0DX, VS6CT
1600 FT4WC, *KL7HF, ZL1AQB,* 4K2/UV3CC
1700 *TU4CO/TT8,* 5R8GD, 3B8FW
1900 *KH6IJ, Y88POL,* 5R8GN
2000 FT4WC, ZS9A

21MHz
0800 BY1QH, 5RY, JD1ABZ, V63NW, YA0RR, ZL, 9L1NS
0900 BY4RSA, 5RA, 5SY, P29NOD, XW8KPL
1200 *BV2A,* V63WB, YA0RR
1500 SV2ASP/A
1700 KH6IDU, 7Q7RM
1900 KL7TC, ZD9CO, ZL4BO
2300 *W6, W7, Y90ANT, ZD8RJ, ZS7ANT*

28MHz
0800 VS6VO
0900 BY5RT, QW, HL9RY, JH1MAD/JD1, VQ9HW, XW8KPL
1000 BV2AL, KE9A/DU3, J6LQC, XU8DX, YA0RR, ZS9Z, 9Q5XO
1100 JX7DFA, VU2OO, 5N8HKC, 5Z4BI, 8R1RBF
1200 A61AD, A71BK, A92EV, YA0RR, 4K2/UV3CC, *3W4DK*
1300 A92BE, HZ1JN, OH0NJ, *TR8GL*
1400 XQ0X, *3B9MW,* 5R8GN, JD, 7Q7RM
1500 V21ZL, ZS4NS/ZS9, 3DA0AY, 7X6DG
1600 *C9EC, FP5DX, XE2MX,* ZF2EZ/8
1700 FO0IGS, TU2QQ, V31DX, VR6BX, ZD7BC

Propagation NEWS

Compiled from reports supplied by G3FKM, G3FPK and the Propagation Studies Committee

GEC-MARCONI Research has introduced a microcomputer based bulletin board. This has a direct connection to the British Telecom network. The number is (0245) 76233. To access the board a prospective user requires a PC or home micro computer, together with a modem and software which provides a viewdata (Prestel style) terminal emulation with settings of 7 data bits, even parity, and one stop bit.

The user will see a frame asking for an identification/password. It has been arranged that amateur service operators should use their callsign to gain access to the information pages. Users will then be prompted to press number or CR keys as appropriate.The board contains a daily summary of the previous day's HF skywave MUF variations, the daytime LUF, shortwave fades, geomagnetic index, sunspot number, and 10cm flux value, together with a comment on general HF conditions. This is followed by a forecast of some of these parameters for the succeeding 24 hours.

For the next few months access to the bulletin board will be granted free of charge by G-MRC.

HF

THE REPORT from G8KG this month is very brief and to the point. He says: "There has been little change in the levels of solar activity in the past month with the 27-day average solar flux gently fluctuating in the 190 to 200 region and the geomagnetic field generally quiet so that conditions on the higher bands have been mostly good."

50MHZ

IN THE COMMENTARY TO his December report Ray Cracknell, G2AHU, states that this ". . . has so far been a relatively poor season for F2 propagation, although solar flux/sunspot numbers were reasonably high and the A index encouragingly low. December showed a very similar pattern to November, exhibiting good conditions from the 5th to the middle of the month over the period when the solar flux was high. This followed one solar rotation after the November high, and the one aurora on the 24th, just 27 days after the one on 27 November."

Comparing the 1990 results to the Americas with those of December 1989 clearly shows them to have been noticeably down. Openings to the various call areas in daily percentage terms, with the 1989 figures in parentheses, were: VE/VO 55(93.5), W1-4 48(90), W5,8,9,0 16(55), W6/7 0(10), FY7THF 26(45), HC2/5 16(58) and KP2/4 6(48). This pattern was not repeated on 28MHz, though.

The aurora in the afternoon of the 24th brought propagation from the UK to LA and OY, while the evening phase provided G, GM and GW contacts. Auroral-E was reported in North America that day. Winter Sporadic-E propagation occurred on ten days in December, some of those events being chronicled in last month's *VHF/UHF News*.

In a letter dated 5 January from Pretoria, Hal Lund, ZS6WB, wrote: "The band has been almost completely dead here since mid-November when the last Gs were worked. In the last six weeks there have been about half a dozen evening openings to the Mediterranean with CN2, F, I, TA4, SV and 9H worked in that period." Hal found 1990 a disappointing year as he ". . . had hoped for more JAs and more activity on the east/west paths." However, based on the experience of Jack Kruger, ZS6LN, who was active in Cycle 21, propagation could be better a year or two *after* the peak of this cycle.

HF F-LAYER PROPAGATION PREDICTIONS FOR MARCH 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	....467762..	...1688884..	...38999971.	...68888993.	311776667985	8655433457799	8752111125 78	+42.....25+
MALTA	....677774..	....8888861.	...29999993.	1..588889962	5318766789 97	9977544458 99	8974211136 89	++5.....3++
GIBRALTAR	....155453..	....3777761.	....7998983.	88889961	32.387777996	8857654457 99	9986322225 89	+++3.....2++
ICELAND	......2221..	.....24453..	.....577861.	....2788884.	1...57778883	7524654567 88	9976322235 68	+++3.....23+
** ASIA								
OSAKA	....461.....	...1673.....	...287421....	...375433211	...152125653	....2...2574	351	..........2.
HONGKONG	...278862...	...3788742..	...26766751.	...145457731	2...12125875	2.......2687	364	..........3.
BANGKOK	...3788872..	...4788884..	...24767871.	25457842	3....2125886	4.......2688	1.........367	34
SINGAPORE	...4788882..	...4688894..	...23667871.	1...15457842	3....2125886	3.......2688	1.........366	33
NEW DELHI	...488884....	...578886....	...44566821.	1.1223447542	521...115787	73......2689	61........367	3.........34
TEHERAN	...5888982..	...7778895..	...644668821	2.2522457853	7342...125888	973.....2689	751.......367	52........34
COLOMBO	...5888983..	...5678896..	...334668831	2...1.2457953	62....125898	72......2689	5.........367	2.........34
BAHRAIN	...68+8984..	...77788961.	1..644668842	312421347975	8541...115899	973.....2689	75........367	52........34
CYPRUS	...4999996..	...69999982.	1..888889952	411876778985	866643456899	996311124789	8841.....1478	+5.........4+
ADEN	...6++++971.	1..766789842	311633468975	632411247998	9751...15899	983.....2688	761.......367	53........34
** OCEANIA								
SUVA/S	.....2332...	.....35542..	....2566751.	...14545772.	...45212572.	...42...25..	...1.....2..	....
SUVA/L	32..532..275	43.175311486	332486433774	113774335861	..2752.1473.	...42...15..	...1.....2..	....
WELLINGTON/S	....14543....	....367652..	...16666751.	...37545772.	...65212574.	...32...252.	...1.....2..	....
WELLINGTON/L	32...2.....24	43..41....46	442272...166	3345731..374	.13652..2651	...42...152.	...1.....2..	....
SYDNEY/S	...2787741..	...4887763..	...68767871.	...575457831	...252125862	....2...2651	.........32.	....
SYDNEY/L	....21....22	11..531....44	221.75211.76	221175222285	...252113573	...12...144.	.........22.	....
PERTH	...5898641...	...5888763..	...466668621	1..145457853	3...12125897	2.......2686	363	.........3.
HONOLULU	.........2..	.........141.	.....21.462.	....1321572.	.112421155..	..352...22..	..13.....	....
** AFRICA								
SEYCHELLES	...56688562.	1..666787842	311433568975	6322..347998	973....15899	961.....2689	73........367	5.........34
MAURITIUS	...58+++9731	1..666889953	411433568987	742211347999	973....15899	951.....2689	72........367	5.........34
NAIROBI	1..587888843	3..666689975	631633368998	86341.147999	9961...15899	984.....2588	772.......366	54........33
HARARE	2..4788+9964	41.666689987	851633368999	973511147999	9962...15899	985.....2588	772.......367	54........34
CAPETOWN	2..288+++976	41.487789998	84.664458999	972732237999	99651....4799	9972.....1589	784.......267	55........34
LAGOS	42.19++++986	64.286668998	972673337999	995751115999	99872...2799	8985.....589	7762......267	453.......34
ASCENSION Is	32..8+777755	64..97667877	883385334899	9965721.2799	99975....599	88852....279	7763......57	444.......24
DAKAR	22..8+++++84	44..98767997	873286334899	996474112799	999751...589	98862....279	7763......57	444.......24
LAS PALMAS	....69+99951	89999972	33.198888996	663388777998	997776545799	999743212589	88752....268	++52.....3+
** S. AMERICA								
Sth SHETLAND	21...48+++74	53..16888887	863236567788	986455335678	899752.12357	78862.....24	4663.....2	234.......
FALKLAND Is	11..16+++474	33..37887886	763166555688	996475332378	999752...147	89862.....15	6863.....2	354.......
R DE JANEIRO	11...8866773	33..28756786	663147433588	8863652..279	999752....58	98862.....27	7763.....5	543.....2
BUENOS AIRES	11..26+88+73	22..47876785	563177643478	886375311168	9996521...37	89862.....5	6873.....2	354.......
LIMA	......+88862	....1.876664	221.42653246	55416342..27	8985521....5	79863.....2	5773.....	254.......
BOGOTA	888761	1876663	221..2643246	55312442..27	8884421....6	89863.....3	6773.....	354.......
** N. AMERICA								
BARBADOS	.....6+88872	7876684	221.17633377	554135411158	9985521...27	99863.....5	7873.....2	554.......
JAMAICA	887761	876663	11..12653346	442.23431127	8874521....5	79863.....2	5773.....	254.......
BERMUDA	2887861	4876773	11....6653476	432.25431268	8873421...37	89863.....4	6773.....2	344.......
NEW YORK	577751	1787772	1....2665575	331..4442357	77523211..26	78853.....3	5763.....1	243.......
MEXICO	77741	277652	1.....364333	321.21342113	57524211...1	48853.....	1663.....	.33.......
MONTREAL	.....57774.	1677762	1....2665675	321..4443367	77523211.136	78853.....4	4763.....1	244.......
DENVER	.....1453.	26641	1.....46543	22..1..45224	56423.112..2	37853.....	1463.....	.24.......
LOS ANGELES	.....452.	6631	1.....27532	21...1..36322	353131.13...	15853...1...	.263.....	..3.......
VANCOUVER	.....11.	.....132.	3541	21.....15532	34213..14211	25752...1...	.253.....	..2.......
FAIRBANKS	.....	.....	.....1122.	1...21123442	331242114543	23453...2321	.133.....1.	....

The provisional mean sunspot number for January 1991 issued by the Sunspot Data Centre, Brussels was 136.9. The maximum daily sunspot number was 256 on 31 January and the minimum was 79 on 2 January. The predicted smoothed sunspot numbers for, March, April and May, were respectively: (classical method) 124, 122, 120; (SIDC adjusted values) 114, 112, 109.

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

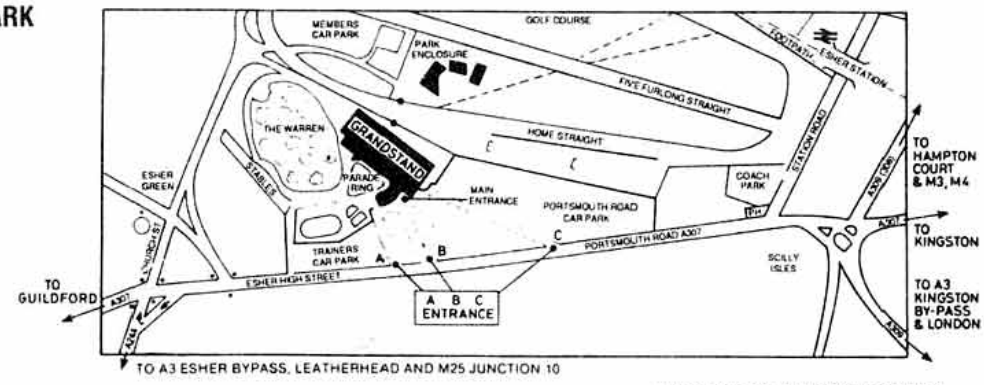
ACCESS MAP TO SANDOWN PARK

RAIL TRAVEL:
British Rail
WATERLOO TO ESHER

TALK-IN STATION:
GB2VHF:
Channels S22 SU22

STAND BOOKINGS:
Les Hawkyard G5HD
Tel: 040-928342

DETAILS:
Geoff Stone G3FZL
Tel: 081-699 6940



Map by courtesy of United Racecourses

RSGB NATIONAL VHF CONVENTION

Sandown Exhibition Centre, Esher, Surrey

LIST OF EXHIBITORS

Andrews Computer Services Ltd
Arrow Radio Ltd
Badger Boards
Barenco
J Birkett
Commonside Hardware Services Ltd
Computer Junk Shop
Dee Comm
Display Electronics
Garibaldi
G4TJB QSL Cards
Gemini Electronics
M Giacomelli
Heatherlite Communications
ICS Electronics Ltd
K M Publications
Martin Lynch
Loutronics
M & B Radio
Marco Trading
Merley Electronic Salvage
New Cross Radio
Newton Engraving
Piper Communications
Poole Logic
Practical Wireless
Qualitas Radio
Quartslab Marketing Ltd
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SGS Electronics
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Syon Trading
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Waters & Stanton Electronics
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WAB Awards Group

LOTTERY TICKETS

Buy your tickets at the RSGB Stand!

A brand new ford Fiesta awaits the first prize winner. There are also Many other excellent prizes to be won.

NEW! from RSGB:

Radio Auroras

During the late 1940s, Scottish and Scandinavian radio amateurs were among the first to notice the strange 'hissing-steam' CW signals emanating from the north during the 'northern lights'. As powerful FM broadcasting was introduced in the 1950s, it was found that long-distance (DX) reception of these stations was possible via the aurora. Soon radio amateurs were using auroras for two-way contacts, to the astonishment of the professionals engaged in atmospheric research, and later on were able to make a significant scientific contribution to our understanding of this fascinating phenomenon.

Charlie Newton, G2FKZ

Radio Auroras tells that story, one of which radio amateurs can be proud, and goes on to give a readable account of how auroras are caused, how they can be forecast, and how best to use them to work DX. All those interested in the experimental side of radio propagation will welcome this unique guide.

Order now, from:

Radio Society of Great Britain
Lambda House, Cranborne Road, Potters Bar, Herts. EN6 3JE
Telephone: 0707-49855

or collect your copy at the VHF Convention

VHF/UHF NEWS

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

WHEN THESE NOTES WERE being compiled, a very large anticyclone was dominating the weather over the British Isles, but it had become very stale and had not produced any enhanced tropo conditions. The Geminids, and especially the Quadrantids, meteor showers were rather disappointing. We really could do with a big aurora to liven things up.

THE 1990 TABLE

GERRY SCHOOF, G1SWH (MCH), repeated his 1989 achievement in heading the 1990 Annual VHF/UHF Table by a substantial margin. Ela Martyr, G6HKM (ESX), was runner-up and Mike Gotch, G0IMG (ESX), came third; they were third and fourth respectively in 1989.

I have shown the top four in each of the five bands. Paul Baker, GW6VZW (GWT), who was third in 1989, was the clear winner of the 50MHz stakes with 48 countries worked, the highest annual total so far by table participants. G1SWH again headed the 70MHz section.

Colin Morris, G0CUZ (WMD), who came top on 144MHz, only missed out on FMH, TYR and one each from OKE, SLD and WIL. The only 'regular' countries not worked were CT and 9H. G1SWH headed the 430MHz section while G6HKM was first past the post again on 1.3GHz. Congratulations to all and I hope you will participate in this year's table, the first appearance of which will be in May.

The primary reasons for including tables in this column are to create some friendly competition between contributors, and generate some activity. However, they also provide a very useful guide to conditions and activity over the year - the better they are, the more points ought to be achieved.

Based on the total points accumulated by the top four, 1990 was down on 1989 on all five bands. In percentage terms the relative figures were: 50MHz, 144MHz and 1.3GHz - 89%; 70MHz - 76% and 430MHz - 68%.

On 70MHz and 430MHz, there were persistent complaints about the lack of general activity. Are there too many licensed listeners waiting for someone else to call CQ?

BEACON NEWS

THE JANUARY ISSUE OF Mark Turner's, G4PCS (BFD), newsletter *2M Direct* includes an item from Andy Steven, GM4IPK (SLD), describing plans for two new Shetland beacons at locator IP90JD. He has been working with John Wilson, G3UUT, the VHF Committee's Beacons Co-ordinator, who has been handling the paperwork with the Society and the RA. Andy wrote: "At present I have funded the entire project myself but I hope to recover some of the cost from VHF operators who use the beacons from the UK, Scandinavia, Germany, etc. by going to the various VHF events and begging."

The 50MHz beacon will run the full UK EIRP beaming NE and SE, probably on 50.064MHz, and the 430MHz one will radiate SSE, probably on 432.965MHz. Andy wants to upgrade the 144MHz beacon GB3LER which at present radiates approximately NNE. He proposes installing two 6-element Yagis radiating NE and SE, running 100W to each using a commercial grade PA. The frequencies of all beacons will be maintained very accurately.

A new 5W Paraguayan beacon ZP5AA (GG14) in Asuncion should now be QRV on 50.023MHz; it appears to employ FSK with the 'keying frequency' given as 50.0245MHz. It was built and shipped to its keeper Doug Woolley, ZP6XDW, by Pat Bunn, N4TLA.

REPEATERS

THE JANUARY *NEWSLETTER* has been received from the Aylesbury Vale Repeater Group and includes status reports on GB3VA (R4), GB3AV (RB2) and GB3BV (RB1). Concerning GB3VB, the Committee is ". . . still putting pressure on the RMG to accept the proposal for this 2m repeater which would be co-sited with GB3BV." The aim is to provide VHF coverage on the M1 motorway between junctions 8 and 16. For details of the AVRG send an SASE to M J Marsden, G8BQH, who is QTHR.

According to Ivan Stauning, OZ7IS, Danish amateurs are planning a repeater network in the 50MHz band. The output QRGs are 51.81, 51.83, 51.97 and 51.99MHz with inputs 600kHz lower. Mobile operation is permitted in Denmark.

MOONBOUNCE

RAY SOIFER, W2RS (NJ), who has been an RSGB member for nearly 25 years, infers I was somewhat pessimistic in November by suggesting that you would only work the very big stations with 100W and a single Yagi. He wrote: "Running 150W and a single 3.2-wavelength Yagi, producing about 37dBW EIRP, I've worked 18 different stations so far on 144MHz EME." They include three 4-Yagi, a 6-Yagi and six 8-Yagi stations.

He continued: "In addition to persistence in arranging and keeping schedules . . . . perhaps the most important aid to successful 144MHz EME for the small station is making use of ground reflection gain, which in my experience can add up to 5dB to signal levels, or even more if it is available on both ends of the path."

Ray endorses Graham Daubney's, G8MBI, advice to use faster CW speeds to make optimal use of signal peaks caused by lunar libration. He uses 15WPM as his standard and concludes: "Under ideal conditions, libration peaks can reach 10dB above normal signal strength. Both ground reflection gain and libration fading are more useful for practical communication at 144MHz than at 432MHz."

The ARRL journal *QST* published articles on QRP 144MHz EME by W2RS in the February 1989 and October 1990 issues; they contain additional ideas for the QRP EME operator. He has also presented papers on the subject to the AMSAT-UK Colloquia at the University of Surrey in 1988, 1989 and 1990, the last in conjunction with Pat Gowen, G3IOR.

The January issue of *2M Direct* includes the first of a promised series of articles under the title, 'The ups and downs of EME propagation.' It deals with spacial and Faraday rotations, what they are and how you can use them. The next article will cover apogee, perigee and wobble.

December brought high random activity in quite reasonable conditions, but the gales over most of the country during the New Year period curtailed activity, eg Martin Platt's, G4XUM (IO82SX), four 15-element Yagis were twisted round 180° by winds gusting up to 160km/h. Prior to that onslaught he completed with the following stations in late December: 28th 1900 UA9FAD (LO88) and 2030 UG6AD (LN20); 29th 0052-0330 K9MRI (EN70), K7CA (DM26), DL5MAE (JN58),

ANNUAL VHF/UHF TABLE

Final placings at 31 December 1990

	50MHz		70MHz		144MHz		430MHz		1.3GHz		Total
Callsign	Cty	Ctr	Cty	Ctr	Cty	Ctr	Cty	Ctr	Cty	Ctr	Points
G1SWH	56	34	56	7	93	20	53	11	16	5	351
G6HKM	60	38	-	-	71	23	34	13	28	11	278
G0IMG	52	33	44	4	52	13	32	4	-	-	234
G0CUZ	-	-	-	-	96	32	35	5	-	-	168
G8PYP	30	34	2	1	52	19	21	6	-	-	165
G8ESB	9	5	18	3	60	8	37	5	15	4	164
G0NFH	40	20	21	3	48	9	11	2	2	2	158
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	12	-	-	-	-	106
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
GM0GEI	42	38	-	-	-	-	-	-	-	-	80
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
GW7EVG	-	-	-	-	37	6	-	-	-	-	43
GM1ZVJ	1	9	-	-	2	1	-	-	-	-	13

British counties were those listed in the January 1990 RadCom, but excluding IOS. Up to three different stations were allowed in all 12 GM regions. EI counties were excluded. Countries were the usual DXCC ones plus IT9.

N5BLZ (EM10) and N7BNJ (CN87); 2149-2300 KD8SI, RB5EC (KN78) and I1KTC (JN45); 30th 0025-0145 LA8YB (JO59), UA1ZCL (KP78), WG8Q (EN82) and W7HAH (DN26).

In late December, John Regnault, G4SWX (JO02PB), completed with the following: 28th at 2142 W5UN, 29th 2040-2140 LA8YB, LA1K, SM2CEW and N5BLZ, 30th 1600-1942 DK0OG (JN68), HB9CRQ and OK1MS. IK2FIV was heard at 2020 but seemed not to hear the many Europeans calling him, 31st 1658 SM2CEW. In January, on the 1st 1712 SM2CEW again, and next day 1850 OZ1HNE (JO57). IW0AKA (JN61) was an incomplete QSO at 2000; he was sending at 25WPM and off frequency at that.

New contributor David Law, G0LBK (IO93JK), runs a pair of 4CX250Bs and four 9-element Yagis. At 0400 on 30 December he completed with N1BUG, his 16th new station, and at 0555 on 5 January with AF9Y for his 17th. Keith Kerr's, GM4YXI (IO87WI), January successes were: 2nd 0900 W7VXW, 1835 SM5CFS and 1845 Y22ME, 4th 2151 EA3ADW and 2200 OZ1HNE, and 5th 0930 AA7A. VE3BQN was a good signal from 0950 on the 6th but the QSO was incomplete.

Dave Dibley, G4RGK (IO91ON), was the only 432MHz reporter but only heard RB5LGX on 28 December. Next day 1855-2335 he completed with GW3XYW, N4GJV and K1FO. The foregoing activity reports came from *2M Direct*, details from G4PCS at 15 Witley Green, Luton, LU2 8TR.

50MHz Annual Table - 1990 Final Placings - Top Four

Call	Counties	Countries	Pts
GW6VZW	77	48	125
G6HKM	60	38	98
G1SWH	56	34	90
G0IMG	52	33	85

70MHz Annual Table - 1990 Final Placings - Top Four

Call	Counties	Countries	Pts
G1SWH	56	7	63
G0IMG	44	4	48
G4OUT	29	5	34
G0NFH	21	3	24

144MHz Annual Table - 1990 Final Placings - Top Four

Call	Counties	Countries	Pts
G0CUZ	96	32	128
G1SWH	93	20	113
G3FPK	81	18	99
G4XEN	71	27	98

430MHz Annual Table - 1990 Final Placings - Top Four

Call	Counties	Countries	Pts
G1SWH	53	11	64
G6HKM	34	13	47
G8ESB	37	5	42
G4XEN	34	7	41

1.3GHz Annual Table - 1990 Final Placings - Top Four

Call	Counties	Countries	Pts
G6HKM	28	11	39
G4DEZ	12	12	24
G1SWH	16	5	21
G8ESB	15	4	19

50MHz

WHO WORKED JR2HOG ON CW at 0949 on 3 March 1990? Dennis Grinnell, G4MKO (HWR), has a QSL made out to him so it must be someone with a similar call. He is QTHR.

Monitoring the 28.885MHz 6m net, Ian Galpin, G1SMD (DOR), heard a very well known 50MHz UK operator telling a DL and an SV that 50.120MHz was the SSB MS frequency. Well it isn't. According to the IARU Region 1 band plan, agreed in Torremolinos last April, 50.350MHz is the SSB MS reference frequency and 50.300MHz the CW one.

GENERAL NEWS

ZS6WB has upgraded his station to an Icom IC-575A driving either a TE Systems 0510G 170W amplifier or a Creative Electronics CE-1000-3A, which uses a 3CX800A7, giving out 400W for 10W input. Hal's antenna is an 11-element Yagi with a 50ft boom at 60ft AGL. He asks UK stations to include their full locator and WAB squares on their QSLs.

In his *Information Pages*, Ted Collins, G4UPS (DVN), reports that I2CSB has moved to Foggia and now signs I7CSB; he promises summer Es activity from JN80, 81, 90 and 91. The Radio Club Pane Djukic's station YU1ANT has an FT-726R transceiver enabling members to work crossband 28/50MHz; a 4-element Yagi will eventually be installed. N6AMG has sent an amplifier and 5-element Yagi to CN8ST.

The 28th edition of the UK Six Metre Group's *Newsletter* is in A5 format, a vast improvement over the previous issue. Its 54 pages are packed with essential information for 50MHz devotees. The editors are John Livesey, G0JJL (LNH) and Neil Carr, G0JHC (LNH), with graphic design, layout and typesetting by Geoff Brown, GJ4ICD, and his son Simon.

ACTIVITY

G1SMD worked W5EU, his first W5, in early December. On 1 January, Ian finally worked 9L1US on CW at 1538. He found the Geminids and Quadrantids meteor showers very disappointing with no complete QSOs. In contrast to 1988 and 1989, 50.350MHz was deserted while several DLs and OEs were operating in the 50.110 - 50.120MHz section.

The highlights from G4UPS's log of stations worked in January were; 1st 1530 9L1US; 3rd 1030-1037 OZ1ABE, OZ3ZW, SM7AED and SM7FJE; 8th from 1317 till fade-out at 1345 VE1s YX, BVL and ZZ; 9th 0912 YO2IS; 15th 1223 PZ1AP, then Es to DL, I and OE from 1510; 16th from 1455 Es to DL and OE up to 1830; 24th from 1309 to fade-out at 1610 VE1s YX, BVL and XDX, K2QIE, K1IKN and K1TOL.

Using SSB, Steve Damon, G8PYP (DOR), completed on MS with DK1PZ (JO41) in 25min by 1300 on 24 December. F2 propagation was; ". . . . not as good as the same period in 1989." Steve Jones, GM0GEI (HLD), now has a 'clean bill of health' from the RIS following alleged EMC problems which curtailed his activity last year. He wants to explore MS mode more so anyone wanting skeds can telephone him on 0349 61080.

Clive O'Hennessey, GW4VVX (GWT), drove 630 miles to IO78TA (HLD) for the 50MHz contest on 17/18 November but only had eight QSOs. Weak MS bursts were heard for much of the time and he completed with G4UPS and G3IMV (BKS). At midnight on the 17th, he worked LA1XDA (JP66) who was S9-plus for ten minutes. At home he uses an HF bands trap-dipole antenna without an ATU.

144MHz

G0CUZ SPENT SOME TIME IN the MS contest in the Geminids but found it rather hard going, completing with only five stations in DL, EA, SM and YU. As for the Quadrantids, Colin wrote; ". . . . what Quadrantids? It seems to have gone missing!" In the CW contest on 20 January he made 59 contacts, much down on 1990, but in similar conditions.

Andy Matheson, G3ZYP (SFK), has been operating /P from Clee Hill (SPE) but finds activity very much less than it was at the end of 1989. He was QRV in the CW contest, best DX being G4KUX. His /P set-up comprised a Kenwood TR-751, 25W to a square halo 3m AGL. A lorry battery supplied the power.

The storms on 5 January stripped the gears on Rik Royall's, G8ESB (YSN), rotator so he will need to install the replacement he has had for some time before getting down to serious operating. G8PYP had two SSB MS skeds in the Geminids but neither was completed. Steve found reflections to be of short duration. Tropo conditions have been very poor with nothing of note heard from Wimborne.

Now some items plucked from the January issue of *2M Direct*. GM4s IPK and YXI reported superb visual, but weak radio auroras on Christmas Eve with DL, GM, LA, SM and Y2 stations worked between 1822 and 1930. Further weak events were heard on 28 and 31 December and on 2 January.

On 16 December, G4SWX and OK1JKT/P (JO60) completed a CW tropo sked at 1030 during which G3IMV heard I4XCC calling G4SWX. It could have been a long meteor burst but there was Es activity to Italy at the time so, bearing in mind the high ERP from I4XCC, it could well have been Es propagation.

G8MBI operated from his French QTH in JN04JK over the Christmas period. Between 1707 and 1726 on 23 December, Graham made tropo contacts with G4YRY (IO80), G4PIQ (JO01) and G0KON (IO80). On the 24th at 0927 he worked G4RRA (IO91) and from 1557-1718 G4SWX, G3IMV and G4PIQ. At 1702 on the 26th, signals to and from G0GMS (IO91) peaked to S5 on CW. Graham completed MS QSOs on 26, 27 and 29 December with DL1EJA, G0GMS and DL3YEL, all on CW.

SIGN OFF

AGAIN, NO REPORTS OF activity on 70MHz or on 430MHz and above; surely some of you are using these bands other than for local QSOs on FM simplex or via repeaters? No mail arrived this month from a few of the regular contributors, so some end-of-year scores may not be final.

GM0GEI wrote: "I have not enclosed a summary of my activity as I realize that space will be limited in the 'new look' *RadCom*" While appreciating Steve's motive, I hope you will continue to submit detailed reports even though the space allocated to this column has been halved. The deadline for the **May** issue is **28 March** and for **June** it is **25 April**.

See you at the VHF Convention

SWL NEWS

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

DAVID WHITAKER, BRS25429 (pictured), spent a fortnight in Tenerife late last year, and spent some of the time listening to a Sony ICF7600DS General Coverage receiver with just 30ft of wire around the apartment. He heard 137 DXCC countries, and all continents were heard on 14MHz. Generally, propagation to the Far East and the Pacific was poor, but conditions to Africa, Central and North America were good. 14MHz showed a tendency to remain open through the night and there was a good short path to VK most evenings. 21MHz closed at around 2000 and 28MHz at about 1900. 7MHz was patchy, and only the strongest signals at the top end of 3.5MHz could be copied easily.

Being near the African mainland, David noticed how strong signals from that continent were. He noted C53GH, J5CVF, TJ1MR, TR8AHO and ZS9/W6KG in particular. From the Indian Ocean, VQ9FM and 3B8FU had outstanding signals. Although 7MHz was patchy, J5CVF and ZS9Z/ZS1 were two of the rarer stations heard during the two week vacation.

LISTENER REPORTS

FURTHER COMMENTS HAVE been received from G3ZPF on this subject which never fails to encourage comment. G3ZPF agrees entirely with the comments made by GM3AWW (Jan 91). He adopts the view that if he wants a card from someone, he takes the initiative and sends them one. He takes the same stance with SWL reports too, since he considers that there must only be a limited number of instances where an SWL report will be anything other than of general interest. G3ZPF considers that it is easy to overlook the fact that an SWL report for a mundane contact in excellent conditions might be of burning significance to that particular SWL, while in the case of foreign listeners, their English might not be good enough to provide a truly valuable well-written report. Two good points, but the important message is simply to make listeners more aware that the more time, thought and care they put into their reporting, the better their QSL returns will be.

On a lighter note, GM3AWW sent a card he received for a contact with a VE3 which had no year, no time and no callsign. Perhaps some of our licensed colleagues need some tuition on how to fill in a QSL card!

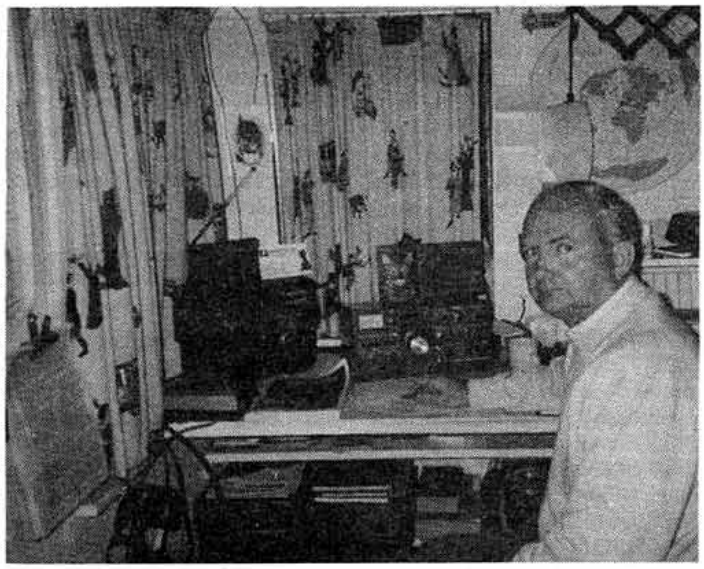
WAB - RARE SQUARES

I HAVE HAD ANOTHER letter from Frank Parkhurst to update his situation. At the time he wrote, he had heard 4016 areas out of the total of 4049 (I was advised that there were 4200 by the Ordnance Survey Office!). So he only needs 33 for a full set, but considers that, realistically, only about 12 are possible as most of the rest are remote areas that it is simply not feasible to activate.

However, knowing how keen some amateurs are in mounting expeditions to rare islands, let me mention these. Denny Is, Avon (ST48); Humla Is, Highland (NG10); Fladda and Sgeir-nam-Maol Is, Highland (NG38), Isle of Rona, Highland (NG66); Old Sgeir Is, Highland (NM19); and Creachasdal Is, Strathclyde (NM14). G4WSB is apparently due to tackle some of the rare squares in Orkney and Shetland in the summer. I will mention some of the other areas where activity is considered impossible in a later issue.

HF CHALLENGE RESULTS

THE 1990 CHALLENGES were fortunate to have good conditions, with the SSB leg having the slightly better conditions. As usual there was plenty of DX to be enjoyed and several entrants notched up some new countries. However, there were some that thought that, given the state of the sunspot cycle, conditions should have been even better. Consensus of opinion considered that the HF bands were somewhat below par and activity from the Pacific almost non-existent, whereas 7MHz conditions were thought to have been very good, with YJ8 and KH0 noted by a few entrants. 3.5MHz was acceptable, with good signals from the Caribbean before midnight and after 0800. 1.8MHz was the band on which Mick Toms based his entry this year, and he logged 5



David Whitaker, BRS 25429, winner of the 1990 HF Table for the second year running. Receivers pictured at his Harrogate home are a Kenwood R0820, a National Panasonic DR-28 and a Sony ICF-7600. On the left is a clip-board containing well-thumbed copies of the RSGBs *DX News Sheet*. Obviously a vital tool for being a top short wave listener.

continents in one three/four hour period on the Sunday; Australasia being the missing one. There were three new countries for Mick in the shape of OY, PJ9 and 9L1. The results are shown in **Table 1**.

HF NEWS

1991 GOT OFF to a good start, DX-wise, with the appearance of YA0RR. Other highlights were the activity from San Felix (XQ0X), VR6BX being heard on 28MHz at 1810 on Boxing Day, and IK2GNW's trip to 8Q7 Maldives and 5R8 Madagascar.

During the month under review, 28MHz was probably the best band, with 7MHz not too far behind. For once, there were no rave notices about 14MHz, and little notable DX was mentioned. The 21MHz band showed rather better with some interesting openings to the Pacific and the Far East (not when I monitored the band - BRS 32525).

Some of the better DX reported by listeners this month includes: 28MHz - VE7DGM/A7, FO0IGS, J37L, XU0AA, 5R8GN and 9Q5XO; 21MHz - KH6XT, KH0/JA2SWA, JT/RA4HA, 3W4DK, 5T5/N5JRC and 9N1HMB; 14MHz - BV2GC and ZL0AAD/ZL7; 7MHz - JD1AMA, W3BEX/FS, HK0OEP, VP2EXX, ZS4NS/ZS9 and 5R8GN; while 3.5MHz had offered TU2UI, VK8TM, ZS9Z and 5N0ATP.

FINALE

NEWS AND VIEWS FOR the **May** issue must be on my door mat no later than **11 March**.

RESULT OF *SWL News* HF CHALLENGE

SSB

1.	ONL383	723,309
2.	BRS8841	450.583
3.	ONL4335	340,587
4.	ONL5923	156,513
5.	BRS32525	88,234
6.	BRS90808	80,088
7.	ONL3997	70,300
8.	RS88887	47,088
9.	BRS31976	9,568
10.	F11DFI	2,067

Check logs were gratefully received from BRS25249, BRS62088 and BRS88969.

CW

1.	ONL383	283,716
2.	BRS8841	207,936.

Table 1

FINAL 1990 HF TABLE

Station	DXCC	28	21	14	7	3.5	1.8	TOTAL
BRS2429	278	219	234	254	200	139	64	1110
BRS8841	274	226	244	246	168	135	65	1084
BRS25209	-	81	111	122	128	85	43	570
BRS1066	175	77	114	133	92	43	38	497
BRS52543	165	66	68	79	120	96	34	463
BRS32525	173	126	54	85	101	46	23	435
G1VDW	149	55	98	99	46	25	1	324
BRS90808	134	88	63	49	51	48	23	322
BRS20249	120	53	68	87	37	23	5	273
BRS40292	-	29	17	31	33	24	8	142
BRS92755	75	-	-	75	-	-	-	75

Congratulations go to David Whitaker, BRS25429, who wins the table for the second year. He reached the milestone of 200 countries on 7MHz SSB on the evening of 31 December. For good measure, he also heard 100 countries on 18MHz in 1990!

THIS MONTH'S *Novice News* will deal with answers to the very many questions we are getting about the Novice Licence. Most of this has been in *RadCom* before, but not in such a handy form.

THE NOVICE LICENCE:

YOUR QUESTIONS ANSWERED

When will Novice Licences be issued?

The RSGB expects the first Novice Licences to be issued from July 1991.

Who will issue Novice Licences?

The Novice Licence is issued on behalf of the DTI's Radiocommunications Agency (RA) by the Radio Amateur Licensing Unit (RALU) at Chetwynd House, Chesterfield, Derbyshire S49 1PF.

Where can I obtain a Novice Licence application form?

Forms will be available from the RALU (tel: 0246-217555). The RA, RSGB HQ and Novice Course Instructors may also be able to supply forms.

What types of Novice Licences are available?

There are two types of licence available:- (i) The Novice A licence which permits operation on all Novice bands and (ii) The Novice B licence which permits operation only on Novice bands above 30MHz.

What basic steps are required to obtain a Novice licence?

The basic steps are:-

(i) Attend an RSGB Novice Licence training course and obtain a course completion slip.

(ii) Sit the City & Guilds of London Institute (C&G) multiple-choice examination and obtain a pass slip.

(iii) In the case of a Novice A Licence, pass the RSGB 5 words per minute (WPM) Morse Test.

How much is the Novice Licence?

The licence is free to those under 21, but £12.00 if you are over 21.

I hold a full Class B licence, can I take out an 'A' Novice Licence?

Yes if you have passed the RSGB morse test at 5 WPM and have been licensed for a year or more. You will be issued with a separate Novice callsign and thus have two entries in the RSGB *Call Book*.

If a full Class B licensee takes up a Novice 'A' licence, can he operate on all HF bands?

No. If he is using a Class 'A' Novice callsign he is restricted to low power and to the frequencies listed in the Novice Schedule.

What power is the Novice Licensee allowed to use?

Five Watts DC input/ three Watts RF output.

Can a Novice use the station of an 'A' licensee?

Yes, as long as he/she is directly supervised, uses the class 'A' callsign and signs the log book.

How long does the Novice Licence last?

There is no time limit at the moment; you will be asked to renew annually.

How old do you have to be to take out a Novice Licence?

There is no age limit. Anyone who completes the course and passes the exams may take out a Novice Licence.

Can a Novice obtain a reciprocal licence?

No. Novice licensees may not obtain reciprocal licences to operate overseas.

What callsigns will novices use?

The novices use the UK prefix '2' with a letter following which denotes the UK country, ie England = E, Scotland = M, Wales = W, Northern Ireland = I, IOM = D, Guernsey = U and Jersey = J.

After the letter, comes a number which indicates the class of licence eg class A = 0, 2, 3, 4 and class B = 1, 6, 7, 8. There will then follow three letters which are personal to the licensee. So, the call 2M0YYY would indicate an 'A' Novice Licensee in Scotland and 2E1ZZZ would indicate a 'B' Novice Licensee in England.

Have the details of the Novice Licence schedule been published?

Yes, in the June 1990 edition of *Radio Commmunication*.

How do I enrol on an RSGB Novice Training Course?

Write to RSGB HQ giving your name and full address, *including your post code*. RSGB will send you a list of all the instructors in your area. Please address your enquiry to 'Novice Training' and enclose a 2nd Class stamp for a reply. Alternatively, telephone the Senior County Instructor listed in the January 1991 edition of *Radio Communication*.

Do I have to go on an RSGB Training Course?

Yes, it is a requirement of the Licensing Authority that the RSGB Training Course be completed before taking the multiple-choice examination.

The course gives grounding in basic electronics and amateur radio procedures; knowledge which is considered essential prior to going on the air.

Can anyone provide Novice instruction?

Anyone may *apply* to be an instructor, but only those approved by the Council of RSGB, through the its Training and Education Advisory Group, may provide the Novice Training Course. To obtain an Instructor's application form and booklet, send an A5 stamped addressed envelope (27p for postage) to Hilary Claytonsmith; G4JKS, 115 Marshalswick Lane, St Albans, Herts, AL1 4UU.

How long does the training course last?

The course will last about 30 hours, normally spread over a period of about 12 weeks.

Where will the training course be held?

Either at the Instructor's home or other suitable premises.

Is the training course available throughout the country?

Yes, it is run on a county, main Islands and Scottish regions basis. Each one of these areas will have a Senior Instructor who oversees the training scheme.

What books and materials will a student require for the training course?

A Student will require:-

(i) The *Novice Licence Student's Notebook* obtainable from RSGB HQ. A book with sample exam questions is also obtainable called *The Novice Licence Examination - Sample Questions and Answers.*

(ii) An Audio Frequency Amplifier Kit and other components to construct a basic radio receiver. Your instructor will tell you where to obtain the kit and the components.

Is there a fee for the RSGB training course?

There is no fee for the course given by your local Instructor, who is a volunteer. However, the Instructor may ask you to assist with modest incidental expenses, which must be stated before the course commences.

What happens when I complete the course?

On successful completion of the course, the RSGB will issue a Course Completion Slip. A completion certificate will also be available at a nominal cost (£2.50).

How do I apply to take the C&G Novice Examination?

Once you have completed the Novice Training Course and have received the course completion slip you may apply to your local C&G examination centre to take the Novice Radio Amateurs Examination (Subject Nr 773). Your instructor will be able to provide you with an application form and advise you of the nearest exam centre. A full list of centres can be obtained from the C&G at 46 Britannia Street, London WC1X 9RG.

When can the C&G Novice exam be taken?

The first Novice Examination will be held on 3 June 1991 at 6.30 pm at a large number of C&G centres all over the UK (the final closing date for entries for this exam is 14 April). Subsequent exams will be held on 16 September 1991 (closing date for entries 1 August) and 9 December 1991 (closing date for entries 25 October). During 1992, Novice Radio Amateurs' exams will be held on

9 March (closing date for entries 1 February), 1 June, 14 September and 7 December.

How much does the C&G Novice Exam cost?

The cost of the examination is £8.95.

Are there any administration costs associated with the examination?

As with all C&G exams, there is often a centre administration fee. This will obviously vary from authority to authority. Your instructor will help you with your choice of centre.

How soon will the examination results be issued?

The C&G expect to have the results available four weeks after the examination.

When can I take the RSGB Novice Morse test?

Novice Morse tests will start to be available from June/July 1991. Apply to RSGB HQ for an application form nearer the expected start date. Further details will be published in *Radio Communication* and given on the weekly GB2RS news bulletin.

What will be the format of the Novice Morse Test?

The precise details of the Novice Morse Test remain to be finalised. However three candidates will be given a receiving test and then each candidate will individually have a sending test. The speed of the test will be 5 words per minute.

Does the RSGB sell a Morse code training tape?

Yes, it is called **Morse Code - Stage 1** and is available from RSGB HQ by post. This course uses the very successful theory of sending letters at a speed of 12 WPM, but leaving longer than normal gaps between characters to reduce the overall speed to 5 words per minute.

Where are the Novice Morse Tests held?

The RSGB has morse test centres in most UK Counties, main Islands and Scottish regions. Each centre holds a test approximately every 2 months but, if you are prepared to travel to an adjacent area, a test will normally be available within a couple of weeks, subject of course to the advanced booking procedure.

IF YOU'RE THINKING OF BECOMING AN INSTRUCTOR

Do you need to have any teaching qualifications to become an Instructor?

No. However you must have held a licence for at least a year and feel that you can pass on your acquired skills in a positive way to others.

Do I have to be a member of the Society to instruct?

No, but obviously it would be an advantage from the point of being able to obtain the RSGB books needed for the course at a discount.

Can I register my Club as being willing to instruct?

No, bulk registrations are not possible; we have to have individual instructor's details registered. The RSGB will encourage club members to register individually and use club facilities for training.

What equipment do I need in order to instruct?

A list of the equipment required is printed in the booklet *The RSGB Novice Licence Training Scheme* which also contains the application form to become a novice instructor. (Available from G4JKS - see above).

Do I have to have insurance cover?

RSGB provides third party insurance cover for Novice Instructors.

If I register as an instructor, how long does my registration last?

All instructors will be re-appointed on an annual basis.

Where do I get the instructors' manual 'Training for the Novice Licence'?

It is available from the RSGB HQ at a cost of £6.21 for members and £7.30 for non-members. This price includes postage and packing. Registered instructors who quote their registration number can obtain a further £2 discount.

Can I just teach my son/daughter and his/her friends?

Yes, but all instructors must be registered, whether teaching family members or the general public. If you only want to teach your family, this should be made known to the Senior Instructor in your area.

If I have to hire a room for the group I'm going to instruct, who pays the room hire fee?

You should expect to recoup this cost directly from your students as an incidental expense.

How many students constitute a group?

The course has been designed around a group of 4 but, if you can provide additional equipment and helpers, the group can be expanded.

(l to r): Dr Pieter Rademeyer, ZR6OR, Chairman of the Trust; Dr John Allaway, G3FKM; John Crampton-Haward, ZR6AQH, SAARDT Young Amateur of the Year; Jean-Claude Fromentau, Managing Director of ECS.

US NOVICE

ALTHOUGH THE United States has a new 'codeless licence' (which does not involve learning the Morse Code), the Federal Communications Commission has kept the Novice Licence as a way into amateur radio. Larry Price, W4RA, President of the American Radio Relay League (the US equivalent of the RSGB), said his members couldn't imagine the Amateur Radio Service without it.

NOT JUST FOR THE YOUNG

MOST *NOVICE NEWS* has been about young people, but of course the licence is suitable for beginners of all ages. This has been recognised in the USA for many years and we recently learned that world famous TV newscaster Walter Cronkite received his US Novice Licence (KB2GSD) in 1988 at the age of 72.

SOUTH AFRICAN YOUNG AMATEUR

LAST NOVEMBER, John Crampton-Hayward, ZR6AQH, received the first Young Radio Amateur of the Year Award from the South African Amateur Radio Development Trust. The award, sponsored by the ECS group of companies, was for his work in promoting amateur radio in his school, and in scout and guide groups.

Jean Claude Fromenteau, ECS's Managing Director, said at the presentation "We see an important role for amateur radio in creating an interest in electronics as a career choice".

Presenting the award was Dr John Allaway, G3FKM, Secretary of Region 1 of the International Amateur Radio Union (and *RadCom* columnist!) who had stopped over in Johannesburg enroute to Harare where he was attending an ITU exhibition.

South Africa recently introduced its Novice Licence based on the RSGB's original proposals for a UK licence. The award winning schoolboy commented that "the Novice Licence is the answer to high school amateur radio." On electronics, he said "it always seemed so complicated to me and difficult to hold onto, but amateur radio did it for me!" He is now about to go to university to study electrical engineering and intends taking up electronics as a career.

THIS MONTH'S SUPER DEALS FROM:

AMCOMM

Hi-Tech, Hi-Spec, Low Cheque

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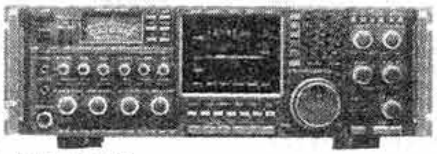

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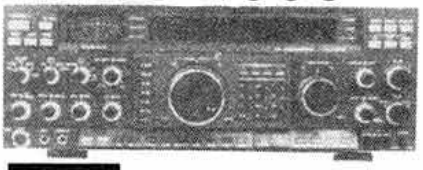

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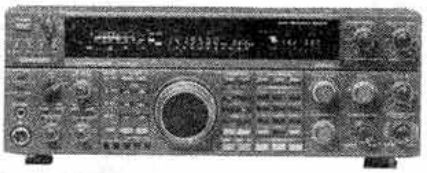

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TOPICS

PAT HAWKER G3VA

SIMPLE HF SUPERHET USING THE MC3362 CHIP

RECENTLY, IT HAS BEEN emphasised in *TT* that the availability of complex IC devices at relatively low-cost has made it as easy to build a superhet receiver as the usual form of direct-conversion receiver. This is particularly so for the increasingly popular QRP HF transceivers with about 1 to 5W RF output.

For example, in *TT* (April 1989) some details were given of a 14MHz 'QRP-20' (5W) CW transceiver described by Rick Lillefield, K1BQT (*Ham Radio*, January 1989) based on the use of three NE602 double-balanced mixer/buffer/oscillator devices. K1BQT has since described a 21MHz version updated by a number of refinements (*CQ*, September 1990). In practice, the 21MHz band should prove more rewarding for QRP operation than among the high-power crowd on 14MHz. In this version, the receiver section is a superhet using NE602 front-end with the VFO tuning 5000 to 5150kHz, a four-crystal ladder filter using low-cost 16MHz series-resonant computer crystals, MC1350P IF amplifier, NE602 product detector with a further 16MHz crystal-controlled oscillator, AF filter and LM386 output with several discrete active devices providing additional facilities. A third NE602 with 16MHz crystal is used as mixer/oscillator to convert the 5MHz VFO to provide 21MHz tunable frequency input into the transmitter section.

An even simpler approach is adopted by Gary A Breed, K9AY, for 'A portable QRP CW transceiver' (*QST*, Part 1 - receiver section, December 1990). This 14MHz 5W transceiver has a superhet receiver based on a single Motorola MC3362 IC as its heart, from RF input to low-level AF.

The 24-pin Motorola device (**Fig 1**) is designed to provide all the functions of a dual-conversion VHF/FM superhet requiring no other active devices except an audio power amplifier. It has two oscillator/mixer sections with buffers, a six-stage limiting (IF) amplifier, quadrature (FM) detector, signal strength indicator output (RSSI) and a comparator for data reception. In K9AY's design the limiting IF amplifier section and the quadrature FM detector are not used; however, K9AY points out that it would be possible to use the IF section as a low-level audio amplifier or as a second IF (up to about 500kHz) in a double-conversion arrangement; the quadrature detector section could then be used as a product detector.

Clearly, an operator requiring an HF receiver of really high performance could not expect to achieve this with a chip intended for less demanding VHF applications, neither in terms of dynamic range nor oscillator stability over a wide range of temperatures. K9AY reports: "I breadboarded a few designs with this chip to determine how it performs at HF for CW and SSB. Performance is good, and I was amazed at the simplicity of the external RF circuitry requirements."

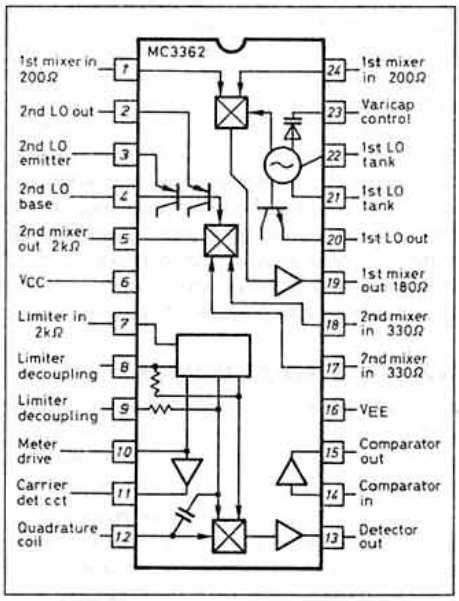


Fig 1: The MC3662 chip showing pin-out and basic functions.

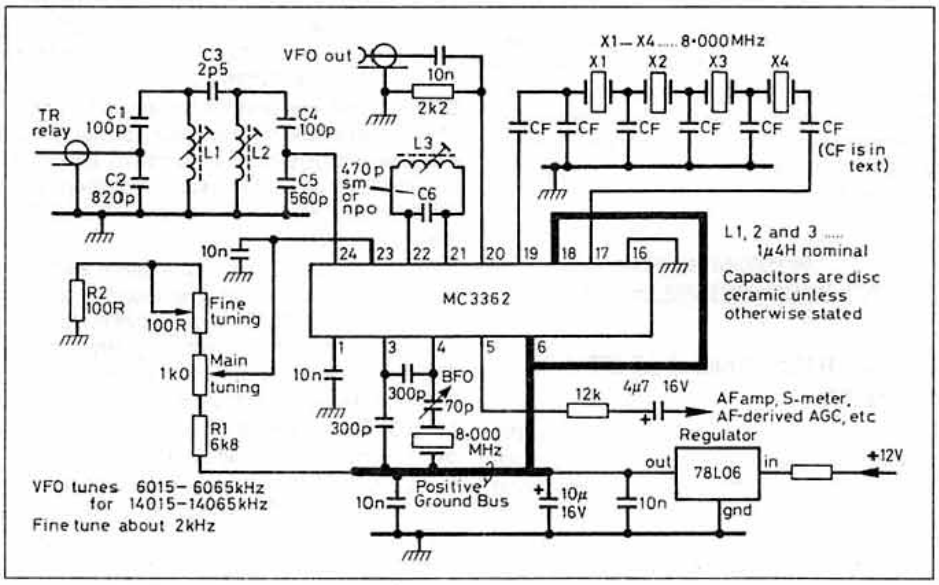


Fig 2: How K9AY uses the MC3662 as the complete front-end of the 14MHz superhet receiver section of his 5W QRP transceiver.

He gives the performance of the receiver (**Fig 2**) as: very high sensitivity (minimum discernible signal about -123dBm); measured third-order IMD dynamic range about 70dB which, he points out, is "not exceptional" but good for such a simple receiver. (The limited strong-signal performance suggests that it would be wise to provide a simple variable-attenuator, eg **Fig 3** at the input to the receiver - G3VA).

The 8.000MHz four-crystal Cohn ladder filter is designed to provide a 400Hz (-3dB) bandwidth for CW reception with the CF capacitors each 300pF (for 600-800Hz bandwidth, about 220pF should be used). The 400Hz filter provides about -30dB selectivity at 1325Hz but the audio-image sideband rejection is a little under -40dB since, with an 8MHz IF, the isolation of the chip and filter circuits is insufficient to permit better performance. (It might be worth considering the use of a ladder filter based on low-cost PAL colour-TV crystals at 4.63MHz, adjusting the tuning range of the variable oscillator accordingly - G3VA).

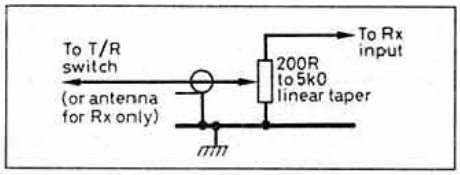


Fig 3: Simplest form of RF input attenuator that can improve handling of strong signals in receivers of restricted strong-signal performance.

K9AY considers that the only real weakness in performance for its intended application (as a compact portable transceiver for use in mountain-climbing etc) is temperature stability that can affect outdoor use, resulting in dial calibration being possibly off by a few kHz in extremely cold or hot situations. He points out that short-term stability is good both indoors and outdoors, with the receiver holding within a few tens of Hertz for hours on end in a shack environment.

CABLE ELBOWS - A WORD OF WARNING

AROUND THE NEW YEAR, BBC News reported the delivery of a Christmas card posted in India that had taken 45 years to reach its UK destination. It thus seemed quite a coincidence when, a couple of days later, a QSL card arrived from Doug Allerston, G5PQ, for a 7MHz CW contact made 52 years before on 21 December 1938 for which no cards had previously been exchanged! It duly checked out with an entry in my first log book.

But the main purpose of G5PQ writing to me was to draw attention to the defects of some impressive-looking 90° co-axial elbow connectors that had seemed a very good buy at a local rally for about 49p each. He writes:

"Unfortunately, they provide an illustration of 'You get what you pay for'. At first, I found them very convenient for bringing some thick (0.5-in) co-axial cable to my TS520 and home-built linear amplifier only a few inches from the shack wall. But increasingly I found that when I released the T/R switch on the microphone, the incoming signal seemed much weaker than originally. Eventually, I set up a signal generator to give a steady S9 on the

meter and flicked the T/R switch a good few times. About 70% of the times, the meter showed a reading of only S5. My reaction was to suspect the back-contacts on one or both of the antenna relays. So out they came from the TS520 and the linear and received a good spraying, etc.

"Result - no improvement. I began to suspect a fault in the front-end of my ten-year-old TS520 transceiver but, fortunately before starting to work on it, I checked for continuity and short-circuits in all the co-axial links. To my surprise, one indicated a varying resistance of up to 320Ω! I traced the fault to one of the elbows although the reason did not become clear until I sawed away the outer shield and revealed a horrible little black metal spring wire which had been carrying up to 400W RF between the plug and socket portions, gripped only by the wire spring turns. I had fondly imagined there would have been a solid conductor between plug and socket!

"Another of these elbows, still in my spares box, proved to have open circuit. The elbows are well finished outside, little better than junk inside! Apart from open circuits and varying DC resistance, such wire-spring connections seem virtually bound in time to form harmonic-generating diodes and generate 'rusty-joint' interference."

One can see the problem of manufacturing elbows with solid 90° connections, and G5PQ wonders if the elbows advertised by some reputable component firms, at two or three times the price he paid at the rally, have secure conductors between the plug and socket sections, or only similar horrible little springs. There seems no way of finding out without sawing them open. As G5PQ puts it: *Caveat Emptor* - let the buyer beware!

WEATHER-RESISTANT WIRE ARRAYS

AGAIN THIS WINTER, MOST PARTS of the UK have suffered from frequent high winds and gales that have not proved kind to HF antennas. Some tips for achieving longer life for wire-type arrays such as quads, VK2ABQ or G3LBQ antennas have been given by Paul T Atkins, K2OZ, with editorial additions in *QST*, (November 1989, p39). K2OZ has succeeded in keeping his quad antenna up and working for about 25 years, following modifications when it began to deteriorate after about 10 years - no mean feat! He writes:

"Sad experience has been my teacher. My first quad required periodic patching because of ice and wind-related flexing. Typically element wire breakage occurred at the element corners where they are supported by the spreaders. Adding a two-wire strengthener, as in **Fig 4(a)**, at each corner solved this problem. Teflon insulated wire is a better choice than stranded bare wire for the elements which suffer from oxidation (elements turning green). The spreaders were tied together (**Fig 4(b)**) with 50-pound monofilament (nylon) fishing line which deteriorates in sunlight from UV radiation and was replaced by more durable cord (Editorial note: Nylon cord, especially that treated to improve UV resistance, is much better than monofilament fishing line for outdoor use; *Dacron* cord is even better. Because it deteriorates rapidly in UV light, avoid using polypropylene lines in sunlit locations - *QST*).

"My quad used tapped-coil inductive reflector tuning. I replaced the Miniductor coils with home-made, 1" ID coils wound with No 12 tinned bus wire (winding each coil on a 1" dia temporary form then removing it from the form and slipping it into position on its respective quad insulator). In the belief that tapped coils, whether unused turns are left open or short-circuited, introduce loss, I tuned the quad reflectors by adjusting the coil turn spacing as necessary. Following these modifications, I have not had to repair my quad for almost 15 years."

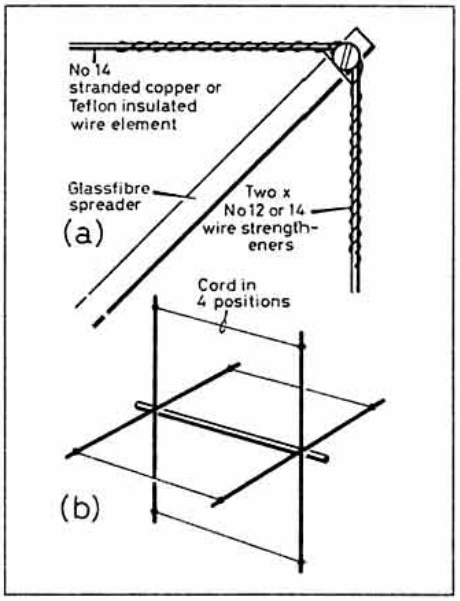
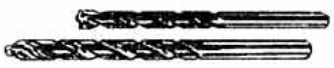


Fig 4: K2OZ's survivable quad modifications, applicable also to other wire-element arrays.

Some additional information is given in the *QST* caption. This points out that Teflon-insulated No 14 stranded copper wire is a better choice than bare stranded copper but care is needed not to nick the wire strands when removing its insulation for soldering (if possible use a thermal stripper). Each corner strengthener consists of two pieces of No 12 or 14 bus wire some 14 to 16" long. After cleaning the element wire until it is bright and solderable, twist on one strengthener wire *in the other direction*. Using resin-cored solder and a soldering iron hot enough to heat the work thoroughly, solder the three wires together. Complete the job by cleaning the joint to remove whatever resin remains. The finished strengthener can be wrapped with tape as required.



BATTERIES AND SAFETY TOPICS

JANUARY *TT* DREW ATTENTION to the explosive nature of the mixture of hydrogen and oxygen surrounding a battery gassing while on charge. This item reminded Brian Kendal, G3GDU, of an incident that shows the danger of disconnecting a charger or a heavy load from a battery still under charge. He writes:

"Some years ago, I used an old car battery to provide a 12V supply from my workshop. The charger was always kept in circuit in a vain attempt to keep the battery in reasonable condition and delivering in the region of 12V. At one period I had been working in the workshop for several days and, consequently, the battery was well up and gassing freely.

"I was working on a piece of gear which took about 10A. Due to laziness, I did not switch off before disconnecting the load from the battery. This, inevitably, caused a spark which ignited the hydrogen-oxygen mixture and caused a minor explosion. Although, fortunately, I was not injured, the force was sufficient to split the side out of the battery".

As noted in the January *TT*, it is essential to avoid doing anything that could spark off an explosion where there is any possibility of an explosive mixture that has not been dispersed by waiting or by fanning with a magazine etc. Otherwise, it could be as risky as looking for a gas leak with a candle!

Ron Wilson, G3DSV, recalling his service days in WW2 as a Royal Navy radio mechanic, adds a final comment on battery acid: "I often visited the EM (electrical-mechanical) workshop. Over the battery charging bench was a very large sign: *Do wot u oughta, add acid to water.*"

WA8MCQ and *QST*'s *Hints & Kinks* editor warns of the danger of close-up soldering without the use of safety goggles. WA8MCQ, while unsoldering a connection, was struck on his lower eyelid by a small piece of hot solder - it could as easily have struck his eye. Hardware and discount stores sell inexpensive plastic safety goggles, it is pointed out.

NATTY FRONT PANELS

KUNIO MITSUMA, KA3RRF, IN *Hints & Kinks* (*QST*, December 1990) provides a method of producing handsome front panels that he learned as a youngster in Tokyo. He writes:

"A nice-looking front panel reflects the quality of the project inside the box. Here is a simple way of making an attractive front panel that has a matt-finish silver hairline design. If your project already has an aluminium front panel, great. If not, cut an aluminium plate the same size as the box's front panel and attach it to the box. Before beginning, make all necessary holes and cuts in the front panel(s). Then proceed as follows:

Step 1: Wrap fine sandpaper around a piece of wood and sand the aluminium panel in one direction until fine hairlines begin to appear. If the panel is coated with paint, be patient and do this *until the paint comes off* and the hairlines appear.

Step 2: Thoroughly clean the panel surface. Now spray the panel with clear *lacquer* paint. The purpose of this is to make the surface of the panel smooth for applying dry rub-on lettering. Wait until the lacquer dries completely, then apply the lettering.

Step 3: Spray the panel with clear *enamel* paint. (**Important:** Use a different type of paint than you used in Step 2. Otherwise this coat may mix with that paint, causing the lettering to float around in a sea of clear paint!). Spray a few coats until the paint completely covers the lettering.

Step 4: Heat the front panel from *behind* the

25W (1.8 - 7MHZ) PUSH-PULL MOSFET LINEAR

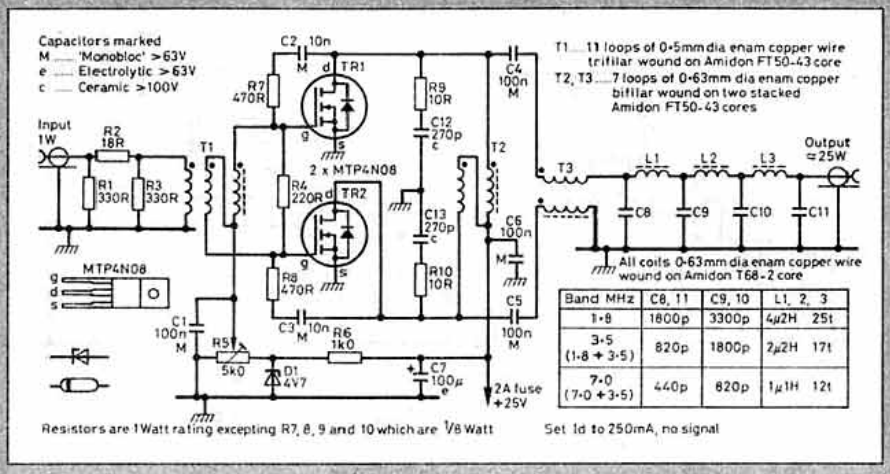


Fig 5: The VK3XU push-pull MOSFET linear amplifier providing about 25W RF output up to 7MHz with about 1W drive and 25V, 2A power supply.

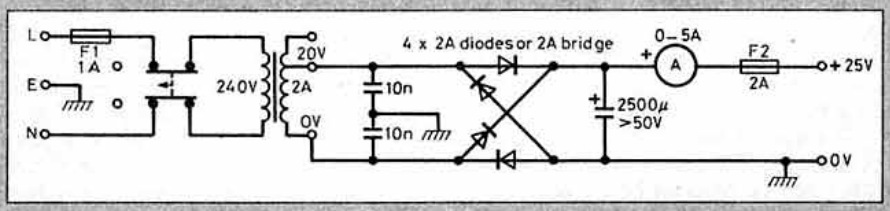


Fig 6: VK3XU's suggested power supply for the 25W MOSFET amplifier.

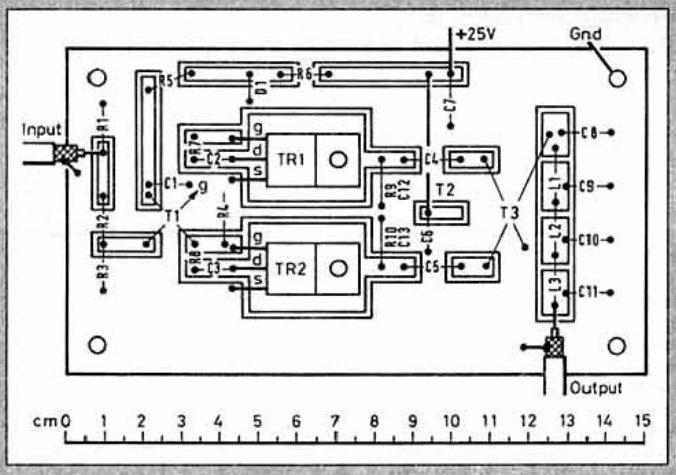


Fig 7: Component and PCB layout for the 25W MOSFET amplifier using double-sided PCB with the other side forming continuous ground-plane (reproduced half actual size).

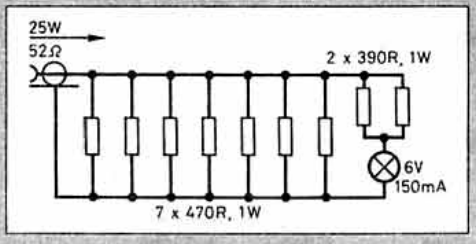


Fig 8: Suggested dummy load for the MOSFET amplifier using ordinary 1W carbon or metal-film resistors. Capable of dissipating 25W at 50% duty cycle in short bursts. Dissipation can be increased by immersion of resistors in a benign clear oil (see text). Such a dummy load suitable for other transmitters of roughly similar output power.

DREW DIAMOND, VK3XU, IN THE Australian *Amateur Radio* (January 1991, pp7-10) describes in detail the construction of a broadband linear push-pull amplifier based on low-cost switching MOSFETs normally used for switching-mode PSUs suitable for boosting the output from a QRP rig: **Figs 5-7**. It uses a pair of Motorola MTP4N08 (80V/4A) devices, available in Australia for under A$1 each. These devices have the same pin-out as the better known IRF510 and IRF511 devices. Since the 510 has lower input and output capacitances for the same voltage and current rating as the MTP4NO8, direct substitution of a pair of IRF510 devices should yield significantly more RF output above about 7MHz, when used with suitable LPF output filters.

VK3XU lists performance with MTP4N08 devices as: frequency range 1.8 to 7MHz (usable with reduced output to 14MHz); output power nominally 25W, typically 30W PEP or CW; input drive power nominally 1W; power gain about 14dB, input SWR less than 1.2:1; two-tone IMD products in the order of -35dB. Harmonic output -50dB (depends on LPF); output protection - will withstand any load SWR, including short and open-circuit at full drive without damage; supply 25V at up to 2A (reduced output at 13.8V).

The amplifier with a symmetrical layout is built on a double-sided circuit board with the unetched side providing a continuous 'ground-plane' under the active component area as an aid to circuit stability. No holes are required for component leads, but rather these are soldered directly onto the copper pads 'VHF-fashion'.

The MOSFETs must each be fitted with a heatsink such as type 6030. The bias zener diode (D1) 4.7V/400mW, should be positioned against one of the heatsinks to provide a degree of thermal tracking. A small blob of heatsink compound may be applied to assist heat-transfer.

The dummy load suggested by VK3XU (**Fig 8**) should take 25W at 50% duty cycle in short bursts, but he suggests that it would be a good plan to house the load and lamp inside a glass jar with a suitable connector fitted to the screw top lid. To increase dissipation, the jar could be filled with some benign clear oil such as paraffin or peanut oil, leaving an air gap for expansion. During on-air operation, input drive must be kept low enough to give linear operation (quiescent no-signal current Idq about 200mA) as over-driving may cause splatter on SSB or clicks on CW. In operation, the I_{dq} may gradually rise to about 300mA but should drop back to about 200mA during receive periods.

painted side until it is almost too hot to touch. You can do this over a gas stove, but be careful to keep the painted side from making direct contact with the flames. Remove the panel from the heat source and *immediately* spray on another coat of clear enamel from some distance away (1ft or more) so that the paint particles land on the panel spread widely apart. As the panel cools, the paint particles will shrink, giving a matt finish on the panel."

Another tip from *Hints & Kinks* by H L Van Ness, W7MPW: "Finishing washers, commonly available in hardware stores, make professional looking LED mounts. Two dabs of hot glue between the back of the LED and the panel hold the assembly in place."

50.1MHZ YAGI DIMENSIONS

RON FISHER, VK30M, AND Ron Cook, VK3AFW, in their *Random Radiators* column (*Amateur Radio* VK, October 1990) provide a useful table to facilitate the construction of DL6WU-type optimised Yagi antennas compiled by VK3AUU: **Table 1** (overleaf).

144MHZ SNIFFER DF RECEIVER/FIELD-STRENGTH METER

THE SEPTEMBER 1990 *TT* PROVIDED a description of a compact twin-loop 144MHz MEF (Miniature Electromagnetic-coupled Foxhunting) antenna developed by John Williscroft, ZS6EF, as an integral part of a hand-held direction-finding 'sniffer' system capable of being used to uncover well-hidden transmitters in 'fox-hunting' contests. At least one copy of this antenna was built and used successfully by a member of the Southgate Amateur Radio Club in conjunction with a professional receiver having an attenuator to reduce the signal fed to the screened receiver when closing in on the transmitter. The September item, however, stressed that ZS6EF considered that most factory-built, amateur-type 144MHz receivers/transceivers were insufficiently well screened to prevent direct breakthrough of signals when very close to the 'fox' and that he had built a special DEF sniffer receiver described in the March 1990 issue of *Radio-ZS*.

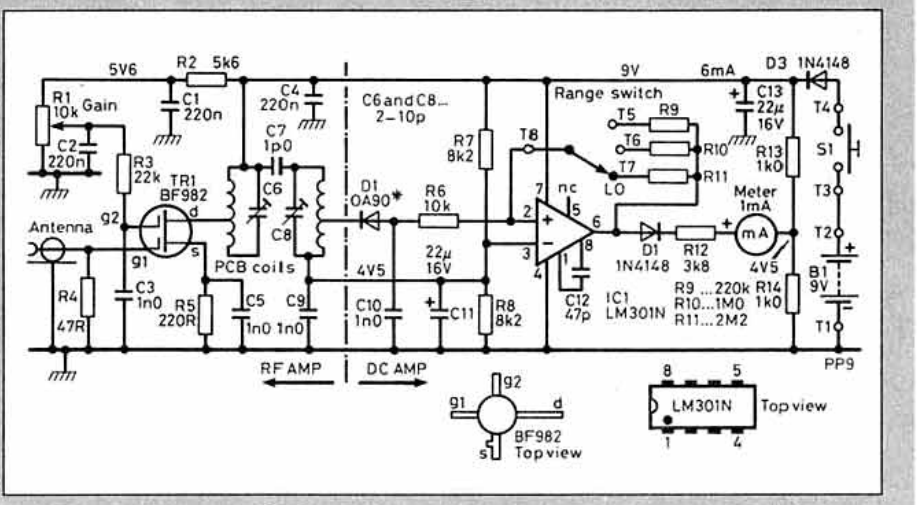


Fig 10: Circuit diagram of ZS6EF's 144MHz well-screened 'sniffer' receiver used with the MEF miniature twin-loop antenna described in *TT*, September 1990.

It is only recently that I have been able to see a copy of this article ('The DEF Receiver - The Sniffer that makes a Difference' by John Williscroft, ZS6EF). His 'Direction-finding Equipment for Foxhunting' proves to be a simple non-regenerative 'straight' receiver comprising a dual-gate FET input stage, interstage tuned RF bandpass filter, germanium diode detector and LM301N IC DC amplifier: **Fig 10**. The DEF is, in fact, derived from experience with a field strength meter described in the *ARRL Handbook* and such a system could be used as a sensitive field strength meter.

The gain of the BF982 input stage is controlled by R1 and arranged so that its 'gain' can be reduced below unity then forming an input attenuator, while also allowing maximum gain for the PCB layout. ZS6EF stresses that the layout of the PCB is critical to avoid breakthrough and oscillation at maximum gain. The gain of the DC amplifier is kept as low as practicable during operation with a range switch provided to reduce its gain as the operator approaches the fox. No speaker/phone socket is provided (presumably to eliminate the risk of pick-up on the leads etc) with the output indicator taking the form of a 1mA FSD meter. The three-page *Radio-ZS* article includes PCB layout and constructional details.

This provides a selection of element lengths and spacings related to the diameter of tubular (non-tapering) elements. For intermediate diameters it should be possible to find dimensions by interpolation.

Fig 9 shows the suggested matching arrangements for the driven folded-dipole element with the two rods spaced about 75mm apart. The balun transformer is based on an electrical half-wave length of coaxial cable, typically about 1976mm long for 50.1MHz. If the elements pass through a metal boom they should be lengthened by two-thirds of the diameter of the boom.

As a nine-element array, the power gain should be about 11dBd, considerably more than most of the arrays used on 50MHz. Even with four directors, it should provide up to about 8dBd gain, but the matching may suffer and some adjustment in the optimum spacing of the first director is likely to be required.

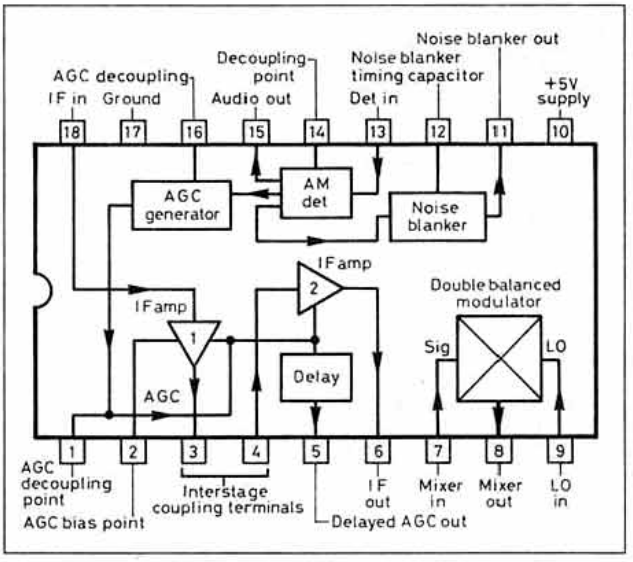


Fig 9: Matching system for DL6WU-type Yagi. For 50.1MHz the dimensions of elements/spacings are given in Table 1. For the driven folded dipole, the elements can be spaced 75mm apart. The balun is made from an electrical half-wavelength of cable (typically 1976mm at 50.1MHz but dependent on velocity factor of the cable).

NEW TECHNOLOGY AND THE SPECTRUM

Experimenting with new modes of communication represents a valuable and important part of experimental Amateur Radio. Since 1945, amateurs have led the way towards widespread use of fully-suppressed HF SSB, slow-scan and wideband image transmission, later HF facsimile, AMTOR RTTY and facsimile, most recently Packet Radio on HF, VHF and microsatellites. It cannot be long before use will be made of digital speech modes although here the trail so far has been blazed by the professionals as they prepare

TABLE 1 - 50.1MHz Yagi Design Data

Element lengths are for constant diameter tubing. Both incremental and progressive spacing dimensions are given.

Element	Spacing Incremental	Spacing Progressive	Element lengths 6mm	9mm	12mm	16mm
Reflector	0	0	3002	2980	2964	2949
Radiator	1436	1436	2920	2880	2851	2823
1st Dir	449	1885	2774	2741	2716	2689
2nd Dir	1077	2962	2753	2718	2692	2664
3rd Dir	1287	4249	2733	2697	2669	2640
4th Dir	1496	5745	2715	2677	2649	2618
5th Dir	1675	7420	2698	2659	2630	2598
6th Dir	1795	9215	2682	2642	2612	2580
7th Dir	1884	11099	2667	2627	2596	2562

dimensions in mm

A 50MHZ PL519 AMPLIFIER

BRIAN BOOTH, G3SYC, NOTED the brief reference *TT*, (December 1990, p33) to the use by G3MY of various types of TV line-output (deflection) valves on 50MHz. While circuit details of PL519 HF amplifiers have been given in *TT* over the past few years, G3SYC has found that a rather different approach may be needed on 50MHz to overcome the problems posed by the relatively high input and output capacitances of these valves which were designed primarily for operation at 15,625Hz (625-line) or 15,750Hz (525-line).

G3SYC writes: "I have built the power amplifier shown in **Fig11** and drive it with 2W from a Yaesu FT690/11 transceiver. Even without optimising the series-tuned PA tank circuit, I obtain an unconditionally stable gain of 12dB (ie output over 30W), although an initial attempt using a conventional pi-network tank circuit failed to produce much output. However, G3MY has used pi-network tank circuits successfully on 50MHz possibly with a layout having less stray capacitance.

"It was possible to obtain an excellent input SWR with the circuit arrangement of Fig 11 (many published circuits are vague about this detail). The valve base was built into a brass sub-chassis as shown in **Fig 12.** This is spaced from the main chassis and all earth returns are made to this including the PA tuning capacitor. For simplicity, two grid and two screen-grid decoupling capacitors

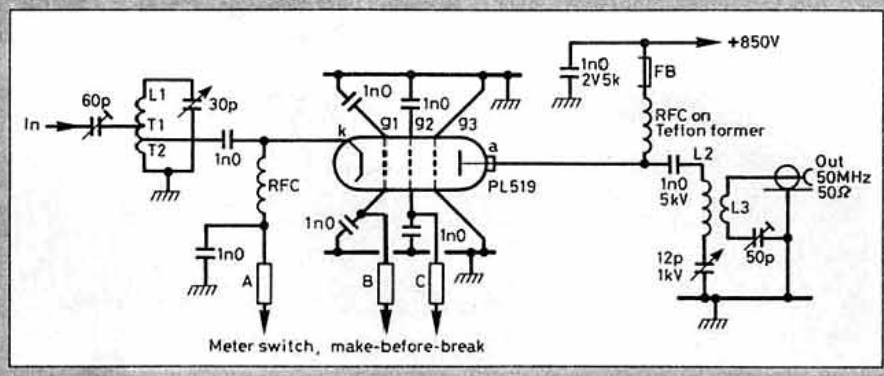


Fig 11: Skeleton circuit of G3SYC's 50MHz amplifier using a single PL519 valve. L1 6 turns 0.5-in ID (18SWG). L2 9 turns, 0.75-in ID (rectangular section strip one-eighth by one-sixteenth-in from old transformer). L3 1.5 turns around middle of L2 but well spaced from it (18SWG). A, B, C are current shunts for meter (A anode plus screen current; B grid current; C screen current).

are shown; in practice four 0.001μF capacitors were used in each case. A *strong* air draught was provided within the PA box by a boxer fan.

"The cathode of the PL519 requires a few volts of negative bias provided by a string of IN1004 diodes. The number of diodes required varied with individual PL519 valves quite widely and should be determined by experiment to provide 25-30mA standing current."

Those with cherished memories of the excellent components once available from Eddystone may be interested to learn that G3SYC's PA tuning capacitor is an Eddystone type (Catalogue No 589) bought by him in his 'teens but never previously used.

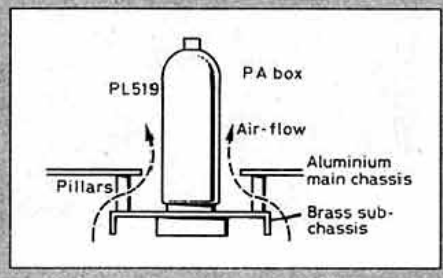


Fig 12: Details of brass subchassis showing air cooling path.

for 'personal' communications networks such as CT2 and DECT cordless telephones. Amateurs will be able to take advantage of the complex VSLI devices now becoming available for CT2. Plessey Semiconductors have recently published a new 293-page *Personal Communications IC Handbook* covering many new devices for small hand-held transceivers and pagers in the 450MHz and 900MHz region of the spectrum, including devices for 'third-method' SSB direct-conversion demodulation of FSK data signals (SL6639/SL6638) at 1200bit/s in the 200MHz region to be released shortly.

But, unfortunately, a problem arises when equipment for modes mutually incompatible with the operation of basic analogue-speech and CW modes is marketed, and then taken up by large numbers of amateurs interested primarily in operating, with little interest in further developing the technology. They begin to demand and expect 'exclusive' allocations even within already crowded and much-used bands and/or operate with the new, non-compatible modes without checking that their transmissions are unlikely to interfere with other users (including those where the skip zone precludes their being heard directly). Some Packet, facsimile and SSTV operators on HF seem to be following the practice of commercial/military RTTY stations in shared bands of suddenly landing on occupied channels, often transmitting 'idling' signals over long periods, or demanding that users of other modes should QSY.

Les Moxon, G6XN, for example, questions recent IARU decisions, apparently taken without democratic endorsement by the bulk of amateurs, to allocate an admittedly small slice of the 14MHz band for the 'exclusive' use of SSTV (although many SSTV stations still continue to operate throughout the SSB portions of the band). The answer would seem to be that no matter what mode you use, there remains a need to show an understanding of the needs and rights of all users. Make QRL? calls before using a channel, listening carefully for any answering request to QSY. We simply cannot afford to engage in mode wars on our bands and must find ways of encouraging the experimental development of new technology, including digital modes, without spoiling the bands for others.

HERE & THERE

Tim Wright, G1BCR (and commercial-testing G9BZW) has uncovered a form of wideband VHF noise that could be regarded as an active rather than a passive form of 'rusty bolt' (parasitic diode) interference - and one that may be more common than has previously been recognised. When he experienced severe noise, apparently originating locally, on all channels of a two-way mobile telephone receiver, he was able with the aid of an RF probe and RF attenuator to pinpoint the source as one of the wire elements of the rear window heater. When, with the aid of a razor blade, this particular wire was cut out of circuit, the noise stopped. G1BCR deduced that what had happened was that due to oxidation, a microwave diode had formed in the wire, reverse biased by the heater supply and so forming a diode noise generator. Subsequently, other cases of similar broadband noise in mobile radios have been treated and cured in the same way. It seems clear that the way some particular forms of window heaters on laminated glass are manufactured can quite commonly lead to the creation of diode noise generators, with the window heater wires acting as a noise antenna. Other makes of vehicle seem immune to this problem.

Derek Austin, G4BLX, recently had cause to investigate and solve a problem with his 18-year-old Heathkit SB220 linear amplifier. Both panel meters were sticking or responding very sluggishly. It seemed unlikely that both meters had acquired dirt or other foreign bodies at the same time. In fact, he simply loosened the front pivot screws of both meters by turning them a couple of degrees anti-clockwise. This released the meter movements after which they worked correctly. He also noticed that the antenna-change-over relay coil on the SB220 did not have any back-EMF diode across the coil, resulting in an unwanted spark across his transceiver's remote PTT relay contacts. Simply adding a 1N4001 diode across the relay coil reduced the spark considerably. Two tips that may be of use to other owners of large HF amplifiers.

LOWE ELECTRONICS LTD.

TS-850S

With recent advances in transceiver performance, it's all too easy to concentrate on single aspects of a complex unit and lose sight of the package as a whole. I am as guilty as anyone in this respect, because I have been simply staggered by the improvements in receiver performance achieved by Kenwood in the TS-950S and TS-850S, and have therefore tended to labour the point. It is nevertheless a fact that the receivers in the TS-950S and TS-850S have taken a significant step forwards relative to any other unit on the market, from whatever manufacturer you care to choose, from whatever country you care to name. There is just no comparison.

However, there is more to Kenwood engineering than just the receiver, and more to user satisfaction than knowing that you have the best receiver in the world. What counts is the inner knowledge that when you buy a Kenwood unit, that unit is the result of careful and detailed assessment of your needs; has been the subject of intensive research and design; and has been matched in every aspect to ease of use by a human being, i.e. you. It has always been commented by reviewers and users alike that anyone can sit in front of a Kenwood transceiver and operate it without reference to a handbook. Whatever you want to do, it is easy to do; whichever control you need to use falls easily to hand. You are never faced with the situation so often encountered with other makes when you say to yourself "Why on earth did it do that?"

Further satisfaction comes from the comments you receive on the air when the station you are working tells you that you have the best sounding signal on the band. This is not the result of an accident; it's due to the care and attention which Kenwood give to the transmitted signal as well as the ultimate receiver performance.

That's the situation in general, but as far as the TS-850S is concerned, it has been remarkable how many people have looked at it, used it, and then said that it has everything that they ever wanted in a transceiver. So whatever your needs in amateur radio, the TS-850S is probably the rig to satisfy you. It's all down to small but significant details such as the fact that the user can select high tone or low tone pairs for RTTY (and it's true FSK rather than AFSK), the fact that the user can operate "Reverse CW" which in effect gives you selectable sideband convenience in CW, and allows you to toss interfering stations to one side, the fact that the main display can be set to show VHF and UHF frequencies when using a transverter (yes, there are full transvert facilities), the fact than an advanced keyer with full BK is provided within the rig; so many details which add up to the whole truth that as a total station, the TS-850S brings Kenwood uncompromising performance and ability within the reach of many more people.

Don't take my word for it, try and see a TS-850S for yourself at one of our branches or one of the approved dealers. If you don't know your nearest dealer, just ring Matlock and we will give you his name and address. It is already clear that the TS-850S will be in great demand, so do make sure that there is one for you to see before heading off on a long journey. I can assure you that when you see the TS-850S you cannot fail to be impressed.

Many people are of the opinion that Kenwood make the two best transceivers in the world — the TS-850S and the TS-950S. I have to agree.

TS-850S	**£1295.00**
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PS-52 Matching PSU	**£230.00**
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BNOS/HEATHERLITE/RF CONCEPTS

Although well known for our association with Kenwood products, many folk do forget that we also stock and sell most things connected with amateur radio. We have introduced several new-ish products to our range, and I thought that I should mention just two:-

First of all, **BNOS** — a name always associated with RF products of the highest quality — is back with a new range of VHF and UHF linears to satisfy every need. In addition to the linears, BNOS manufacture dc power supplies for the demanding professional market, and these are now available to the amateur and hobbyist. If you thought all power supplies were the same, be prepared for a pleasant surprise. The BNOS "Black Brick" will sit there delivering smooth well regulated dc, and you will be secure in the knowledge that the supply is over-current and over-voltage protected.

The Linears

CLX range. Linears without pre-amp. First number is the frequency band, second number the input power, third number the output power.

CLX144-3-100	**£225**	CLX432-1-50	**£225**
CLX144-10-100	**£192**	CLX432-10-50	**£192**
CLX144-10-180	**£356**	CLX432-10-100	**£356**
CLX144-25-180	**£303**	CLX432-25-100	**£303**

CLP range. Linears with high performance rx pre-amp.

CLP50-10-100	**£257**	CLP144-3-50	**£152**
CLP70-10-100	**£257**	CLP144-10-50	**£152**
CLP432-1-50	**£257**	CLP144-3-100	**£257**
CLP432-10-50	**£225**	CLP144-10-100	**£225**
CLP432-10-100	**£389**	CLP144-10-180	**£389**
CLP432-25-100	**£334**	CLP144-25-180	**£334**

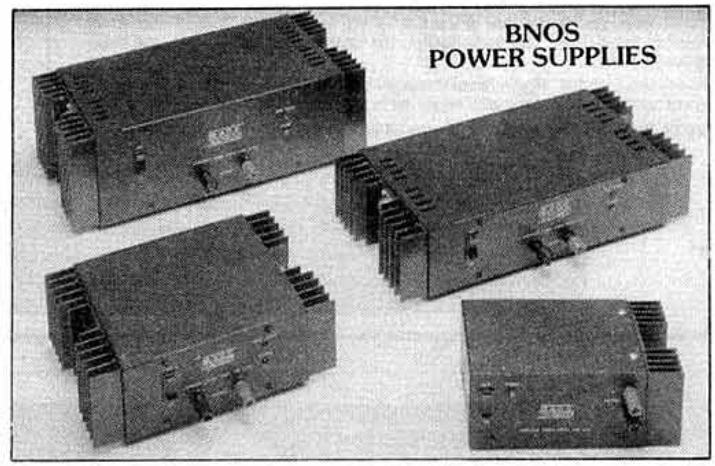
The power supplies

The "E" series which are the rugged "Black Brick" construction, designed to be tucked away under the bench and forgotten about. The first number in the model description is the nominal output voltage; the second number is the rated current output at 50% duty cycle. The peak current capability is 20% higher than the rated output, e.g. the 12/30E delivers 30A rated, and 36A peak.

12/5E	**£78.20**	12/20E	**£204.70**
12/10E	**£147.20**	12/30E	**£250.70**

The "E" range is also available in 5V and 24V output voltages at the same prices as the 12V range.

I know. I know, you can get cheaper power supplies, but not with the in-built protection and RF immunity which come as a standard feature from BNOS. These supplies are literally "Fit and Forget".



HEATHERLITE "HUNTER"

Secondly, the linear amplifiers from **Heatherlite.** I was impressed by the Heatherlite Hunter, which is an ideal match for the small HF transceivers such as the TS-140S and TS-440S, or the ICOM range. Using a single 3-500Z tube, the Hunter is easily driven to the full legal limit on all bands from 80 to 10. It is ruggedly made, and has all facilities and full metering. All in all a very nice unit and designed to give long reliable service. I liked it so much that we now stock the Hunter, and will be happy to show it to you at Matlock.

It's rather nice to note that both BNOS and the Heatherlite Hunter are British made, as of course are our own HF-225 and HF-235 receivers which are stirring up remarkable sales world wide. However, there are other products and other countries, so across the pond to the U.S. of A.

You may be aware of the name of **RF Concepts** as the makers of high performance RF linear amplifiers, but you may not know of their close association with Kantronics, who are without doubt the most innovative of the American producers of packet radio terminals. The Kantronics approach is also evident in the RF Concepts designs, as typified by the new dual band RF power amplifier designed to be used with the new generation of dual band 2m/70cm handhelds from the major Japanese manufacturers.

As far as we are aware, the RF Concepts RFC 2/70G is the first RF power amplifier to cater for both 2 metre and 70 centimetre bands in one box. It's certainly a well made, well thought out product, and simple to use because you just connect the single feed from your handheld to a single input socket. The amplifier itself decides on which band you are transmitting and switches automatically to the correct band for you. Switching speed is less than 20mS, so packet radio is catered for with ease. Output power for 5W input is 30W on 2 metres and 20W on 70 centimetres, so you effectively turn your dual band handheld into a dual band mobile. All you need then is a suitable dual band mobile aerial such as the HS727VM from Hokushin (which of course is available from us at about £25).

To add to all the excitement, the RFC 2/70G includes GaAsFet preamplifiers for both bands, making the whole package a most versatile addition to your station. The RFC 2/70G is available right now at £239 including VAT.

Also available, the RFC 2-23; 2W in/30W out on 2 metres for £119; and the RFC 4-32; 4W in/20W out on 70 centimetres for £159. Both amplifiers are fitted with GaAsFet preamps, and are powered from 12V dc.

Finally, a real bargain at the other end of the price scale. We have obtained a fair quantity of mains power supplies originally intended to power a well known portable computer. These are housed in a 100 x 65 x 70mm black plastic brick, and deliver 13V dc at 1.9 amps unregulated. Ideal for powering all those little accessory items around the shack, or many of the VHF scanner receivers in use today, these are a real bargain at £5.75 including VAT. Because they are a bit heavy, postage is £2.50, but the weight is a measure of the quality. No good buying a light weight power supply is it?

73

John Wilson

G3PCY

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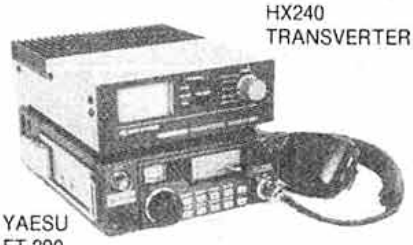

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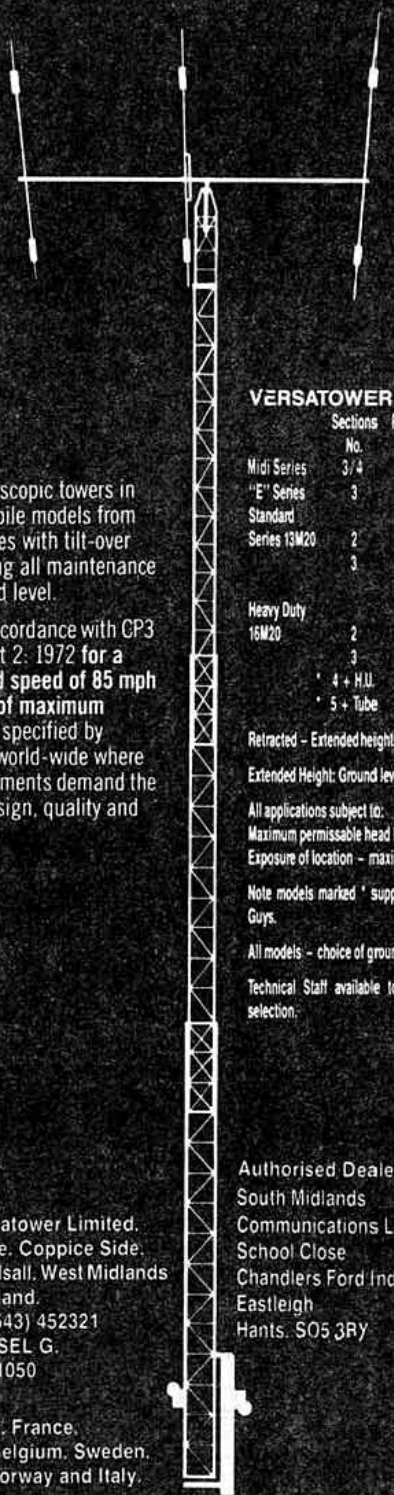

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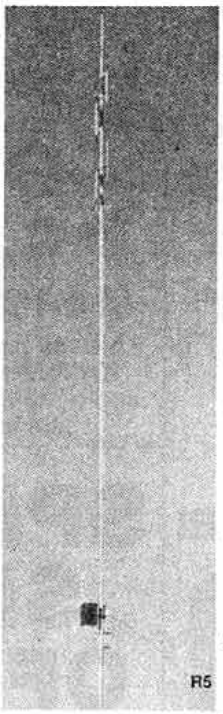

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DCS2 "S Meter" to suit our receivers	**£8.90**	**£12.90**
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VF160 Dual band VFO to suit AT160	**£19.90**	**£34.20**

Please add £1.20 p&p to your total order value.

EXPORT — use prices and postage as listed except for airrmail delivery outside Europe — add £2.50 per kit. Sterling only — credit card is easiest.

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All kits contain a good quality printed circuit board with screen printed parts locations, full clear instructions, and all board mounted components. Credit card sales and technical service are available by phone during office hours. UK delivery is normally within 7 days.

73 from Dave G4KQH, Technical Manager

Quality

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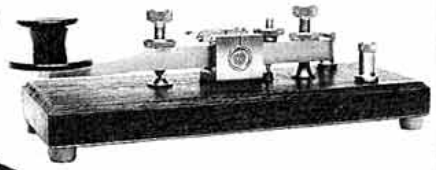

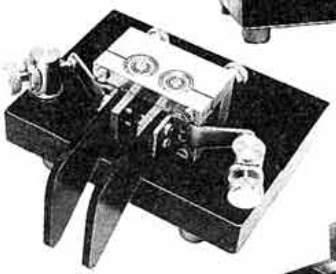

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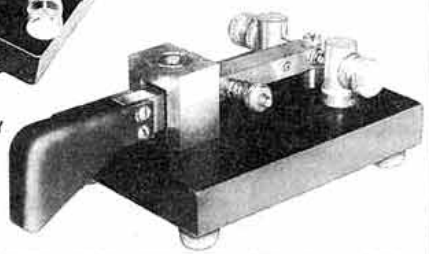

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The keypad offers an easy to use method of quickly changing parameters to customise the MM-3.

MM-3: £169.95 inc. VAT

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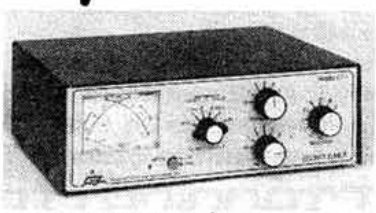

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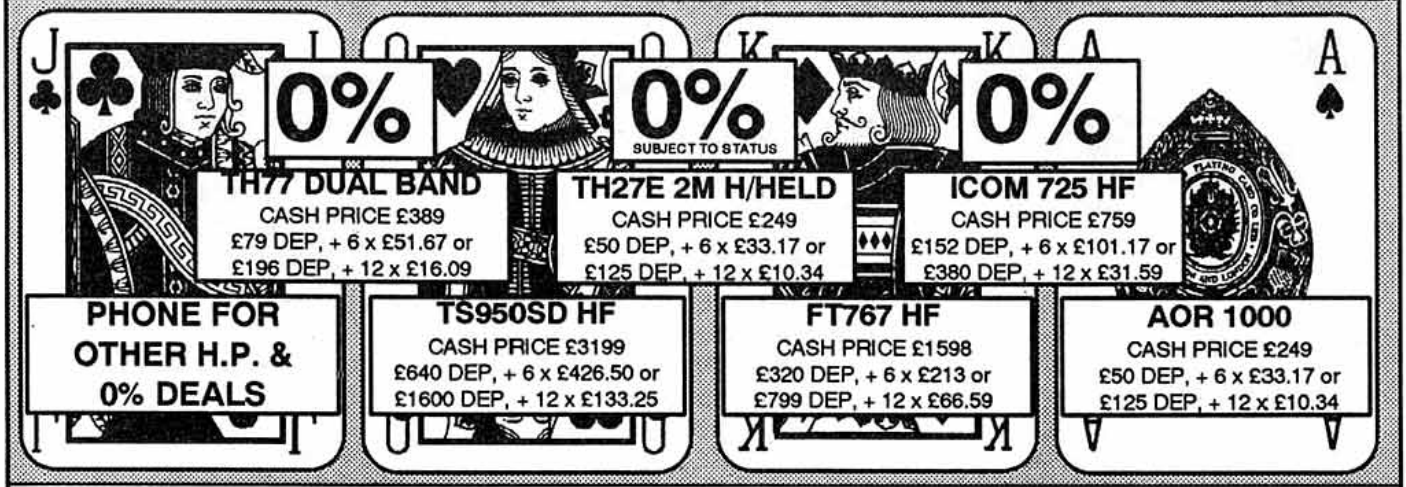

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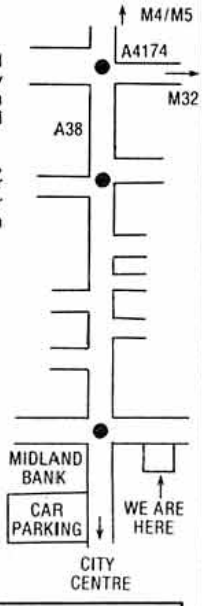

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RSGB Annual Meeting

8 DECEMBER 1990

University of Bristol

As usual, the meeting was in two parts: the Annual General Meeting as required by the Companies Acts, and an Open Meeting comprising a speech by the outgoing President, presentation of Trophies, and a question and answer session.

The Tyndall Theatre in the University of Bristol's H H Wills Physics Laboratory, had been proposed as a venue by the Bristol RSGB Group who, together with local Raynet groups, provided talk-in and car park marshalling. As described last month, severe snow falls prevented anyone attending from the Midlands, North or Scotland, except those who travelled the previous day or by air.

The Chairman of the Bristol RSGB Group, G0FGZ, welcomed the assembled company to Bristol, thanking the stewards and talk-in operators.

The BRSGBG was, in turn, thanked by RSGB Secretary, David Evans, G3OUF, who explained that the Council had decided a few years ago to move the Annual Meeting around the country so members outside the south-east could participate in the meeting. The policy had been successful despite the bad weather. Next year's AGM would be in London.

Minutes of the 64th Annual General Meeting of the Radio Society of Great Britain

The President, Frank Hall, GM8BZX, introduced those with him on the rostrum:- Julian Gannaway, G3YGF, Immediate Past President and Chairman Finance and Staff Committee; Philip Smith, Financial Controller; Willie McClintock, G3VPK, Honorary Treasurer; David Evans, G3OUF, Company Secretary; and John Case, GW4HWR, President-Elect.

Apologies for absence were recorded on behalf of:- G Jessop, G6JP; M Atherton, G3ZAY; R Peace, G8SOZ; M Dixon, G3PFR; R J Hughes, G3GVV; A Butcher, G3FSN; R Broadbent, G3AAJ; N Roberts, G4IJF; A Voss, G0CCI; R Ray, G3NCL; S Ray, G4HES; H Fenton, G8GG; J Bazley, G3HCT; P Chadwick, G3RZP; M Shardlow, G3SZJ; D Lawley, G4BUO; R Barrett, GW8HEZ; P Essery, GW3KFE; D Jackson, G4HYY; J Jackson, G8WWO; E Batts, G8LWY; F Claytonsmith, G3JKS; R Heath, G3UJV; B Patterson, GI3KYP; I Kyle, GI8AYZ; H Irvine, GI3TLT; D A Palmer, G6CMV; and R E J Sharp, G4VNR.

The President recorded that more than 50 members were present so the meeting was quorate (it was later recorded that some 74 members attended). The Secretary read the notice convening the meeting which had been circulated to all members with the November 1990 edition of *Radio Communication*.

Minutes

The President drew members' attention to the first Agenda item **to receive and consider the minutes of the 63rd Annual General Meeting circulated with the March 1990 issue of *Radio Communication***. He reminded those present that it was not a Companies Act requirement that the Minutes be presented at an AGM, nor was it a requirement of the RSGB to record discussions other than recording decisions made. However, Council felt that members should have an opportunity to comment on the minutes.

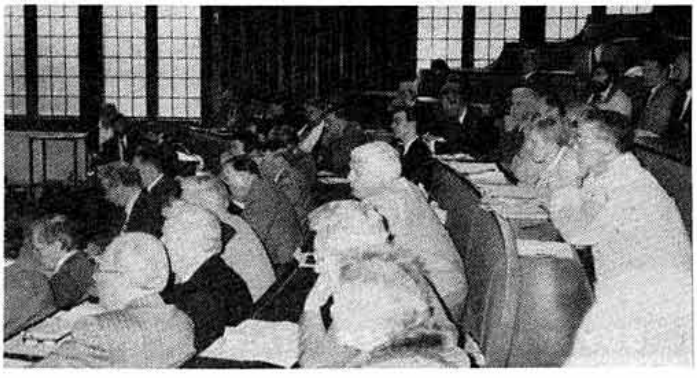
Mr Crosland, G6JNS, complained that corrections he had submitted had not been published in a form he considered to be accurate.

The Immediate Past President, Dr Julian Gannaway, G3YGF, said the corrections received were very long, almost verbatim, but he had incorporated the gist of the requested corrections in keeping with the style of the rest of the minutes.

Mr Crosland replied that, even the gist had not accurately reported what was said, and accused the IPP of deliberately trying to conceal some answers given at the meeting.

The President cautioned Mr Crosland that he had made a very serious accusation, and reminded him that research had shown that members did not want *RadCom* to be filled with the details of the AGM.

Mr Crosland said he stood by his allegation that embarrassing items had been omitted and insisted that his proposed amendments be accepted, though the President reminded him that no-one else had requested such amendments.



Mr Hein, GM1YME, felt the allegation should not be dismissed lightly and asked for the proposed amendments to be published for members to make up their own minds. The President reiterated that, of the 100-plus members present at Dunoon, no-one else had complained of inaccuracy, but he was prepared to put it to the floor. On a show of hands, the vast majority were satisfied with the minutes as published.

Accounts

Moving to item two on the Agenda, **to receive and consider the accounts for the year ending 30 June 1990 and the Reports of the Council and Auditors thereon**, the President asked the President Elect to read the Auditors' Report. This stated that the accounts gave a true and fair view of the affairs of the Society and had been properly prepared.

The President called on the Honorary Treasurer to present the accounts for the 1989/90 financial year.

Mr McClintock referred to the problems in the Society's Accounts Department in 1989 leading to an inauspicious start to the financial year.

In September, he had agreed to be Hon Treasurer, but only as a temporary appointment. It had immediately become apparent that, to obtain accurate financial information rapidly, an IBM AS400 computer and some accounting software packages should be leased to provide the long term benefit of a fully integrated computer system.

Council had employed an external accountant to produce accurate monthly accounts but he was immediately diverted onto problems with VAT. As a result, it was nearly six months into the financial year before the first four months' accounts became available. A decision was taken to increase the subscription at March 1990, and to reduce *RadCom* costs which had not been kept in check. A number of the *RadCom* team including the Editor were not prepared to accept this decision and in January they resigned. Fortunately, Mike Dennison was recruited internally to do the Editor's job. At the same time, after examining three tenders, Council appointed Peter Goddard and Co to do the 1989/90 audit.

The first seven months of the year had shown a deficit of £20,000 which increased to £23,000 for the first 8 months. This was the position at the end of April, with only two months of trading being left in the financial year.

In the past, May and June had been good months for subscription income, usually providing a surplus, so there was optimism that the year end result would be reasonable. Unfortunately, March produced a deficit of nearly £40,000 and, when this was apparent in early May, it was recognised that costs would have to be reduced. However, any savings made were unlikely to affect the year end result.

Council then employed Philip Smith, as a financial consultant for three days a week from 1 June to improve financial control within the Society's operations and to produce management accounts not later than two weeks after each month end. However, this did not affect the financial year to 30 June and a further loss of £40,000 in April helped to push the deficit towards £110,00, where it remained until year end.

A budget for 1990/91 had been prepared which included significant staff cuts, charging for services, increased subscriptions and general economies. Council had agreed that the Society had to change its priorities, so that it could operate primarily as a successful business providing only those services which it could afford.

Over the last five or six years, the services provided by the Society had expanded in response to members' needs and demands. The list included *Radio Communication*, newsletters, *Call Book*, technical books, GB2RS, the QSL Bureau, microwave components, EMC advice, planning advice, technical queries, insurance, audio visual library, awards and trophies. Support was provided for contests, DF, Raynet, rallies, repeaters, packet, beacons, bandplanning, and propagation studies. Then there was representation at the International Amateur Radio Union to make sure that we had bands to operate on, the RLO scheme, affiliated societies, regional meetings, club lectures, general correspondence, DTI liaison, WARC liaison, Novice Licence, special events, reciprocal licensing, notices of variation for packet stations, special research permits, repeater licensing, intruder watch and spectrum abuse.

Using graphs, Mr McClintock demonstrated how the surpluses of the 70s and early 80s had been turned into losses in recent years. He said it was vitally important that subs kept pace with inflation and not be allowed to fall behind, as had been the case in the past. The Hon Treasurer then demonstrated how, in real terms, expenditure per member was much higher now than in 1977, amounting to £40; the balance being made up from advertising and book sale income.

Members' demands for services had been met but this had depleted the Society's cash reserves. Obviously, said Mr McClintock, we had erred on the side of benevolence to the detriment of the business and this trend needed to be reversed.

Council had approved a new Headquarters structure from 1 January 1991, which recognised that running the business and dealing with amateur radio matters was too great a job for one person. It was currently necessary to give finances absolute priority, and to that end Philip Smith would join the staff at

HQ and assume responsibility for the day-to-day management of all of the Society's operations. This decision demonstrated that Council had identified the underlying problems and was prepared to take radical steps to ensure a business-like approach to running our Society.

Coming to the Accounts themselves, the Hon Treasurer said the income and expenditure account showed a large loss but that the balance sheet was very strong. The Society had a net worth of nearly £840,000 reflecting its true worth; the HQ building and land was now properly valued and the value of the creditors was properly shown.

The President then asked for questions on the finances.

John Cook, G4GAR, was unhappy about the small number of income headings which precluded judgement of the profitability of, for instance, newsletters.

The Honorary Treasurer replied that the accounts had always been portrayed in this way but he agreed with Mr Cook's point. Mr Smith had plans to expand next year's accounts, though it would need more *RadCom* space.

Mr Smith explained that newsletter income was £32,000 which meant a small loss when overheads were taken into account. More detailed internal accounting would prevent this kind of thing happening, and newsletter subs had recently increased and were being closely monitored. This approach would apply to all categories of income.

The President mentioned that written questions had been received from P Crosland, G6JNS, J H Cook, G4GAR and A Voss, G0CCI. The Hon Treasurer would be dealing with those. Written replies had already been given to the more detailed questions.

Mr Hawkyard, G5HD, asked whether the trade debtors figure was considered excessive. Mr McClintock agreed it had increased owing to the depression. Mr Smith added that much tighter credit control was now being exercised, with debtors being vigorously chased.

Mr Crosland, G6JNS, asked why the Society had not acted on recommendations made by the auditors that the very expensive new computer should not be bought and that the Secretary should be dismissed.

The Hon Treasurer replied that the auditors had made a recommendation based solely on the accounts side of the computer. Mr Smith said that although the recommendation was right in the short term, Council had taken the long term view that all software should be fully integrated which entailed the use of the mini-computer.

Mr Crosland pressed for a reply to the second part of his question.

Mr Smith said that the auditors had made several recommendations in a series of options. These ranged from expanding out of trouble (assuming many new members would immediately join) to dramatic cuts, including dispensing with the Secretary (which would have had a disastrous effect on the Society's amateur radio operations). Council had decided to take the interim course involving running the business like a business and trying to keep the amateur radio side as a much smaller unit running efficiently within a budget. He said he would support the course whereby the profits of the business are ploughed back into amateur radio services. At present, the tail was wagging the dog.

Mr Crosland expressed his continuing worry about losses. Had they been contained?

Mr Smith said that the Society was in a strong position provided he received support from Council to make tough decisions in the next six months to get the Society into surplus. He would be producing an account up to the end of December so that members could see the results so far. These would not be good as there had been no major management change in the last six months, though there had been a lot of economies. Success next June would depend on members continuing to support the Society by paying the increased subscription.

Mr Crosland asked whether the Society might break even in the current financial year.

Mr Smith replied that this was his intention but it depended partly on how many members due to pay in July paid early. He added that he would be putting more information into *RadCom*, such as interim figures and statistics. He was trying to be more open.

John Hein, GM1YME, asked when the six months figures would be published. Mr Smith replied he was aiming at February.

1991 Council

The President moved to agenda item 5 **to announce the names of those members to serve on Council for the year 1991 and to call for volunteer scrutineers for the 1991 Council election**.

The results of the recent Council Election for one honorary vacancy on the 1991 Council were:-

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

Mr J D Forward, G3HTA, was declared elected.

In Zone E, Wales, the results were:-

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

Mr C N Trotman, GW4YKL, was declared elected.

In Zone B, the Midlands, John Allen, G3DOT, was declared elected unopposed.

In Zone F, Northern Ireland, there were no candidates put forward for election. Therefore a casual vacancy existed from 1 January 1991 which would be discussed by the 1991 Council.

PHOTOGRAPH: G0CKQ

Left to right: Philip Smith, Julian Gannaway, G3YGF, Frank Hall, GM8BZK, and David Evans, G3OUF.

The President congratulated the successful candidates and welcomed them to the Council.

As usual, a number of votes could not be allowed. These totalled 220 and were for the following reasons:-

Received late	25
Unidentified	146
Duplicates	0
Members whose subs were in arrears	25
Invalid categories, (clubs, associates, etc)	6
Spoilt papers	18

The President then read out the names of those to serve on the 1991 Council:-

Ordinary members:

John Case, GW4HWR, President for 1991
Frank Hall, GM8BZX, Immediate Past President
John Bazley, G3HCT
George Benbow, G3HB
Hilary Claytonsmith, G4JKS
John Forward, G3HTA
George Jessop, G6JP
Smudge Lundegard, G3GJW
Angus McKenzie, G3OSS
Francis Rose, G2DRT

Zonal members:

Zone A:	Geoff Smith, G4AJJ
Zone B:	John Allen, G3DOT
Zone C:	John Greenwell, G3AEZ
Zone D:	Peter Chadwick, G3RZP
Zone E:	Clive Trotman, GW4YKL
Zone F:	TBA
Zone G:	Ian Suart, GM4AUP

The scrutineers were thanked for their work. They were E Major, G3BYC; B Bower, G3COJ; W Dunell, G3BYW; W Craig, G6JJ; A Butcher, G3FSN; A Gard, G4LWA; P Manning, G1LKJ; I Brothwell, G4EAN; T Winchcombe, G6ZH.

The President announced that all of the above had agreed to take part again next year and called for further volunteer scrutineers for the 1992 Council election. John Hein, GM1YME, volunteered. The *RadCom* Editor was asked to remind members that anyone could volunteer, not just those who attended the AGM.

Auditors

Lastly on the AGM Agenda was a resolution **to reappoint the Auditors, Peter Goddard and Company and to authorise Council to fix their remuneration**. The President called for a proposer and seconder.

The motion was proposed by Mrs M Jenkins GW3OMN, and seconded by Mr P A D Manning G1LKJ. On a show of hands the motion was carried unanimously.

A report on the informal session will appear in a later *RadCom*.

The half yearly accounts appear, this month, on pages 57 and 58.

Amateur Radio Band Plans

On all bands there are recommended sections set aside for use by each mode. In some parts of the world (e.g. the USA) observance of these band sub-divisions is mandatory. The IARU Region 1 hf band plan is set out below and should be observed at all times even though its recommendations are only advisory as far as UK amateurs are concerned.

1.8MHz

	UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
1.810							
CW only			Available on the basis of non-interference to other services (inside or outside the United Kingdom)	(Not allocated)	9dBW	15dBW	Morse Telephony RTTY Data Facsimile SSTV
1.840	1.840 ±2kHz	*RTTY*					
CW and phone							
2.000							

Callsign	Location	Frequencies (kHz)
GNI	Niton IoW	1834
GNK	Norwick, Shetland	1824
GPK	Portpatrick	1883
GHD	Hebrides	1866
GKR	Wick	1827, 1922*
GND	Stonehaven	1856w, 1946, 1999*
GCC	Cullercoats	1838, 1953w
GKZ	Humber	1869, 1925(w)
GNF	N. Foreland	1848
EJM	Malin Head	1841w
EJK	Valentia	1827w
OST	Ostende	1817w, 1820w, 1905, 1908, 1971.5*
OSA	Antwerpe	1901w, 1904
PCH	Scheveningen	1862w, 1890w,1919.5*, 1939w (1971), 1972.5*, (1995)
DAN	Norddeich	1911
DAO	Kiel	1880, 1883, 1915, 1918
OXB	Blavand	1813
FFU	Brest	(1894), (1995)
FFO	St Nazaire	1817, (1995)
FFC	Bordeaux	1820, 1862w
FFM	Marseilles	1906w, 1988
TKM	Grasse	1834, 1988

The 1.8MHz band is shared with other services. This is a list of coastal radio station frequencies which are to be avoided.

All frequencies are used for ssb, except those marked with an asterisk (rtty). Apart from those in brackets, which are available when required, they are all in regular use. "W" indicates a working frequency.

In addition to these, 1950 and 1953kHz, both J3E/USB, are assigned to all UK coastal radio stations. The frequencies which tend to suffer interference from stations in the amateur service are 1,820, 1,841, 1,852 and 1,953kHz, with the last being by far the most commonly affected.

IARU: Band Plan co-ordination

As the RSGB represents the interests of radio amateurs within the UK, so the International Amateur Radio Union (IARU) represents amateur radio on an international scale. Its membership is made up of national societies rather than individuals and it has 124 member societies. It was founded in 1925 and has its headquarters in the USA. It is split into three sections as is the International Telecommunications Union (ITU). Region 1 comprises the UK, Europe, Africa and the USSR.

The aim of the IARU is to promote worldwide growth in the movement and where necessary represent the movement's interests at the ITU. It also regulates and co-ordinates band plans, and makes recommendations for the use in operation of specialised activities such as meteor scatter.

Another service provided is the Monitoring Service (IARUMS) which monitors unauthorised transmissions by other services within the amateur bands. Reports from the IARUMS are sent to both the ITU and national telecommunication administrations.

3.5MHz

	UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
3.500							
CW only	3.500 – 3.510	*reserved for intercontinental working*	Primary. Shared with other services	(Not allocated)	20dBW	26dBW	Morse Telephony RTTY Data Facsimile
	3.500 – 3.560	*contest preferred segment*					
	3.590 – 3.600	*used by packet radio shared with CW/RTTY*					
3.600	3.600 ±20kHz	*RTTY shared with CW/phone*					
CW and phone	3.600 – 3.650	*contest preferred segment*					
	3.635 – 3.650	*used by USSR stations for intercontinental working*					
	3.700 – 3.800	*contest preferred segment*					
	3.735 ±5kHz	*SSTV/fax recommended*					
	3.775 – 3.800	*reserved for intercontinental working*					
3.800							

7MHz

UK Band Plan			Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
7.000							
CW			Primary	Primary	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV
7.040	7.040 ±5kHz	*RTTY/SSTV/fax shared with CW/phone*					
CW and phone							
7.100							

10MHz

UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
10.100						
CW		Secondary	(Not allocated)	20dBW	Morse 26dBW	Telephony RTTY Data Facsimile SSTV
10.140						
RTTY (shared with CW)						
10.150						

Notes: No contests should be organised on the 10MHz band. Credit for awards or diplomas should be accepted for contacts made on the 10MHz band. SSB may be used on the 10MHz band during emergencies involving the immediate safety of life and property, and only by stations actually involved in the handling of emergency traffic.

14MHz

UK Band Plan			Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
14.000							
CW	14.000 – 14.060	*contest preferred segment*					
14.070							
RTTY (shared with CW)	14.089 – 14.099	*used by packet radio*					
14.099							
	14.099 – 14.101	*reserved for International Beacon Project (packet radio operators are asked to take special care to avoid causing interference in this segment)*	Primary	Primary	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV
14.101							
CW and phone	14.125 – 14.300	*contest preferred segment*					
14.250							
CW and phone	14.230 ±5kHz	*recommended for SSTV/fax*		(Not allocated)			
14.350							

18MHz

UK Band Plan	Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
	Amateur Service	Amateur Satellite Service	Carrier	PEP	
18.068					
CW					
18.100					
CW and RTTY	Primary	Primary	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV
18.110					
CW and phone					
18.168					

21MHz

UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
21.000						
CW	21.100 ±20kHz *RTTY shared with CW* 21.100 – 21.120 *packet*	Primary	Primary	20dBW	26dBW	Telephony RTTY Data Facsimile SSTV
21.149	*reserved for International Beacon Project*					
21.151						
CW and phone	21.340 ±5kHz *recommended for SSTV/fax*					
21.450						

24MHz

UK Band Plan	Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
	Amateur Service	Amateur Satellite Service	Carrier	PEP	
24.890					
CW					
24.920					
CW and RTTY	Primary	Primary	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV
24.930					
CW and phone					
24.990					

28MHz

UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
28.000						
CW	28.120 – 28.150 *packet radio* 28.190 – 28.300 *reserved for International Beacon Project (to end 1990)* 28.190 – 28.225 *reserved for beacons (from end 1990)*	Primary	Primary	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV
28.200	28.100 ±50kHz *RTTYshared with CW*					
CW and phone	28.680 ±5kHz *recommended for SSTV/fax* 29.250 ±50kHz *packet radio NBFM* 29.300 – 29.550 *reserved for Satellite Service downlink*					
29.700						

50MHz

UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
50.000						
CW only	50.020 – 50.080 *beacons* 50.090 *CW calling*	Primary. Available on the basis of non-interference to other services outside the United Kingdom. Antennas limited to 20 metres above ground level, with horizontal polarisation only. No Mobile or Maritime Mobile operation	(Not allocated)	14dBW erp	20dBW erp	Morse Telephony RTTY Data Facsimile SSTV
50.100						
All narrow band modes	50.100 – 130 *intercont.DX window* 50.110 *intercontinental calling* 50.185 *cross-band act. centre* 50.200 *SSB calling* 50.300 *CW MS calling* 50.350 *SSB MS calling*					
50.500						
All modes	50.600 *RTTY (AFSK)* 50.630 *packet radio* 50.650 *packet radio* 50.670 *packet radio* 50.690 *packet radio* 50.710 *packet radio* 50.730 *packet radio* 50.750 *packet radio*					
51.000						
SSB and CW only	51.110 *VK / ZL calling*	Secondary. Available on the basis on non-interference to other services outside the United Kingdom. Antennas limited to 20 metres above ground level, with horizontal polarisation only. No Mobile or Maritime Mobile operation				
51.125						
All modes	51.210 *Raynet* 51.300 *calling (not FM)* 51.410 – 51.590 *FM telephony* 51.510 *FM calling* 51.950 *Raynet* 51.970 *Raynet intergroup working* 51.990 *Raynet*					
52.000						

70MHz

UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
70.000						
Beacons	70.030 *personal beacons*	Secondary. Available on the basis on non-interference to other services outside the United Kingdom	(Not allocated)	16dBW	22dBW	Morse Telephony RTTY Data Facsimile SSTV
70.030						
SSB and CW only	70.150 *meteor scatter calling* 70.185 *cross-band activity centre* 70.200 *SSB / CW calling*					
70.250						
All modes	70.260 *AM / FM calling*					
70.260						
Channelised operation using 12.5 kHz channels	70.3000 *rtty / fax* 70.3125 *packet radio* 70.3250 *packet radio* 70.3375 70.3500 *Raynet* 70.3625 70.3750 *Raynet* 70.3875 70.4000 *Raynet* 70.4125 70.4250 70.4375 70.4500 *FM calling* 70.4625 70.4750 70.4875 *packet radio*					
70.500						

144MHz	UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
144.000							
CW only	144.000 – 144.025 144.050 144.100 144.140 – 144.150	*moonbounce* *CW calling frequency* *MS CW ref. frequency* *FAI working*					
144.150							
SSB and CW only	144.150 – 144.160 144.250 144.260 144.300 144.400	*FAI working* *used for GB2RS (SSB) and slow morse transmissions* *used by Raynet* *SSB calling frequency* *MS SSB ref. frequency*					
144.500							
All modes non-channelised	144.500 144.600 144.600± 144.625 144.650 144.675 144.700 144.750 144.775 144.800 144.825	*FSTV calling frequency* *RTTY calling frequency* *RTTY working (FSK)* *packet radio* *mailboxes* *packet radio* *fax calling frequency* *FSTV calling and talkback* *Raynet* *Raynet* *Raynet*					
144.845							
Beacons	144.850	*Raynet**					
144.990							
FM repeater inputs	145.000 R0 145.025 R1 145.050 R2 145.075 R3 145.100 R4 145.125 R5 145.150 R6 145.175 R7		Primary	Primary	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV
145.200							
FM Simplex channels	145.200 S8 145.225 S9 145.250 S10 145.275 S11 145.300 S12 145.325 S13 145.350 S14 145.375 S15 145.400 S16 145.425 S17 145.450 S18 145.475 S19 145.500 S20 145.525 S21 145.550 S22 145.575 S23	*Raynet* *used by Raynet* *used for slow morse tone modulated transmissions* *RTTY AFSK* *FM calling channel* *Used for GB2RS (FM) broadcast* *Used for rally/exhibition talk-in*					
145.600							
FM repeater outputs	145.600 R0 145.625 R1 145.650 R2 145.675 R3 145.700 R4 145.725 R5 145.750 R6 145.775 R7						
145.800							
Satellite service							
146.000							

Notes on UK 144MHz and 430MHz Band Plans

MS operation can take place up to 26kHz higher than the reference frequency (see RSGB *Amateur Radio Operating Manual* p80).

The beacon and satellite service must be kept free of normal communication transmissions to prevent interference with these services. (* – 144.850MHz in use by Raynet until further notice, subject to 25W erp max and vertical polarisation).

The use of the fm mode within the SSB/CW section and CW and SSB in the FM-only sector is not recommended.

Repeater stations are primarily intended as an aid for mobile working and they are not intended to be used for DX communication. FM stations wishing to work DX should use the all-modes section, taking care to avoid frequencies allocated for specific purposes.

430 – 440MHz

430 – 440MHz	UK Band Plan	Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
430.000		Secondary. Not available for use within the area bounded by: 53°N 02°E, 55°N 02°E, 53°N 03°W and 55°N 03°W		10dBW erp	16dBW erp	
431.000		Secondary. Not available for use: a) within the area bounded by: 53°N 02°E, 55°N 02°E, 53°N 03°W and 53°N 03°W; b) within a 100km radius of Charing Cross, London (51°30'30"N, 00°07'24"W)				
432.000						
CW only	432.000 – 432.025 *moonbounce* 432.050 *CW centre of activity*					
432.150						
SSB and CW only	432.200 *SSB centre of activity* 432.350 *microwave talk-back*					
432.500						
All modes non-channelised	432.500 *SSTV activity centre* 432.600 *RTTY (FSK) activity centre* 432.625 *packet links* 432.650 *packet links* 432.675 *packet radio* 432.700 *fax activity centre*					
432.800						
Beacons		Secondary	(Not allocated)	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
433.000						
FM repeater outputs in UK only	433.000 RB0 433.025 RB1 433.050 RB2 433.075 RB3 433.100 RB4 433.125 RB5 433.150 RB6 433.175 RB7 433.200 RB8 433.225 RB9 433.250 RB10 433.275 RB11 433.300 RB12 *(RTTYand voice)* 433.325 RB13 433.350 RB14 433.375 RB15					
433.400						
FM simplex channels	433.400 SU16 433.425 SU17 433.450 SU18 433.475 SU19 433.500 SU20 *FM calling channel* 433.525 SU21 433.550 SU22 *used for rally and exhibition talk-in* 433.600 SU24 *RTTY AFSK* 433.625 *packet radio* 433.650 *packet radio* 433.675 *packet radio* 433.700 *Raynet* 433.725 *Raynet* 433.750 *Raynet* 433.775 *Raynet*					
434.600						

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430 – 440MHz

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	UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
434.600							
FM repeater inputs in UK only	434.600 RB0 434.625 RB1 434.650 RB2 434.675 RB3 434.700 RB4 434.725 RB5 434.750 RB6 434.775 RB7 434.800 RB8 434.825 RB9 434.850 RB10 434.875 RB11 434.900 RB12 434.925 RB13 434.950 RB14 434.975 RB15	*RTTY and voice*	Secondary	(Not allocated)	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
435.000							
Satellite Service	434 – 440	*ATV — frequencies chosen so as to avoid interference to other band users and, in particular, the amateur satellite service*		Secondary			
438.000							
				(Not allocated)			
440.000							

1,240 – 1,300MHz

	UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
1,240.000							
All modes	1,240.150 1,240.300 1,240.450 1,240.600 1,240.750	*packet radio (150kHz b/w)* *packet radio (150kHz b/w)* *packet radio (150kHz b/w)* *packet radio (150kHz b/w)* *packet radio (150kHz b/w)*	Secondary	(Not allocated)	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
1,241.100							
ATV							
1,251.500							
All modes							
1,260.000							
Satellite service				Secondary. Earth to space only			
1,270.000							
ATV							
1,286.000							
All modes c)							
1,291.000				(Not allocated)			
Repeater input	RM0 RM19	*(UK) 25kHz spacing*					
1,291.475							
1,291.500							

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1,240 – 1,300MHz

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UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
1,291.500						
All modes						
1,296.000						
CW	1,296.000 – 1,296.025 *moonbounce*					
1,296.150						
SSB Narrow band DX segment a)	1,296.200 *narrow-band centre of activity* 1,296.500 – 1,296.600 *linear transponder input* 1,296.600 – 1,296.700 *linear transponder output*					
1,296.800						
Beacons exclusive b)	1,296.500 *SSTV* 1,296.600 *RTTY* 1,296.700 *fax*					
1,296.990						
		Secondary	(Not allocated)	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
1,297.000						
Repeater output	RM0 – RM19 *(UK) 25kHz spacing*					
1,297.475						
1,297.500						
FM simplex d)	SM20 – SM30					
1,298.000						
All modes	*digital communications*					
1,298.500						
	1,299.000 *remote control* 1,299.000 *packet radio (25kHz b/w)* 1,299.425 *packet radio (150kHz b/w)* 1,299.575 *packet radio (150kHz b/w)* 1,299.725 *packet radio (150kHz b/w)*					
1,300.000						

UK extends to 1,325MHz.

Notes on the 1,240 – 1,300MHz Band Plan

1. IARU Region 1 Band Plan
the following notes are part of the provisional IARU Region 1 band plan, adopted at the IARU Region 1 conference in Cefalu (1984), and all member societies should strongly promote adherence to the recommendations made in these notes.

1.1 Footnotes
a. CW is permitted over the whole narrow-band DX part of the band; CW exclusive between 1,296.000 – 1,296.150MHz.
b. Regional planning by the Beacon Co-ordinator only for beacons with more than 50 Watts ERP.
c. DARC draws attention to the fact that in order to avoid interference to/from primary users the use of 1,286 – 1,291MHz for ATV will be continued in The Federal Republic of Germany.
d. In countries which do not have access to 1,298 – 1,300MHz (e.g. Italy) the FM simplex segment may also be used for digital communications, if necessary.

1.2. Miscellaneous agreements
At the IARU Region 1 conference in Warsaw (1975) it was recommended that France, after their loss of the upper part of the band to other services, adopt the portion 1,238 – 1,240MHz for narrow-band operations in the same way as the rest of Region 1 uses in 1,296 – 1,298MHz segment of the band.

2. Usage
The following notes are referring to the usage column in the band plan. In the right amateur spirit operators should take notice of these agreements which are made for operating convenience, but no right to reserved frequencies can be derived from a mention in the usage column or from the following notes.

2.1 During contests and band openings local traffic using narrow-band modes should operate between 1,297 – 1,298MHz.

2,320 – 2,450MHz

	UK Band Plan	Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
2,300.000						
Sub-regional (National band plans)	2,310.0 – 2,310.5 *repeater links* 2.310.100 *packet radio (200kHz b/w)* 2,310.300 *packet radio (200kHz b/w)* 2,310.0 – 2,310.5 *remote control*					
2,320.100						
CW exclusive	2,320.000 *EME* 2,320.025 *(moonbounce)*					
2,320.150						
CW & SSB	2,320.200 *SSB centre of activity*					
2,320.800						
Beacons exclusive						
2,320.990						
2,321.000						
Simplex & repeaters (FM)		Secondary	(Not allocated)	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
2,322.000						
All modes	2,322 – 2,355 *ATV* 2,355.1 – 2,364.0 *repeater links* 2,355.100 *packet radio (200kHz b/w)* 2,355.300 *packet radio (200kHz b/w)* 2,364.000 *packet radio (1MHz b/w)* 2,365 – 2,370 *repeaters* 2,370 – 2,390 *ATV*					
2,390.000						
	EME (moonbounce)					
2,392.000						
All modes						
2,400.000						
Amateur satellite service		Secondary. Users must accept interference from ISM users	Secondary. users must accept interference from ISM users			
2,450.000						

Notes on the 2,300 – 2,450MHz Band Plan

a) In countries which do not have access to the ALL MODES against 2,322 – 2,390MHz, the FM SIMPLEX & REPEATER segment 2,321 to 2,322MHz may be used for digital data transmissions.

b) In countries where the narrow-band segment 2,320 – 2,322MHz is not available, the following alternative narrow-band segments can be used: 2,304 – 2,306MHz and 2,308 – 2,310MHz.

ISM (Industrial, Scientific and Medical).

3,400 – 3,475MHz

	UK Band Plan	Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
3,400.000						
All modes						
3,456.000						
Narrow band CW/EME/SSB	3,456.200 *centre of activity* 3,456.800 – 3,457.000 *beacons* 3,457.000 – 3,458.000 *remote control*	Secondary	(Not allocated)	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
3,458.000						
All modes						
3,475.800						

5,650 – 5,850MHz

UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
5,650.000						
Amateur satellite service (up-link)		Secondary	Secondary. Earth to Space only	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
5,670.000						
All modes						
5,680.000						
All modes	5,668 – 5,670 *narrow band** 5,668.2 *centre of activity** 5,668.8 – 5,669.0 *beacons**	Secondary. Users must accept interference from ISM users	(Not allocated)			
5,760.000						
Narrow-band CW/EME/SSB	5,760.200 *centre of activity* 5,760.800 – 5,761.000 *beacons*					
5,762.000						
All modes						
5,830.000			Secondary. Users must accept interference from ISM users. Space to Earth only			
Amateur satellite service (down-link)						
5,850.000						

* change expected to take at least 2 years.

10,000–10,500MHz

UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
10,000.000						
All modes (ATV, data transmission, FM simplex, duplex and repeaters)	10,006 – 10,026 *packet radio* 10,006 – 10,026 *repeater links / control* 10,100 *wide band beacons* 10,150 – 10,170 *packet radio* 10,150 – 10,170 *repeater links / control*	Secondary	(Not allocated)	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
10,368.000						
Narrow-band CW/EME/SSB/ Beacons	10,368.200 *SSB centre of activity* 10,368.800 – 10,369.000 *narrow band beacons*					
10,370.000						
All modes	10,400 *wide band beacons*					
10,450.000			Secondary			
Amateur and amateur satellite service (all modes)						
10,500.00						

Notes on the 10,000 – 10,500MHz Band Plan

In those countries where the narrow-band segment 10,368 – 10,370MHz is not available, the segment 10,450 – 10,452MHz is suggested as an alternative narrow-band segment.

24.0 – 24.25GHz	UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
24.000.000							
Amateur satellite service	24,025.000	*preferred operating frequency wide-band equipment*	Primary. Users must accept interference from ISM users	Primary. Users must accept interference from ISM users	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
	24,048 – 24,050	*preferred narrow band operating*					
24,050.000							
All modes			Secondary. May only be used with the written consent of the Secretary of State. Users must accept interference from ISM users	(Not allocated)			
24,150.000							
All modes			Primary. Users must accept interference from ISM users				
24,250.000							

47.0 – 47.2GHz	UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
47,000.000							
	47,088.000	*centre of narrow-band activity*	Primary	Primary	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
47,200.000							

Notes to the Schedule

(a) Maximum Power refers to the rf power supplied to the antenna. Maximum power levels will usually be specified by carrier power. For emissions having a suppressed, variable or reduced carrier, the power will be specified by the peak envelope power (pep) under linear conditions.

(b) In the case of frequency bands above 1000 MHz, since high intensities of rf radiation may be harmful, the following safety precaution must be taken. In locations to which people have access, the power flux density on transmit must not exceed the limits recommended by the competent authorities (currently, this limit is 10 mW per square centimetre).

(c) **Primary, permitted and secondary services**

For the purpose of this Licence, frequency bands allocated to the Amateur Service and the Amateur Satellite Service on a primary basis cannot claim protection from Harmful Interference or Undue Interference from any other authorised services, such protection being afforded only to users whose frequencies have been registered nationally or internationally. In the United Kingdom, individual frequency assignments are not registered in the Amateur Service, except for beacons and repeaters. This applies equally to bands allocated on a secondary basis where stations of the Amateur Service and the Amateur Satellite Service are also required not to cause Harmful Interference or Undue Interference to stations of a primary or permitted service to which frequencies are already assigned or to which frequencies may be assigned at a later date.

(d) Any modulation technique (except for pulse emissions below 1000 MHz) may be used for the types of transmission specified in the sixth column of the Schedule which are defined as follows:

Morse: hand or automatically-sent international morse code

Telephony: speech, including selective calling signals

RTTY: radio teletype and AMTOR

Data: digital codes representing numbers, text, speech, images, measurements, computer programms or other information authorised by the Licence

Facsimile: transmission of fixed or graphic images

SSTV: slow scan (i.e., reduced bandwidth) television

FSTV: fast scan television

(e) **Interpretation**

(i) Carrier Power: The average power supplied to the antenna by a transmitter during one radio frequency cycle taken under the condition of no modulation.

(ii) Effective Radiated Power (erp): The product of the power supplied to the antenna and its gain in the direction of maximum radiation.

(iii) Gain of an Antenna: The ratio, usually expressed in decibels, of the power required at the input of a loss free reference antenna to the power supplied to the input of the antenna to produce, in a given direction, the same field strength or the same power flux-density at the same distance. When not otherwise specified, the gain refers to the direction of maximum radiation. The gain may be considered for a specified polarisation. The reference antenna is usually a half-wave dipole. The gain may be referred to as decibels relative to a half-way dipole (dBd).

(iv) Mean Power: The average power supplied to the antenna by a transmitter during an interval of time which is sufficiently long relative to the lowest frequency encountered in the modulation taken under normal operating conditions.

(v) Peak Envelope Power (pep): The average power supplied to the antenna by a transmitter during one radio frequency cycle at the crest of the modulation envelope taken under normal operating conditions.

Amateur Radio (Novice) Licence (A) and (B) Schedule

Those licensed under an Amateur Radio (Novice) Licence (B) may not transmit on those bands between 1.950 and 28.500MHz.

1	2	3	4	5
Frequency Bands in MHz	Status of Allocations in the United Kingdom to the Amateur Service	Maximum Power DC Input (Watts)	Maximum Power RF Output (Watts)	Permitted Types of Transmission
1.950 - 2.00	Available on the basis of non-interference to other services (inside or outside the United Kingdom).			Morse Telephony RTTY Data
3.565 - 3.585	Primary. Shared with other services.			Morse
10.13 - 10.14	Secondary.			Morse
21.100 - 21.149	Primary.			Morse
28.100 - 28.190				Morse RTTY Data
28.225 - 28.300				Morse RTTY Data
28.300 - 28.500				Morse Telephony
50.620 - 50.760	Primary. Available on the basis of non-interference to other services outside the United Kingdom. Antennas limited to 20 metres above ground level, with horizontal polarisation only. No mobile operation.	5	3	Data
51.250 - 51.750	Secondary. Available on the basis of non-interference to other services outside the United Kingdom Antennas limited to 20 metres above ground level, with horizontal polarisation only. No mobile operation.			Morse Telephony Data
433.00 - 435.00	Secondary.			Morse Telephony Data
1240 - 1325				Morse Telephony RTTY Data Facsimile SSTV FSTV
10000 - 10500				Morse Telephony RTTY Data Facsimile SSTV FSTV

Notes to the Schedule (Extract)

(a) The maximum power specified in the third column of the Schedule refers to the peak input power (pip) and the maximum power specified in the fourth column of the Schedule refers to the peak envelope power (pep). The Licensee may use either measurement method, provided that the maximum power specified in the fourth column of the Schedule is not exceeded.

(b) In the case of frequency bands above 1000 MHz, since high intensities of rf radiation may be harmful, the following safety precaution must be taken. In locations to which people have access, the power flux density on transmit must not exceed the limits recommended by the competent authorities (currently, this limit is 10 mW per square centimetre).

(c) **Primary, permitted and secondary services**
For the purpose of this Licence, frequency bands allocated to the Amateur Service on a primary basis cannot claim protection from undue interference from any other authorised services, such protection being afforded only to users whose frequencies have been registered nationally or internationally. In the United Kingdom, individual frequency assignments are not registered in the Amateur Service, except for beacons and repeaters. This applies equally to all bands allocated on a secondary basis where stations of the Amateur Service are also required not to cause undue interference to stations of a primary or permitted service to which frequencies are already assigned or to which frequencies may be assigned at a later date.

(d) Any modulation technique (except for pulse emissions below 1000 MHz) may be used for the types of transmission specified in the fifth column of the Schedule which are defined as follows:

Morse:	hand or automatically-sent international morse code
Telephony:	speech, including selective calling signals
RTTY:	radio teletype and AMTOR
Data:	digital codes representing numbers, text, speech, images, measurements, computer programs or other information authorised by the Licence
Facsimile:	transmission of fixed or graphic images
SSTV:	slow scan (ie reduced bandwidth) television
FSTV:	fast scan television

Planned Bands

This month's extra centre section includes the internationally agreed bandplans with details of UK usage. Amateur radio is unique in its international self-regulation which allows a large number of transmission modes and types of activity to coexist, even in the most crowded bands. The Society considers bandplans so important as to send copies to all members via *RadCom*. Clubs may like to pin a copy on their notice board for the benefit of those who are not RSGB members.

Unfortunately, although the majority adhere to the bandplans, a few selfish amateurs do not. Following complaints from the ARRL about UK stations using SSB in the narrowband sections of 18 and 24MHz, RSGB Council made the following statement:-

Council endorses the HF bandplans as agreed within IARU Region 1; and that failure to observe the HF bandplans should be taken into account by Society officers when considering applications or recommendations for awards, trophies and special privileges (for example packet forwarding/mailbox licence).

Users of the 18 and 24MHz bands are reminded that, by international agreement, SSB should not be used below 18.110MHz and 24.930MHz. Both bands are very narrow, and departures from the IARU agreed bandplans tend to cause more of a problem to users of other modes than on the wider bands. Specifically, only 10kHz is set aside for digital modes such as RTTY, AMTOR and packet on 18 and 24, and a single SSB station can disrupt many narrowband digital contacts. IARU HF bandplans can be found on the preceding pages.

HQ News

continued from page 5

Her Majesty's Customs & Excise to reduce the proportion of our subscriptions on which VAT is levied. These negotiations should bear fruit in the near future.

I am restructuring the day-to-day management of Headquarters in an attempt to cut our response time and enable enquirers to get through to staff who can help them. This involves changes and re-training which will be a challenge in the short term but should be to the benefit of all in the long term.

During the 1980's, when everyone was on the up and up, we, like other companies, put on weight. Now the economic environment is very different and we must run in as lean and efficient a manner as possible.

Philip Smith,
General Manager

NEWS & REPORTS

QSL VIA THE BUREAU?

The following (from the RSGB *DX News Sheet*) is a list of countries for which proper QSL bureau facilities do not exist. If you work a station in one of these countries, ensure that you get the QSL route from the operator at the time of your QSO. It may well be possible to send cards for such stations to QSL Managers in other countries via the bureau system.

A5	Bhutan	TJ	Cameroon	ZD9	Tristan
A6X	UAE	TL	Cent Af Rep	ZK1	S Cooks
A7X	Qatar	TN	Congo	ZK2	Niue
C9	Mozambique	TT	Chad	ZK3	Tokelaus
D6	Comoros	TY	Benin	3C	Eq. Guinea
ET	Ethiopia	TZ	Mali	3C0	Annobon
HZ	Saudi Arabia	V3	Belize	3V	Tunisia
J5	Guinea-Bissau	V4	St Kitts	3X	Guinea
KC4	US Antarctica	VP2E	Anguilla	5A	Libya
KH1	Baker, Howland Is	VP2M	Montserrat	5H	Tanzania
KH2	Guam (Note 1)	VR6	Pitcairn	5R	Malagasy
KH3	Johnston Is	VU	India (Note 3)	5U	Niger
KH5	Kingman Reef	XT	Burkino Faso	5X	Uganda
KH5	Palmyra/Jarvis	XU	Kampuchea	6O	Somalia
KH7	Kure Is	XV	Vietnam	7O	Yemen
KH9	Wake Is	XW	Laos	7Q	Malawi
KP1	Navassa	XX9	Macao	8Q	Maldives
KP5	Desecheo	XZ	Burma	9G	Ghana
PY	Brazil (Note 2)	YA	Afghanistan	9N	Nepal
T2	Tuvalu	ZA	Albania	9U	Burundi
T3	Kiribati	ZD7	St Helena		

Note 1: The Guam QSL Bureau only operates for incoming cards. KH2 operators have to make their own arrangements for outgoing cards.

Note 2: The Brazilian Bureau was also recently reported to be handling incoming cards only.

Note 3: Both Indian societies - the ARSI and NIAR operate bureau facilities of a sort, but it is not known if they handle cards for each other's members.

RADIO SOCIETY OF GREAT BRITAIN

INCOME AND EXPENDITURE ACCOUNT FOR THE 6 MONTHS ENDED 31 DECEMBER 1990

	£	£
INCOME		
Subscriptions		313,105
Newsletters		17,688
Advertising		122,643
Book Sales		154,982
Morse Tests		5,067
Rent		6,933
Rallies and Exhibition Fees		8,080
Other Income		8,646
TOTAL INCOME		£ 637,144
EXPENDITURE		
Cost of Sales		
Cost of printing & distribution (Books etc)	103,767	
Cost of publishing & despatch staff	26,797	
Cost of printing & distribution (Newsletters)	17,574	
Morse Tests	4,712	
		152,850
Headquarters		
Rates,lighting,heating & cleaning	17,968	
Repairs & maintenance	8,130	
		26,098
Administration		
Cost of administration staff/accounting	147,863	
Telephone, postage, printing & stationery	46,231	
Insurance	2,294	
Hire & maintenance of equipment	24,343	
Depreciation of fixed assets	23,824	
Audit fees	6,464	
Redundancy	1,853	
Legal fees	7,176	
General expenses	223	
		260,271
Finance		
Bank charges	7,562	
Credit card charges	1,975	
Bad debt collection	10,045	
Finance Lease interest charges	3,170	
		22,752
Membership services		
Radio Communication	196,960	
Certificates, awards, trophies, etc	4,342	
QSL Bureau	10,798	
Beacons, repeaters, satellites & Intruder Watch	9,456	
IARU Region 1 contribution & levy	8,170	
Rallies and exhibitions	8,179	
Cost of committee, regional & Council meetings	15,895	
Cost of Annual General Meeting	10,408	
Novice Licence costs and Project Year publicity	6,862	
		271,070
TOTAL EXPENDITURE		£ 733,041
DEFICIT FOR THE HALF YEAR		(95,897)

RADIO SOCIETY OF GREAT BRITAIN

BALANCE SHEET AS AT 31 DECEMBER 1990

	At 31 December 1990 The Society £	At 30 June 1990 The Society £
FIXED ASSETS		
Tangible assets	841,281	*860,185*
Investments	100	—
	841,381	*860,185*
CURRENT ASSETS		
Stocks, at lower of cost and net realisable value	97,443	*100,441*
Trade debtors	105,977	*113,912*
Prepayments and accrued income	13,120	*18,372*
Cash at bank and in hand	41,851	*10,605*
	258,391	*243,330*
CREDITORS: AMOUNTS FALLING DUE WITHIN ONE YEAR		
Obligations under finance leases	(19,874)	*(19,874)*
Bank Overdraft	—	*(18,041)*
Trade creditors	(93,402)	*(41,470)*
Corporation tax	—	*(5,000)*
Other taxation and social security	(24,792)	*(18,996)*
Other creditors	(1,914)	*(21,503)*
Accruals and deferred income	(13,763)	*(16,699)*
	(153,745)	*(141,583)*
Subscriptions in advance	—	*(50,000)*
	(153,745)	*(191,583)*
NET CURRENT ASSETS	104,646	*51,747*
	946,027	*911,932*
CREDITORS: AMOUNTS FALLING DUE AFTER MORE THAN ONE YEAR		
Obligations under finance leases 2-5 years	(59,138)	*(67,906)*
Corporation tax payable 1 July 1991	(5,000)	*(5,000)*
	£ 881,889	£ *839,026*
ACCUMULATED FUNDS		
Income and expenditure account		
Balance at 1 July 1990	(46,260)	*78,996*
Deficit from Income & Expenditure Account	(95,897)	*(125,256)*
	(142,157)	*(46,260)*
Current Subscriptions Reserve	138,760	—
Revaluation Reserve	350,000	*350,000*
Special Reserve	317,946	*317,946*
General Reserve	217,340	*217,340*
	£ 881,889	£ *839,026*

Half-Year Accounts

The unaudited Income and Expenditure account for the half-year to 31 December 1990, presented on page 57, indicate that the Society has produced a further deficit of £95,897. This result is after transferring £138,760 to a current reserve to even out the effect of the common renewal date. The subscriptions received each month have been taken to Income and Expenditure account at the average for the previous year and this might therefore be a conservative figure. I wish to take a prudent view of the income so that expenditure can be cut back to come within the likely income stream for the remainder of the year.

As a result of the positive effect of increased cash flow from subscriptions, the balance sheet has been strengthened and net current assets have more than doubled.

The monthly management accounts show an improving position with the smallest deficit occurring in December. Action was taken in September to reduce staffing levels and review all ongoing expenditure. The effect of these cuts is now coming through into the Income and Expenditure account and January is expected to show a surplus.

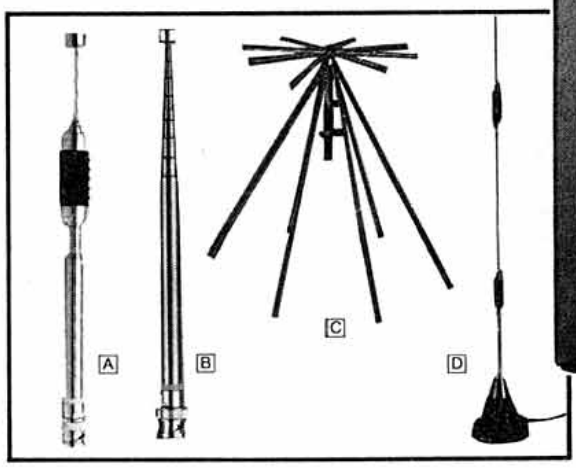
I have taken further measures to reduce staff in February but the effect will not be felt until March.

I believe the Society is on target for a break-even point at 30 June 1991, but there are still five months to go and there is no sign that the recession has yet reached its bottom.

Philip Smith, General Manager

REALISTIC®

SCAN THE BANDS



E

F

Enjoy superb reception and extended frequency coverage, with the Realistic PRO-34 Portable Programmable Scanner. Features include 200 channels in 10 selectable banks and two speed scan, squelch control, 3.5mm earphone jack and BNC jack for external aerial. Requires 6 "AA" batteries or AC/DC adapter.

For the more budget conscious, the Realistic PRO-38 is excellent value. This 10 channel, portable scanner features direct entry keyboard, audible low battery indicator and manual and scan modes. Flexible antenna and BNC antenna jack. Requires 5 "AA" batteries or AC/DC adapter.

There are also a superb range of scanner aerials, including two Telescopic Whip Aerials that extend portable scanner range, one with and one without load coil. The All-Band Magnet-Mount Mobile Antenna includes 4.8 metres of cable and Motorola-type plug, while the Discone Aerial fits masts up to 38mm diameter and receives 25-1300 MHz. So whatever your scanner requirements are, you can be sure that Tandy have the answer!

A **Telescoping Whip Aerial.**
20-006 ..... **£6.99**

B **Telescoping Whip Aerial.** (Without load coil).
20-008 ..... **£5.99**

C **Discone Aerial.**
20-013 ..... **£49.95**

D **Magnet-Mount Mobile Antenna.**
20-012 ..... **£29.95**

E **Realistic PRO-34.** Covers: 68-88, 108-136 MHz (AM) 136.005-174, 380-512 And 806-960 MHz.
20-9135 ..... **£249.95**

F **Realistic PRO-38.** Covers: 68-88 MHz VHF-Lo, 136-174 MHz VHF-Hi And 406-512 MHz UHF.
20-9139 ..... **£99.95**

Tandy

Over 500 Stores And Dealerships Nationwide. See Yellow Pages For Address Of Store Nearest You.
InterTan U.K. Ltd., Lemaore Lane, Walsall, West Midlands. WS2 7PS Tel: 0922 710000

RADCOM CONSTRUCTION FEATURE

How to Lay Out RF Circuits

. . . and how to build them

The conclusion of a 2 part article by Ian White, G3SEK

THE IDEAS THAT WENT into planning the layout are carried through into construction. Although you'll eventually learn from your own experience, the following guidelines will give you a good start -

1. Divide the unit into modules which can be separately boxed and screened, eg RF, IF, VFO etc. Make low-impedance RF interconnections using thin coaxial cable. Modular construction improves RF stability, and makes the individual modules easier to build and test. It also means that you can make major changes without having to rebuild the whole unit.
2. Always use a full copper groundplane. This is your largest single assurance of RF stability and good performance.
3. Keep inputs and outputs well separated - for each stage, and for the whole unit. So:-

   Lay out all the stages in a straight line.

   Never let the RF signal path double back or re-cross itself.

   Keep stages at different frequencies well-separated to avoid breakthrough.

   Use interstage screens where necessary, but don't rely on them to cure a bad layout.
4. Make all ground connections short and direct to the groundplane.

   Keep each input ground close to the output ground of the previous stage.

   Locate the common ground for each stage between the input and the output ground ('single-point grounding' seldom works at RF).
5. Avoid unwanted coupling between tuned circuits.

   Use screened inductors or toroids in preference to open coils.

   Keep the RF voltage-points close to the groundplane.
6. Use *lots* of extra RF bypassing, especially on DC supply rails.
7. Try to keep RF and DC wiring on opposite sides of the board, so that the DC wiring is in an RF 'dead-space'.
8. Don't try to squeeze the unit into an existing box, unless it's a big one.

   If guidelines 1-7 mean that the unit needs to be bigger, then build it bigger!

Now for some detailed descriptions of construction techniques which embody these guidelines.

WIRED TRACKS

IF SOMEONE HAS thoughtfully provided a PCB layout but you don't want to copy the whole circuit - or you can't be bothered to print and etch a double-sided board - then the easiest constructional technique is 'wired tracks'. You simply drill the necessary holes in a piece of single-sided board, remove the copper groundplane from around the holes, and then wire up the back using component leads and bits of wire instead of etched tracks (**Fig. 3**).

To transfer an existing board layout, make a 1:1 photocopy and tape it to your piece of PC board. Then prick through the holes with an automatic (one-handed) centre punch or by firm pressure with a sharp scriber, remove the photocopy and drill all the holes. Holes for ground leads are optional - you generally get a better RF ground by bending the component lead flat to the board and soldering it down. Remove the copper around the rest of the holes twiddling a drill bit between your fingers. Then wire up the circuit beneath the board. The results will look very neat and tidy - from the top, at least!

The circuit of Figs 1 and 2 (last month) would be a good candidate for the wired-track technique because it contains components which were originally designed for PC mounting (the three IF transformers). Wired tracks would also be suitable for circuits involving multi-pin RF ICs, double-balanced mixers and the like. When bypassing the pins of these components to ground, you can do better than a conventional PC layout in which the capacitor must be mounted on the top-side of the board. Instead, connect a miniature ceramic capacitor underneath the board, directly from the bypassed pin to the solder lug of the component can; but don't forget to solder the can to the groundplane on top.

A wired-track board is fairly robust, even though many of the components are only held in by their bent leads and blobs of solder. A drop of cyanoacrylate 'instant super-glue' will hold down any larger components or those with fragile leads.

PIN-AND-WIRE

THIS IS MY OWN favourite technique, especially for circuit development (**Fig. 4**). Components are mounted on Veropins [2], which are pushed into holes drilled exactly where you need them. If a component has a reasonably rigid lead to which you can attach other components, you use that instead of a Veropin. With pin-and-wire you can start building a unit at one corner of an empty board and work your way across the board, developing and testing each stage as you go. If you start with an oversized board, you can cut it to the correct size when the circuit is finished and working, and then look for a suitable box. By the way, don't use tin-shears for cutting the finished board to size; the shearing action distorts the laminate and may even pull connections or components apart. It's far better to use a nibbling tool which removes a thin strip of material while firmly supporting the board on both sides of the cut.

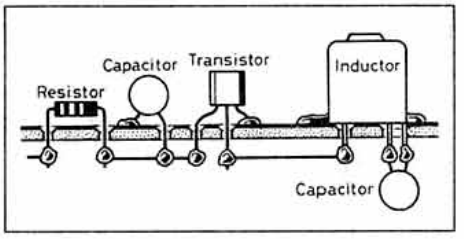


Fig 3: Wired-track construction on single-sided board, copper side uppermost

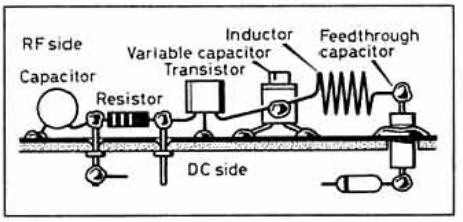


Fig 4: Pin-and-wire construction on single-sided board, copper side uppermost

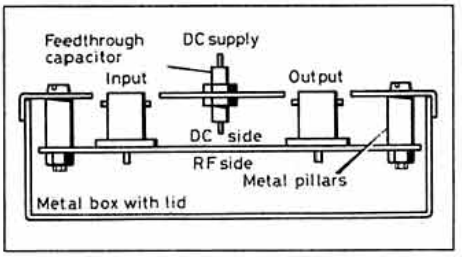


Fig 5: Mounting a pin-and-wire board in a screening box

Holes for pin-and-wire construction are drilled 'freehand' with a high-speed PCB drill, having first marked the position with an automatic centre punch to prevent the drill from skidding. Veropins of the recommended size require a 1.0mm hole - 0.9mm is too tight and 1.1mm is too slack - so order a few 1.0mm

drills when you buy the Veropins. Although fibreglass is harder than the SRBP matrix board for which Veropins are intended, it is usually quite easy to push in the pin when some of the thickness of fibreglass has been removed during countersinking. It also helps to use the proper pin insertion tool, which is simply a piece of rod with a 1.1mm hole drilled in the end, mounted in a handle.

RF components are usually mounted on top of the board, and DC components underneath. If the Veropins are pushed in from underneath, any 'RF' pins that protrude unnecessarily through to the DC side can be cut off at the shoulder. DC feed-through connections can be made using Veropins which are bypassed by capacitors on top of the board, or via small solder-in feedthrough capacitors for more critical applications. PCB-mounting screened inductors or double-balanced mixer packages can mounted on the copper side of the board, using a bit of wired-track technique to make their connections.

The whole board can be mounted upside-down in the lid of a metal box (**Fig. 5**), creating a screened RF dead-space for DC wiring between the board and the lid. The main DC connections to the unit in its box can be made via screw-in feedthrough capacitors through the lid. Metal mounting pillars will usually make a satisfactory RF grounding connection between the board and the lid, and signal connections can be made to sockets mounted directly on the board, with over-size holes through the lid.

SURFACE-MOUNTING

SURFACE-MOUNTING OF components is not new - it was an established 'ugly-board' and professional technique for years before its appearance in micro-miniature amateur and consumer electronics. It is particularly suitable for boards which need to be single-sided, eg for solid-state power amplifiers where there is no clearance between the back of the board and the heat-sink. UHF circuits which require chip capacitors for low-inductance RF bypassing are also candidates for surface-mounted construction.

There are two alternative techniques for surface-mounted 'ugly-board'. Method one is to cut out small insulated islands in the PC board (**Fig. 6**). Either you dispense with that area of ground-plane, or else use double-sided board. The islands can be cut out with a craft knife, making parallel cuts about a millimetre apart and peeling away the copper with the point of a hot soldering iron. An alternative is to use a burr in a hand-held PC drill.

The second method of surface mounting is also shown in Fig. 6. This is to cut small patches of single-sided board and super-glue them onto the copper groundplane. Although very effective, this technique can be tedious for all but the simplest circuits. There is also the problem of finding your fingers permanently connected to the board!

'DEAD BUGS', STICKY COPPER AND OTHER TRICKS

ALTHOUGH DUAL-IN-LINE (DIL) IC packages are not ideal for RF, devices such as the Plessey SL series of communication ICs can be very useful indeed. Obviously DIL packages can be mounted in an array of drilled holes (use a piece of Veroboard as a template) and then connected using wired tracks as described earlier. However, they can also be mounted using the 'dead-bug' method (**Fig. 7a**), upside-down with their legs in the air and secured to the groundplane by glue or double-sided tape. The pins to be grounded are bent back and soldered directly to the groundplane, and the remainder can be treated as if they were wiring pins. If the dead-bug technique involves bending back too many pins for comfort, bend up the ungrounded pins and solder the IC down the right way up (**Fig. 7b**).

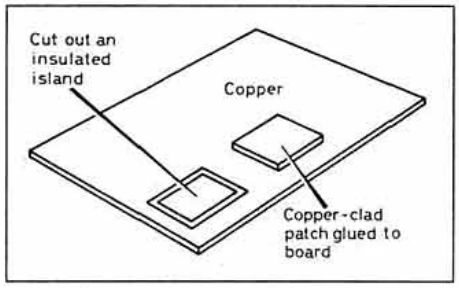


Fig 6: Two types of 'surface-mount' connection pads

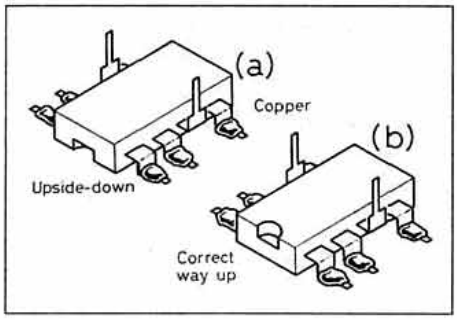


Fig 7: 'Dead-bug' and 'live-bug' mounting of DIL ICs for RF

ICs which are now appearing as radial-lead devices with very close pin spacing can be handled in a similar manner - at least for one-off amateur applications - although it may involve quite a lot of eye-strain.

I also ought to mention that components can be mounted in mid-air, suspended in the wiring. This is not very desirable as a general construction technique, but it can be absolutely the best way where low stray capacitance is critical, eg in UHF tuned circuits.

Cutting away the copper groundplane to make various lengths and widths of stripline is a technique extensively used in the construction of amateur microwave circuits - and also for professional prototyping [3]. An alternative microwave technique which can be borrowed for lower-frequency applications is to stick copper foil onto single-sided fibreglass board. Electromail sell self-adhesive copper "shielding foil" which can be used for this purpose [4].

You may want to build an RF unit which also involves LF or logic circuitry. Since the latter can be quite complex, and may well involve several ICs, techniques such as pin-and-wire will not be appropriate. You have a number of choices here. The most obvious is to build the lower-frequency section separately, using Veroboard or a similar type of IC stripboard. But if it isn't worth making a separate board, you could drill a 0.1in pattern of holes in the RF board as a wired-track area for the ICs, once again using a piece of Veroboard as a template.

MIX AND MATCH

ONE FINAL POINT: you can use a mixture of construction techniques on the same board - and in most cases you probably *should*. Even though you choose one style for most of the wiring, there will probably be places where other techniques would be better. If so, do whatever is best for that bit of the circuit.

Your resulting hybrid won't look pretty - these techniques aren't called 'ugly-board' for nothing - but it will probably **work**!

ACKNOWLEDGEMENTS

ANY ARTICLE ON construction will inevitably bring out other people's good ideas. Thanks are due to the RSGB reviewers for contributing some of their own [5] - and we'd like to hear about *yours*. Finally, thanks to G3ROZ for reminding us of the need for an article like this.

REFERENCES AND NOTES

[2] Veropins type 2144:-
Electromail/RS order code 433-860
Maplin order code FL23A
Cirkit order code 21-09091
(Quantities and prices vary between suppliers)

[3] *RSGB Microwave Handbook*, Volume 1 (1989)

[4] Self-adhesive copper foil - Electromail/RS order code 512-266

[5] PC cleaning and polishing block for preparing boards:-
Cirkit order code 42-92002
Maplin order code HX04E0
Conformal coating spray for protecting finished boards:-
Maplin order code YP37Q
Cirkit order codes 51-11005, 51-11111, 51-11112
A less expensive substitute is Holt's *Damp Start* spray.
Thanks to G6XM for these recommendations.

The Fifth-Method Stabilised Oscillator

by Klaus Spaargaren, PA0KSB.
Part one of a two part article with an introduction by Pat Hawker, G3VA

TECHNICAL TOPICS (July 1973) included notes on the prototype of what soon became known as PA0KSB's 'Huff and Puff' VFO stabiliser. He had developed this to overcome the problems of spurious products and FM noise that were all too evident in the early, low-cost frequency synthesizers - and not entirely overcome even now. The 'Huff and Puff' technique, used a handful of TTL digital ICs, and was designed to hold an existing LC tuneable oscillator to within a few Hertz of frequency steps 25 or 50Hz apart by means of a sample-and-hold IC. It used as a timing reference the output from a stable crystal oscillator, typically at 100 or 1000kHz, divided down to open and close a 7400 divider chain (typically at 0.2S open, 0.25S closed). A number of *TT* readers successfully implemented the system to stabilise an existing LC oscillator in receivers or transceivers etc. Subsequently, PA0KSB developed huff and puff systems based on CMOS logic, and details of his system were published in *TT* as well as the USA.

Recently, PA0KSB has developed a new form of stabilised VFO capable of providing a pure, stable and continuously variable frequency which takes advantage of the ability to pull an HF crystal oscillator a few kHz by means off a variable capacitance (electronic tuning diode) without degrading its performance. This VXO/VCO is then used as the reference signal for stabilising an LC-type VCO covering a much wider frequency band. The result is a very stable oscillator, which in the prototype can be tuned to any frequency between 23.0 and 23.5MHz to provide the injection signal for a 14MHz amateur-band receiver. PA0KSB claims this arrangement has proved to be "one of the best oscillators that I have ever used for that purpose. It has excellent stability with a minimum of unwanted effects. The tuning rate can easily be adjusted between just a few and many kilohertz per knob revolution. There are many options for the basic system. I hope that many experimenters will become as enthusiastic as I am".

PA0KSB originally sent me details of his new system for possible inclusion in *TT*. However, to do this would mean either omitting much relevant circuit information or spreading the information over a number of months. It seems more sensible for the information to appear as a separate article. Although basically a simple system, it is fairly complex to implement and is not a project for the inexperienced.

Klaus has invited readers to suggest a name for his new system, much in the same way as I originally dubbed his earlier system (acting on a comment from Joe Cropper, G3BY) the 'huff and puff' stabiliser. Since the system is a combination of VXO/VCO/VFO techniques, I feel there is a temptation to call it the VVV oscillator or perhaps (in view of the Morse-like opening bars of Beethoven's Fifth Symphony) the Fifth-Method Stabilised Oscillator (FMSO) until someone comes up with a more appropriate name!

G3VA

PERHAPS ONE OF THE most difficult problems in the design and construction of home-made equipment is the generation of a pure, stable and accurately adjustable frequency to provide the HFO of a receiver or transceiver. In factory-built equipment this is now almost always achieved with a frequency-synthesizer. These do indeed produce stable signals but suffer typically from such problems as high levels of oscillator phase noise and spurious outputs on non-harmonically-related frequencies.

For a number of years, I have experimented with many synthesizer designs based on phase-locked-loops (PLL); although usable results have been achieved, there were always shortcomings which I was unable to overcome. In particular, I experienced large numbers of weak 'birdies', especially in HF receivers with wideband front-ends. The higher the frequencies of the additional oscillators and mixers in receiver PLL circuits, the more difficult it is to avoid spurious responses. I was truly surprised at the very many ways in which oscillator harmonics and harmonic products of the mixing processes could find their way into the sensitive parts of a receiver even when there existed extensive shielding,

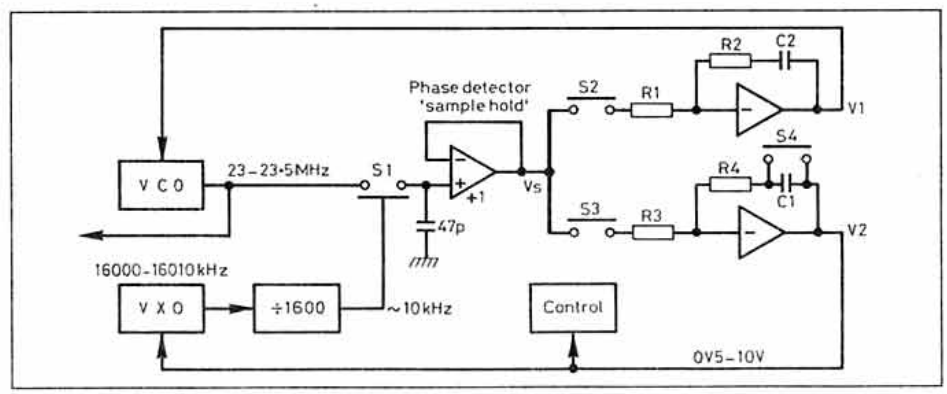


Fig 1: Block diagram of the basic 'Fifth Method Stabilised Oscillator'

decoupling and buffering of signals. Moreover, apart from the problem of spectral purity, I found it difficult to fine-tune a PLL synthesizer in incremental steps of about 20Hz without the use of a microcomputer. Modern micro-controllers and special chips remain outside my range of constructional skills. The result is that I have fallen back on rather older, and already to some, 'old fashioned' technology. By far the most satisfactory results that I have obtained have been using the system outlined in this article. Although basically it constitutes a simple principle, I cannot recall ever having seen or heard of it being previously described. I can hardly believe that it has never been applied before and would be very interested to learn of any previous applications of the basic principles.

BASIC PRINCIPLES

THE BASIC CONFIGURATION of the stabilised oscillator is shown in **Fig 1**. There are two voltage-controlled-oscillators (VCO): a wideband VCO with a range of 23 to 23.5MHz; and a narrow band variable-crystal-oscillator (VXO) with a range of only 16.000 to 16.010MHz. A sample-and-hold type phase detector, around S1, is driven by a 10kHz signal derived from the VXO. V1 and V2 function either as controllers in a closed loop, or as hold-amplifiers in the open-loop situation. Normally S3 is open and S2 is closed. The VXO frequency is then determined by the voltage in the hold-capacitor C1 and can be varied up and down by the tuning mechanism. In that situation, the VXO controls the VCO which is stabilised at a high multiple of the 10kHz signal via the phase detector and V1.

A numerical example will clarify these operations (for simplicity some numbers have been rounded off):

When the VXO is tuned from 16,000 to 16,010kHz, the VCO follows and tunes for example from 23,000 to 23,014kHz, the multiplication factor of the phase detector reference frequency being 2300. Note that with a sample-and-hold type phase detector, stable operation of the associated VCO is achieved at all multiples of the sampling frequency. Thus a VCO frequency of 23,012kHz can be controlled when the VXO frequency is 16,008kHz (23,012/2300 x 1600) and its control voltage is about 8V. But, equally, a VCO frequency of 23,012kHz could be controlled by a VXO frequency of 16,001kHz (23,012/2301 x 1600) with a control voltage of about 1V. The only difference in this second case is that the multiplication factor is 2301 instead of 2300. This principle is fully exploited in this system (**Fig 2**).

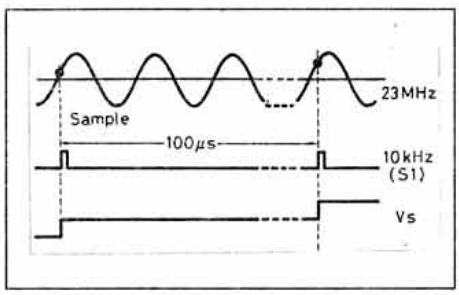


Fig 2: Sample-and-hold principle

Assume that the VXO control voltage is driven upwards by the tuning mechanism and exceeds 8V. This situation is detected by a simple voltage-detection circuit which forms part of a control circuit. The following actions occur:

(1) S2 opens and S3 closes. The VCO frequency is frozen at its last value and the VXO in the closed loop via V2 is now controlled by the VCO.

(2) C1 is forced in a short time to an initial value such that the VXO frequency is in the middle of its range. A search voltage then gradually drives the output of V2 in the opposite direction from which it came, so towards 0V. At about 1V the VXO locks on to the VCO and a stable situation is obtained.

(3) The search voltage is switched off and, after a short stabilisation period, S2 and S3 are switched to their normal positions and the VCO is again under VXO control. It can follow the VXO further upwards. A similar action would occur at the lower end of the range of the VXO.

> '. . . I can hardly believe that it has never been applied before . . .'

When in the locked position, the VCO frequency is extremely stable since the effective multiplication of the VXO frequency is by a factor of only 1.4 (ie 23/16); as the loop-bandwidth of the PLL loop can be made relatively large, low frequency noise and any 50Hz (mains-frequency) modulation are attenuated. The basic crystal stability is hardly degraded at all in a VXO that tunes over a narrow range by means of a single pulling capacitor.

Provided that this entire procedure is performed within about 200 milliseconds, it is hardly noticeable to the operator. This is because:

(1) During the 200mS that the VCO runs free, no appreciable frequency change will take place.

(2) When a carrier or CW signal is tuned in and the audio tone varies, it is only for 200mS that the tone does not change. This is hardly noticeable; when receiving SSB the effect is even less noticeable.

(3) Switching takes place only when the receiver frequency is being changed. At all other times the VCO is phase-locked to the VXO.

(4) There is no phase jump of the VCO just after switch-over; the integral action in the controllers guarantees that there is always a zero phase relationship between the VCO and VXO frequencies and the 10kHz signal once the loop has stabilised. Thus clicks are avoided during reception; an annoying effect that can be observed with several factory-built products at regular intervals (some even mute the audio signal for a short time).

An obvious advantage of the system is that, apart from the VXO, no other additional oscillators are needed. The VXO frequency can be chosen so that it does not interfere with reception, either from the fundamental or harmonics. It is for this reason advisable to use the highest possible VXO frequency, with suitable divider. With respect to the choice of reference frequency for the phase detector it is again better to choose the highest possible frequency since the PLL loop bandwidth can be made large, resulting in better rejection of oscillator noise.

When the ratio between the frequencies of the VCO and VXO is much larger than in the example given above, there may be more than two suitable VXO frequencies. In principle this causes no problem, although in practice it would be better to increase the reference frequency of the phase detector for the reasons given.

When the loop is stable, the output of the sample-and-hold phase detector is a DC voltage with only a small amount of 10kHz ripple. Such ripple is caused by capacitor leakage, amplifier input current and switch feed-through. In my experimental set-up, the 10kHz sidebands of the VCO were already some 80dB below the carrier without any additional circuits for 10kHz rejection in the VCO control voltage line.

It will by now be clear that there are many design options in such an arrangement. In practical engineering, however, there exist no designs entirely free of compromises. This stabiliser is no exception. A principal problem is that the voltage in the holding capacitor (V1) will drift slowly because of leakage or amplifier input current. Possible solutions are the use of a huff and puff stabiliser measuring the 23MHz output frequency and controlling the charge in V1, or a digital circuit in the form of a high resolution digital-to-analogue convertor. In my design, I use a drift correction method based on the use of a 'D' flip-flop, as briefly explained later. It is described extensively in the Dutch *Electron* (Journal of VERON) September 1989 in *Reflections door PA0SE*.

Other shortcomings are that from a cold start, the 23MHz frequency does not begin at the same value it had previously (ie there is no memory) and also that the method does not lend itself to computer control to provide additional features such as memories and split-frequency operation. For such reasons, it is likely to remain an amateur radio rather than a professional technique. A slight disadvantage is that the frequency of a VXO is non-linear in relation to its control voltage with the result that one turn of the control knob does not always result in the same shift of frequency; in practice this effect is hardly noticeable. With some extra circuitry such problems could be overcome though I did not find this worthwhile.

To be concluded . . .

IDEAS FROM ABROAD

TRANSLATED AND EDITED BY ERWIN DAVID, G4LQI

THE CONCLUSION OF DL1VU's SARDINE TIN OPENER (STO) with comments and MININEC computations by **Peter J Swallow, G8EZE**, and additional applications by **Erwin David, G4LQI**.

THE 1988 λ/8 STO is the next step. Applying the same calculations to its original symmetric form, **Fig 1d**, the uncompensated areas are: left +0.261, right -0.116; this unbalanced situation can be corrected by making the flat top lopsided, with approx. 60% of the span on the side connected to the feed point; **Fig 1e**. Now the areas are equal: left +0.192, right -0.192; the best yet.

The new top load with a span of only λ/8 permits construction of short yet very efficient radiators. The field strength on the horizon at a distance of 1km from an unloaded vertical radiator fed with a power of 1kW, neglecting all losses, is given by:

$$E=\sqrt{(3,600,000/R_r)} \times (1-\cos\beta h)$$

in which E is field strength in mV/m, R_r is radiation resistance, β is 2Π/λ and h is antenna height in λ. A T-antenna with the new low-radiation flat top delivers a surprising field strength on the horizon when compared with unloaded verticals. In **Fig 4**, the height of the radiator is marked off on the X-axis; the field strength on the horizon is read on the Y-axis. The field strengths calculated for common verticals are the broken horizontal lines marked 0.25λ (314mV/m), 0.50λ (380mV/m) and 0.64λ (444mV/m).

The field strength of unloaded verticals is plotted as a dotted curve; an infinitesimally short radiator, according to Hertz, produces 300mV/m. This is a purely theoretical value. As the antenna height increases, the field strength rises to its maximum where it touches the 0.64λ line, then goes back down.

At h = 1λ, field strength on the horizon is zero, with all radiation at high angles, ie useless for DX. *[though useful when short skip is required - Ed].*

The field strength of a T-antenna with non-radiating 90° flat top is shown as a solid curve. It also starts at 300mV/m, rises more steeply and at point A at a height of 0.18λ surpasses that of a λ/4 vertical. At point B, the 0.34λ high T does as well as a λ/2 vertical. Finally, at point C, the 0.39λ high T produces its maximum field strength of 428mV/m, almost as much as the 0.64λ vertical in spite of the height reduction by λ/4.

Fig 5 shows the vertical-plane patterns of 0.25, 0.5 and 0.64λ unloaded verticals, the latter often somewhat mislabeled as a five-eighth antenna, and the 0.39λ high STO T. The T's low-angle radiation approaches that of the 0.64λ vertical but its high-angle minor lobe is 1.8dB smaller.

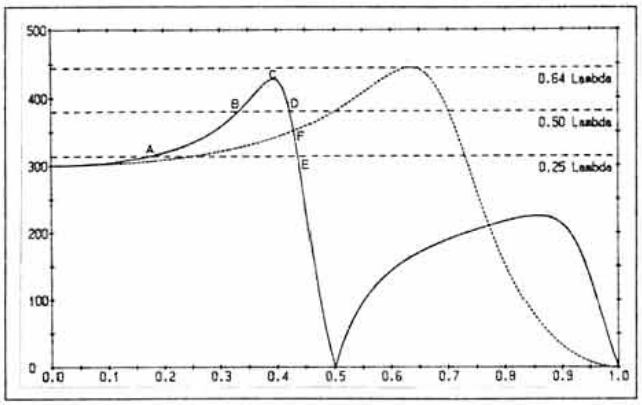


Fig 4: Field strength vs antenna height (dotted curve: unloaded vertical. Solid: new T-antenna).

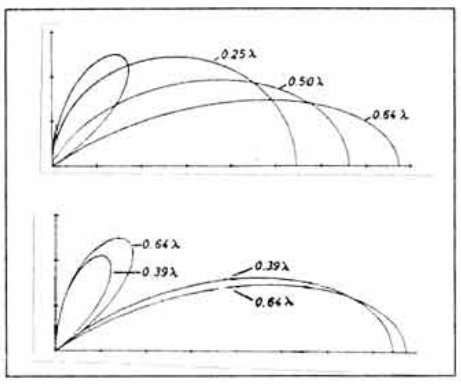


Fig 5: Vertical Radiation patterns of 0.25, 0.5 and 0.64λ verticals and new 0.39λ T over perfect earth.

CONSTRUCTION

THE NEW ANTENNA IS easy to build. The DL1VU 7MHz antenna is made of stranded hard-drawn copper wire. The 20cm end pieces are of copper pipe with steel inserts for rigidity. A good insulator should be used at the free end.

The flat top was stretched between two trees by means of 2mm polyester line. The 16.7m vertical radiator hung down from it and was terminated in an ATU at ground level. The feed point impedance was measured to be 90 - j450Ω; not what I expected but it then had a ground plane in one direction only; accordingly, this measurement may not be typical. The antenna was matched with an L-network. It and the coax were earthed to a ground mat now consisting of 48 radials, each 21.5m long.

DL1VU's article ends here but, during translation, several questions and additional applications came to mind.

DL1VU'S IMPROVEMENTS IN DX TERMS

FOR URBAN AMATEURS seeking low-band DX, a vertical with 90° top load has special advantages: maximum radiation-producing current is at the top, high and in the clear, whereas a ground mounted monopole has its maximum current at the bottom, as likely as not between the houses.

To repeat, the purpose of the top load is to place the current maximum at the top of the vertical radiator while losing a minimum of power by radiation from the top load itself. How strong, however, is the unwanted radiation off the various models of flat top? DL1VU does compare the flat tops with one another, but not with the wanted radiation off the vertical. G8EZE computed that radiation from the flat top of a T of three λ/4 legs in free space is, at 45° off the horizontal wire where it is maximum, 10dB down from the field strength due to the vertical leg: a less than 5% loss of field strength at the target, though on receive it may occasionally spoil a null towards a QRM station. Under the same conditions, maximum radiation off the original (symmetrical) STO was 30dB down, ie negligible both on transmit or receive. The effort to still further reduce radiation from the STO by making it lopsided is believed trivial as well as suspect: because the wire is folded back onto itself, the current distribution along the wire cannot be expected to be sinusoidal, a basic assumption for all of DJ1VU's calculations. Therefore, DJ1VU's method is valid as a first ap-

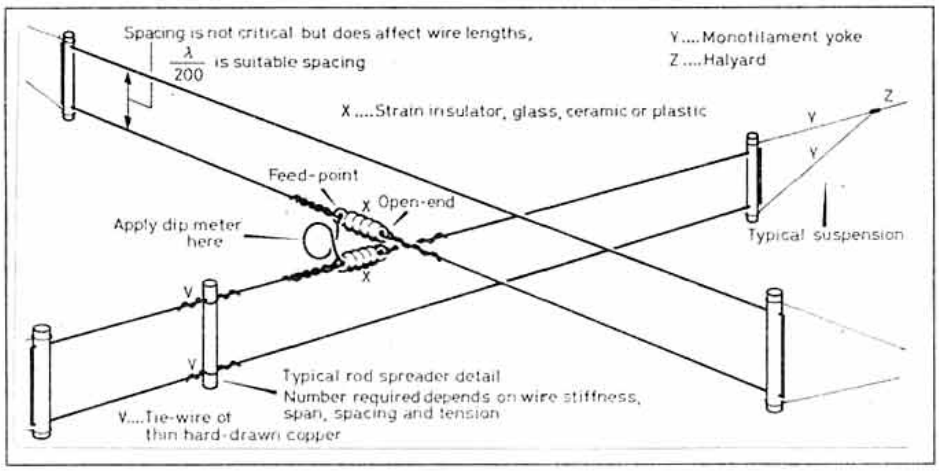


Fig 6: Checking the frequency of a pair of STOs with a dip meter.

proximation, but not when it comes to low-level details. What then is the merit of the STO? Mostly small size and hence modest demands on its supports. With it, you can buid antennas in places where one of the larger flat tops would be impossible or undesirable, with no apparent loss of performance, except possibly band width.

PHYSICAL VS ELECTRICAL LENGTHS

DIMENSIONS IN DJ1VU's article are given in terms of electrical wave lengths with no mention of physical measurements. It is well known that, for a given fraction of a wavelength, a bent (quad loop) or coiled (rubber duck) wire must be longer than a straight wire. How long then must the wire be which, when folded, makes a λ/4 STO? Wire gauge, spreader length and capacity across the insulator at the unconnected end come into it but no formula was found. Fortunately, the resonant frequency (λ/2) of a pair of identical STOs can be measured; they are temporarily suspended within easy reach from the ground at right angles to each other so that they cross, just without touching, at their feed points. A short wire, U-shaped at VHF or coiled into one or more turns at HF, interconnects the two feed points and couples to a dip meter to find resonance **Fig 6**. Dimensions can then be adjusted to move resonance to the desired frequency. At G4LQI, two 358mm lengths of Bofa 300Ω ribbon made into a pair of 342mm long STOs with an 8mm gap between feed point and open end resonated at 145MHz; 692mm of wire made 517mm of electrical length, ie a 34% lengthening factor. Similarly, using open (ladder) line with 1mm bare wire spaced 25mm with 6mm diameter plastic spreaders every 150mm, and a 51mm ceramic strain insulator between open end and feed point, a 29.6MHz STO had a span of 1.63m; 29% of extra wire.

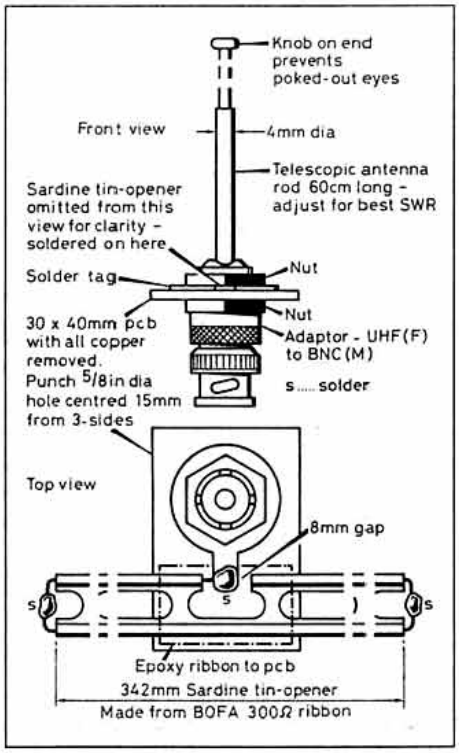


Fig 7: 145MHz ground plane vertical for use with a hand-held transceiver. During the 1990 Strathclyde Special Olympics, Raynet operators seated in packed city buses could maintain communication with this antenna where 'rubber ducks' were inadequate.

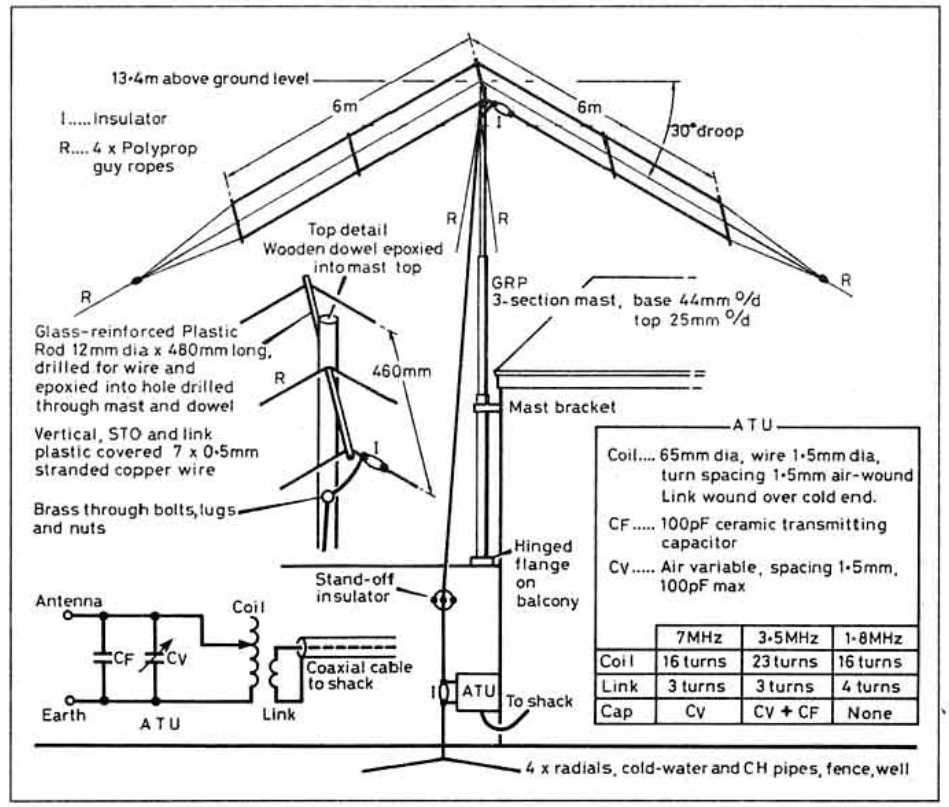


Fig 8: The STO can be hung as an inverted-V. This antenna was designed for 3.75MHz but also works well on 1.8 and 7MHz.

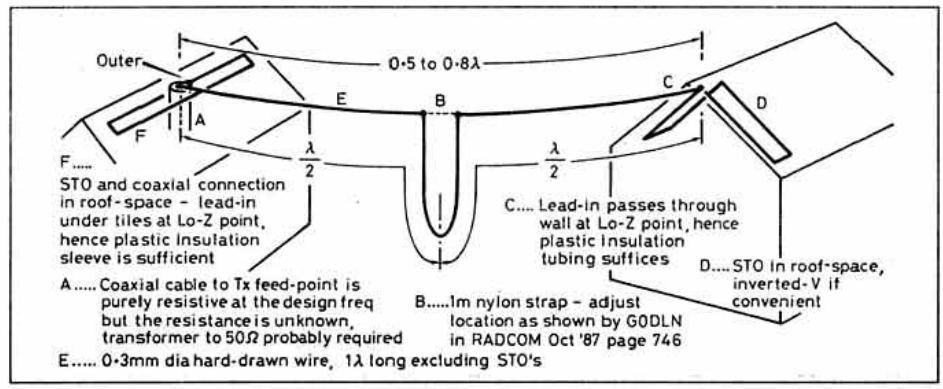


Fig 9: A collinear antenna as short as λ/2! It was designed, but is as yet untried, as a short-span alternative to the 'invisible DX antenna' described by G0DLN in *RadCom*, Oct '87.

The flat top must be of exact electrical length only if its feed point is to be purely resistive, eg if a coax feeder is to be connected there as in **Figs 7 & 9**. In DL1VU's own application, and in that of **Fig 8**, non-resonant antennas by nature, a shorter flat top would merely move the current loop down on the vertical wire. There would be no noticeable difference in performance though the measured feed point impedance and hence the ATU components would be different from those calculated.

An inverted-V style STO is effective atop a single vertical radiator. G8EZE has computed that a droop of 45°in the two halves of an STO on top of a 0.39λ vertical costs only a negligible 0.4dB in field strength on the horizon, a small price for saving a support. G4LQI's current 80m antenna, **Fig 8**, has a drooping STO on top of a 0.16λ vertical of which the lower 0.07λ closely skirts the salt-water drenched wall of the house. Though no objective comparison of performance can be made with an earlier λ/4 inverted-L on the same mast, raising the current loop up into the clear has considerably eased RFI to the telephones in the house.

OTHER APPLICATIONS

THE FEATURES OF THE DJ1VU flat top, ie virtual earth and current loop at its feed point together with small size and minimum radiation, are not unique to T-antennas. They also are the very requirements for counterpoises at the bottom of vertical antennas of which the ground plane vertical is but one example. Compare the STO with G6XN's linearly loaded 'best-buy' counterpoise on p165 of his book *HF Antennas For All Locations* (published by RSGB - see price list); DJ1VU's flat top is a cleverly optimised version of that counterpoise! Identical STOs could even be used as counterpoise and top load in one antenna, horizontal or vertical, eg in colinear arrays. See **Fig 9**. ❑

The Peter Hart Review

Butternut HF6V-X
Multiband Vertical Antenna

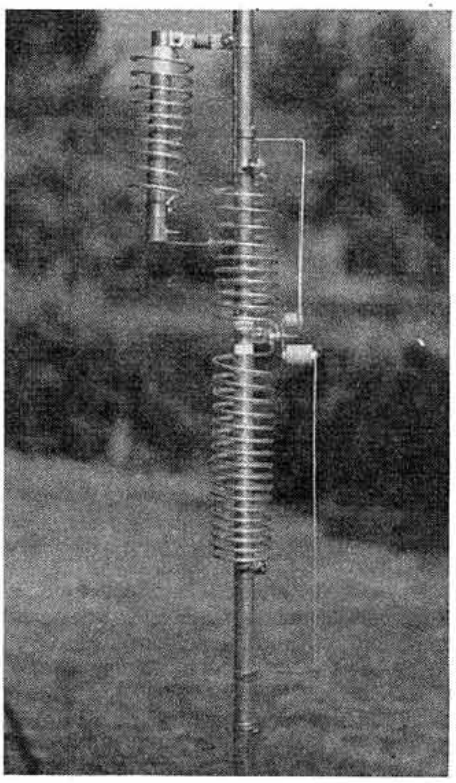
WITH AN IMPENDING house move during last Summer, I decided to purchase a multiband vertical in order to remain operational on the HF bands whilst planning the longer term antennas at the new QTH.

The US manufactured Butternut HF6V multiband vertical has been available since the early 1980s and over the years has acquired a reputation as an excellent all-round performer. The basic antenna functions on six bands - 3.5, 7, 10, 14, 21 and 28MHz but additional add-on resonators are available to extend coverage to 1.8, 18 and 24MHz giving the possibility of covering all nine HF bands in a single antenna with no switching or tuning between band changes. The vertical is about 7.8m (26ft) in length, yet it will pack into a cardboard carton 104cm long by 12x12cm with a shipping weight of 5.4kg. For this reason it has proved most popular with DXpeditions and is easily carried with conventional luggage in normal air travel. The older HF6V and the currently supplied HF6V-X are electrically identical; changes were made to the mechanical construction in 1988 to accommodate a shorter shipping container to comply with international mailing needs. The antenna is rated at 2kW PEP / 1kW CW on all bands except 10MHz where the power should be limited to 500W PEP / 300W CW.

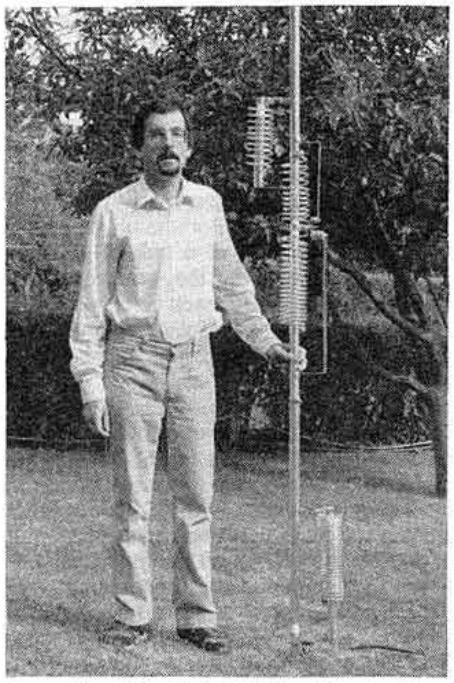
DESCRIPTION

THE HF6V-X USES A CLEVER design to achieve maximum performance in a multiband antenna. Most multiband verticals use traps to isolate the unwanted sections of antenna. These are invariably lossy to a greater or lesser degree and on the higher frequency bands, only the lower sections of antenna are operational. This arrangement results in physically short quarter wavelength radiators with reduced bandwidth and radiation resistance. With the exception of 21MHz, the whole length of the Butternut radiator is used on all bands. On 28MHz, it functions as a 3/4 wavelength radiator, and on 14MHz as a 3/8 wavelength radiator. On 10MHz it is a little longer than a quarter wavelength and on 7MHz somewhat shorter than a quarter wavelength. On 3.5MHz it is less than 1/8 wavelength long. These lengths can all be brought into resonance and made to match satisfactorily to 50Ω with series inductive or capacitive loading. On 21MHz, the full length radiator would be close to a half wavelength. This would require a high impedance feed and be difficult to match in conjunction with the simple series loading requirements for the other bands. Hence, the HF6V-X makes use of a shorter radiating section on this band, about quarter wavelength, with the upper section of the antenna isolated by a quarter wavelength stub decoupler. This is formed very simply and effectively by spacing a flexible wire alongside the antenna tubing for quarter wavelength, shorted at the top end and hence effectively open circuit at the bottom. Coaxial sleeve baluns provide isolation in a similar fashion.

In order to match to 50Ω cable, series loading coils are used on 3.5 and 7MHz, each equipped with parallel capacitors to provide bypassing of the inductors on the higher frequency bands. A third inductor-capacitor combination bypasses part of the 7MHz coil to achieve a match on 10MHz. The various inductors and capacitors all interact to a certain extent but have been optimised overall to provide the correct amount of inductive loading on 3.5 and 7MHz together with capacitive loading on 10 and 14MHz and minimal loading on 21 and 28MHz. The inductors are all adjustable, as is the 21MHz stub and top tubing length to allow each band to be independently optimised. A small shunt inductor is provided across the feedpoint which gives DC grounding to the antenna hence eliminating static build-up and also improves the match on 3.5MHz. The turns of the coil can be compressed or expanded to further optimise the match on this band. On 14MHz, the feed impedance of the antenna is in the region of 100Ω. A quarter wavelength section of 75Ω cable is connected at the feedpoint to transform the feed impedance to 50Ω. This length of cable has a minimal effect on the other bands. The electrical arrangement of the antenna with the various inductors, capacitors and stubs is shown in **fig 1**.



3.5, 7 and 10MHz band resonators.



The author, Peter Hart, G3SJX, pictured with an antenna showing a 160m adaptor.

For operation on 1.8MHz, an additional resonator is available, the TBR-160-S. This mounts at the feed point and provides additional series inductance to resonate the antenna on 1.8MHz. A shunt capacitor is arranged as with the 3.5 and 7MHz resonators to bypass this inductor on the higher bands. Some readjustment of the 3.5 and 7MHz inductors is needed if the 1.8MHz resonator is retrofitted to an existing installation.

Operation may also be extended to cover 18 and 24MHz with the A-17-12 adaptor kit. Note that this appears to be identical to the A-18-24 adaptor, just a recent change to the part numbering. Two inductors are used, one for each band, connected in shunt to the antenna just above the 10MHz inductor. The other ends of these coils are each connected to small capacity hats. These shunt loading inductors provide a resonance for the antenna in the appropriate band, 18 or 24MHz.

An essential part in the performance of a vertical antenna system is the effectiveness of the ground/radial system. The HF6V-X may be used either mounted on the ground or

elevated above ground level. For ground mounting, it is not sufficient to use just a ground stake. A number of radial wires should be used either laid on the ground or hidden for convenience just under the surface. The ground stake is useful, though, to provide DC earthing and as a tie point for the radials. The length of the radials is unimportant and a larger number of short radials is more effective than a smaller number of long radials for a given length of wire. Resonant radials are not needed as the close proximity provides tight coupling to the ground and removes the resonance.

For mounting in an elevated position, antenna grounding operates in a fundamentally different way. Resonant radials are needed as a counterpoise, one to four quarter wavelength radials for each band equally spaced around the antenna. The STR-II stub-tuned radial kit is available. This provides a single wire radial for 3.5MHz, four wire radials for 10MHz and four stub-tuned radials for 7/14/21/28MHz. The stub-tuned radials comprise 11.8m lengths of 300Ω twin feeder. Notches are cut to isolate one conductor which functions as a stub and achieves resonance on four bands. This makes a very neat arrangement.

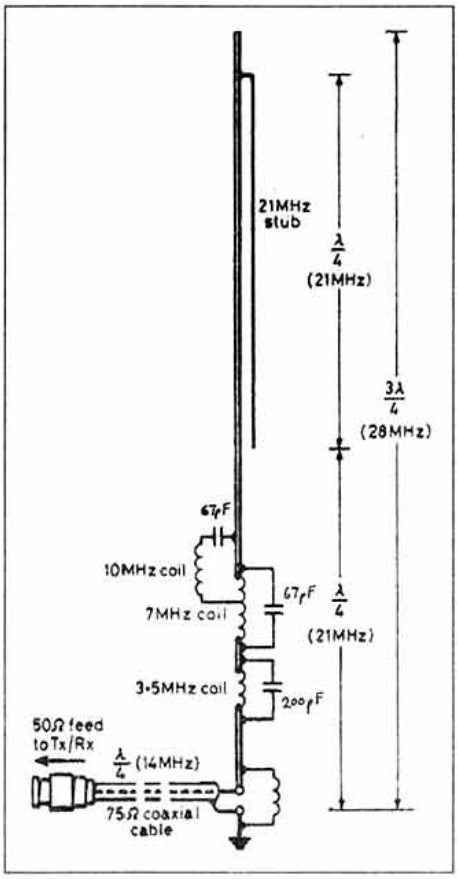


Fig 1: Electrical arrangement of the HF6V-X.

The antenna is provided with 17 pages of information giving detailed assembly instructions, specifications, operation theory, hints on mounting, radials, guying and fault finding etc. It is a well written and useful document. Other accessories available include the RMK-II roof mounting kit and MPS mounting post sleeve. The mounting post sleeve may be left in the ground for easy removal of the antenna.

The antenna has a wind loading area of 1.5 sq ft / 0.15 sq m and is designed to survive wind speeds up to 80mph/125kph when new. Over a period of time, it is to be expected that frequent flexing will reduce the chances of survival in winds that would not damage a newly installed antenna. In windy climates, and I include the UK these days, guying is recommended. One set of non-conductive guys should be attached just above the top inductor. Guying any higher will cause the lower part of the antenna to bow and possibly break in windy conditions.

ASSEMBLY AND TUNING

THE ANTENNA ARRIVED well packed in a compact box. The number of parts agreed exactly with the packing list and a few spare nuts, bolts and washers are included. It is amazing how difficult it often is to find a small nut dropped on the lawn! The photograph shows all the parts for the basic antenna with the 1.8MHz addition. The hardware is of good quality with the main 26ft radiator made up from eleven lengths of aluminium tubing, tapering from 1¼ inch at the bottom to ⅜ inch at the top. Non-rusting plated and stainless nuts, bolts and washers are used and the inductors are all wound from 3/16 inch aluminium wire, 3.5 inches in diameter. The capacitors are all higher power ceramic types with ratings of 7.5 or 10kV. The Q of these components should be very high.

The initial assembly took about 2-3 hours but this was following the instructions very closely. The instructions are clear and detailed and apart from a couple of minor points, are in full agreement with reality. Subsequent dismantling and reassembly was achieved in a much quicker time and some DXers have modified the tubing to allow the coil assembly to be packed for transport without dismantling. All joints in the antenna should be lightly greased with the RF conductive anti-oxidising compound supplied which has the somewhat intriguing name of 'Butter-it's-not'! The only problem experienced was a hose-type compression clamp fixing the lower part of the antenna. This is a flimsy clamp which stripped on tightening and was replaced with a more subtantial 'Jubilee' clip.

All the tests were done with the HF6V-X ground mounted using the MPS mounting post sleeve. Alternatively, the antenna itself can be set into the ground but this does not allow for removal. It is necessary to remove the antenna from the ground to make adjustments during tuning (unless a 20ft high pair of step ladders is available!!). It is most important that some care is taken to ensure that the mounting post sleeve and antenna are truly vertical. Mistakes cannot be corrected later. I used a 4ft steel pole slightly smaller in diameter than the mounting post, knocked into the ground for 2ft to make a tracer hole, constantly twisting and removing to clear the hole. This pole was twice as long as the mounting post and was easier to check for verticality with a spirit level.

Tuning of the antenna is accomplished using a VSWR indicator in the 50Ω feedline. This is fully described in the instructions with the order starting on 3.5MHz and proceeding through 7, 14, 21, 28 and finally 10MHz. In retrospect, it may be better to tune 28MHz first, as this slides the top section in or out, setting the length of the antenna which effects the tuning on all bands. With the initial settings described in the instructions, the resonance occured in the American phone bands on 3.5 and 7MHz, close to optimum on 10 and 14MHz and considerably LF on 21 and 28MHz. Adjustment on 3.5, 7 and 10MHz entails sliding clamps up or down to compress or expand the length of the appropriate coil and the tuning point is quite critical. A similar scheme is adopted for 1.8, 18 and 24MHz where those bands are fitted. Tuning on 21MHz entails adjustment of the stub wire length and on 28MHz, the total antenna length. There is a certain amount of interaction between the different bands, but it is quite easy to achieve a good match on all the bands and position the tuning point wherever it is required by spending some time going back and forth between the bands. The bandwidth on 3.5MHz is very narrow and it is not possible to cover the CW and SSB sectors simultaneously. However, it is relatively easy to tune the antenna to any desired frequency in the band. Stand well away from the antenna when checking tuning. There is a noticeable detuning on 3.5 and 1.8MHz if standing within 3ft of the antenna.

PRACTICAL RESULTS

Over a period of six months, the antenna was used extensively from three separate locations, in all cases ground mounted using the MPS mounting post sleeve. The experiments conducted and results achieved will be described location by location.

> ‘A most effective multiband vertical antenna’

LOCATION no: 1 - CROYDON, SURREY. August/September 1990.

This was a sloping well drained site with a thin layer of soil over chalk. During the period under test, ground conditions were extremely dry. A total of sixteen radials were used laid out symmetrically on the ground. Four were 34ft, four 25ft and eight 17ft in length. After tuning the basic antenna for best overall performance (without 1.8, 18 or 24MHz), the VSWR figures obtained were as shown in the table. This shows the minimum VSWR in the band together with either the maximum VSWR at the band edges, or the bandwidth for 2:1 VSWR if such a bandwidth is less than the entire band.

The instructions emphasise the importance of taking the radials directly to the base of the antenna which should be fixed at the correct depth in the ground. Lifting the antenna by 12 inches and dressing the radials down had little effect on the low frequency bands but the resonance was shifted down by 100kHz on 14MHz, 150kHz on 21MHz and over 400kHz on 28MHz.

41.	G4JXG/P	C	544
42.	G3VNG	M	526
43.	G0HRW	C	462
44.	G0DAY	M	383
45.	G3VGG/P	C	366
46.	G0LRJ	M	356
47.	G4OFR	M	327
48.	GM4WLN	M	321
49.	G0JYC	M	279
50.	GW6TM	C	243
51.	G0NIF	M	232
52.	G4ISO	M	204
53.	G0KYE	M	84
54.	G3KDB	M	56
55.	G0LSJ	M	36
56.	G0KZQ	M	28

SWL SECTION

1.	BRS28198	1076#
2.	G1EMD	966
3.	BRS20249	941
4.	G8FM	666

* The Ariel Trophy - Leading Club
+ Cert to Leading Member
* Cert to Leading Non Club Member
# Cert to Leading SWL

21-28MHZ SSB CONTEST 1990 RESULTS

This event coincided with an excellent spell of conditions, particularly on 28MHz, where well over 150 different country/prefix multipliers appeared in the logs from UK entrants. There were 612 different UK callsigns listed in the check sheets from overseas entrants . . . . it is disappointing that only 46 of these sent in logs for checking, compared to the 129 logs from overseas. It was pleasing to receive so many checklogs but, alas, these also were nearly all from overseas stations.

The top UK Single-operator, G3NLY, made a total of 1136 contacts, with 811 of these being on 28MHz. This excellent performance wins him both the Whitworth trophy as overall leader and the Powditch trophy for the highest 28MHz score.

Once again the Martlesham Contest Group entered two stations in the UK Multi-operator section and battled it out for first and second places. Although their QSO totals were similar, G0KPW triumphed by finding two more multipliers. Congratulations also to all the certificate winners.

It is curious that while SWL members complain about the lack of trophies available to them and ask for more contests with Receiving sections, only three made the effort to enter this event, where two separate listener trophies are awarded. Once again BRS32525 has scooped the pool and wins both the Metcalf trophy as overall leader and the Powditch Receiving trophy for his 28MHz score. The Committee, in line with IARU Region 1 policy, try to include SWL sections in as many HF contests as possible, but unless there is more support this policy may have to be reviewed.

The standard of the logs was of a high order with many being computer prepared. There was a minimum of unmarked duplicates and although there were errors, these mainly consisted of one or two characters incorrectly copied in callsigns, or over-optimistic claims for multipliers. The change to counties as the basis for the overseas multipliers was well received, the only complaint being from GW4BLE (checklog), who felt the prefix multiplier to be better.

G6LX

UK SINGLE OPERATOR SECTION

POS	CALL	OVERALL SCORE TOTAL	MULT	28MHz SCORE POS	SCORE	MULT.
1	G3NLY*#	497568	146	1	182475	75
2	G4CNY*	430554	146	3	126309	71
3	G3OZF*	410733	141	4	107712	68
4	GW0ARK	346647	119	7	68740	51
5	GM0ECO	340992	128	9	65790	51
6	G3TBK	311736	124	8	80040	58
7	G4FMO	228390	115	12	41652	44
8	G3VHB	182352	116	15	34416	46
9	G3FFH	170130	107	16	30381	41
10	G3MGW/P	152352	92	11	41832	42
11	G4UDU	132240	58	2	132240	58
12	G3WRS	107892	81	14	35490	35
13	G6LX	103500	75	5	103500	75
14	G4IUF	97680	55	6	97680	55
15	G4FPQ/P	94563	79	13	37752	44
16	G4LYM	92904	79	21	12690	30
17	GM3ULG	88970	78	18	17205	31
18	G4IQM	75276	82	19	16539	37
19	GW4HSH	63516	79	22	11781	33
20	G0FGI	61344	71	23	7848	24
21	G2QT	57834	51	10	57834	51
22	GW4OXB	45012	62	26	5250	25
23	G3NKC	33432	56	25	5625	25
24	G3UFY	29394	46	17	29394	46
25	G0AHC	28056	56	27	2862	18
26	G0KTN	18093	37	20	14764	32
27	GW0AJI	17388	42	30	1122	34
28	GM4HQF	16065	45	28	2700	20
29	GM3CFS	11934	39	29	1680	16
30	G4PTE	10710	34	31	1023	31
31	G0GGX	10530	30	24	6900	23
32	GM0GNT	10488	23	32	0	0

UK MULTI-OPERATOR SECTION

1	G0KPU*	534150	150	7	G3VER/P	301644	168
2	G4PIQ/P	529692	148	8	G4YME	262350	110
3	GX3GRS	438606	177	9	GX4IRC/P	209880	110
4	GX0MCG	388395	135	10	G4NOK	206415	99
5	GX0FDX	370464	136	11	G0NYL	79650	75
6	GD3CSA/P	305244	122				

UK RECEIVING SECTION

1	BRS32525*#	116412	109	1	26772	46
2	BRS20249	25983	63	3	6132	28
3	BRS28198	23100	70	2	8040	40

OVERSEAS SINGLE-OPERATOR SECTION

AFRICA

1	G4WYG/ST2*	8910	2	S80SA	420

ASIA

1	UA9CDT*	226320	14	JL7FLY	1122
2	JA7SN	21105	15	JA6EFT	1083
3	JA6GT	12600	16	UA9FLN	1140
4	UL7FCW	11826	17	JR7LVK	912
5	RW9HZ	9711	18	UA9XBE	864
6	JH1BXH	6318	19	UA9UDV	630
7	JA3LDH	4752	20	JL1MWI	507
8	JE7DOT	4515	21	JR9GQP	189
9	9M2CX	3720	22	JH2WHS	27
10	JG2REJ	2626	23	JL1UMX	15
11	UM8MGO	2400	24	JL6IPK	12
12	UA9CI	1419	25	JL1KUH	3
13	JE1CCD	1242			

EUROPE

1	9H1GU*	203760	21	IK3MAW	4884
2	LZ2AQ*	104430	22	HA2KMR	3375
3	UB4QWW	91512	23	IK3IEQ	2844
4	RB5QW	83160	24	YO7ARZ	2652
5	LZ1ZX	68355	25	YO7LFV	2649
6	YO7AQP	40800	26	EA4CQF	2277
7	UA3AGN	37914	27	UB5VDA	2262
8	UA3DPX	28575	28	RB5SA	2232
9	CT1/G0AEV	27435	29	UB5AF	2229
10	UY5TE	26520	30	UA1WFP	1908
11	RB4EXN	26246	31	YU7KM	1578
12	HA9CD	25145	32	OH7NW	1575
13	UB3MW	22110	33	UB5ZME	1572
14	UZ1TWC	16182	34	SM4BTF	1242
15	LY2BJV	11475	35	SP7FQI	957
16	YO6VZ	10692	36	OK3CXS	546
17	YU7LS	9150	37	RB5TBS	510
18	OH2MPO	5508	38	I4CSP	240
19	UV3DPP	5460	39	ON5FV	168
20	RA3DAN	4956	40	DK5KJ	165

NORTH AMERICA

1	K2TCK*	118422	6	VE3NYT	2880
2	K7QQ	94941	7	W9CNF/M	2673
3	W1/G4DZC	78174	8	N2KLJ	2205
4	N6JM	3444	9	W5EIJ	1008
5	WK4F	3024	10	AA8AW	464

OCEANIA

1	ZL2BED*	6120	2	VK2PWS	540

OVERSEAS MULTI-OPERATOR SECTION

1	LZ5Z*	175968	4	UZ3QYA	3618
2	UZ3XWC	83490	5	UZ0SXC	1845
3	UZ4WWQ	19206	6	UB4JWO	1716

OVERSEAS RECEIVING SECTION

1	LZ1-M333*	42570	4	IA5-2304-FI	2001
2	UA4-156907	6750	5	OE1-0140	840
3	SP0182-67	5232	6	SWL-JG4SNR	3

= Trophy Winner.
* = Certificate Winner.

Checklogs gratefully received from: FG8/KK4A, G0CLP, G3KZJ, G4AGQ/M, GW4BLE, HA2MJ, JA0FFF, JG6CFD, LA4YW, LY1ZD, LY3BA, LY3DD, LZ1DM, LZ1KWZ, LZ1MM, N0GOS, SM4SET, UA1ANA, UA3TAM, UA4PDX, UA4PKN, UA4PKZ, UA9UDX, UA0SFN, UB4XWK, UB5QFD, UB5VMR, UB6YKC, UB5XEG, UL7RER, UV3DN, UZ4RRF, VE1TH, VE7ZC, Y48GN.

HF CONTESTS CALENDAR - 1991

Mar 2/3	*ARRL DX SSB (p17, Jan 91)*
Mar 9/10	Commonwealth (Dec 90)
Mar 16/17	*Bermuda (p17, Mar 91)*
Mar 23/24	1.8MHz SSB (Feb 91)
Mar 23/24	*CQ WPX SSB*
Apr 7	Repoco 1 (Jan 91)
Apr 14	28MHz Cumulative (Feb 91)
Apr 21	Low Power (Feb 91)
Apr 22	28MHz Cumulative
Apr 27/28	*Helvetia (CW/SSB) (p17, Mar 91)*
Apr 30	28MHz Cumulative
May 8	28MHz Cumulative
May 11/12	*CQ-M (CW/SSB)*
May 16	28MHz Cumulative
May 18	County Roundup SSB (Mar 91)
May 19	County Roundup CW
May 25/26	*CQ WPX (CW)*
Jun 1/2	NATIONAL FIELD DAY

Full details of all RSGB HF Contests can be obtained from the Chairman of the HF Contests Committee, Dave Lawley, G4BUO, who is QTHR.

The typeface in *Contest News* has been reduced at the request of the HF Contests Committee in order to do justice to the large amount of contest information requiring publication, whilst retaining the same page allocation.

SSB FIELD DAY 1990 RESULTS

Record scores were made in the open section (the leaders averaging 73+ QSOs per hour) and strategy proved vital . . . . Cambridge's superior QSO rate being overcome by Lichfield's extra multipliers on 3.5MHz to give the Midlands group their 4th win in five years (with a lineup of TS940, TL922, TH6, 3.5MHz Delta Loop & 7MHz 2-ele rotary quad they are clearly going to take some beating!). However, the restricted section was the more competitive, providing the closest finish for some years. There was much adverse comment regarding the use of 'GX' and 'GS' calls, and this has been noted by the HFCC.

Comments received included: The 7MHz quad was a source of disbelief and wonder *(G3WAS)*; Operated by candlelight after main generator failed *(G3GLL)*; Very little contest experience but everyone enjoyed themselves *(G8NT)*

G3KDB

OPEN SECTION

Pan	Call	Points.Multipliers Group	3.5	7	14	21	28	QSOs	Score
1	G3WAS/P	LICHFIELD ARC	513.22	1008.35	1075.52	1429.47	1469.45	1701	1102485
2	GX6UW/P	CAMBRIDGE UNIV RS	249.12	811.34	1946.56	1460.45	1043.45	1771	1057728
3	GD3FVA/P	S MANCHESTER	552.17	1010.36	1543.51	1156.39	359.35	1408	822360
4	G4OBK/P	CENTRAL LANCS ARC 'A'	490.17	736.31	1248.49	1641.53	498.26	1341	811868
5	GM5VG/P	WINDY-YETT CG	562.19	821.26	1051.53	1609.39	571.31	1361	784380
6	GW4CC/P	SWANSEA RS	602.11	884.26	632.36	1013.36	874.32	1128	548685
7	G4HRS/P	HORSHAM ARC	816.21	823.26	554.30	949.35	212.60	932	442728
8	G3VHB/P	TOWER SNATCHERS	836.22	1192.25	765.43	368.28	96.13	916	426667
9	G3XEP/P	WHITE ROSE RS	511.9	423.8	395.27	1769.47	797.17	1154	420660
10	G4FRS/P	FARNBOROUGH & DRS	628.16	708.20	608.39	1190.39	215.6	978	401880
11	G3SFG/P	SOUTHGATE ARC	523.13	529.18	979.38	1022.34	390.9	992	385616
12	GM3ZET/P	LERWICK RC	169.7	632.20	708.29	1302.39	45.6	606	291210
13	GX3ASR/P	EDGWARE	532.17	902.22	522.36	561.20	292.6	779	283709
14	GX4IRC/P	IPSWICH RS	359.8	1198.32	356.34	147.23	2.1	631	210324
15	G3GHN/P	CLIFTON ARS	382.8	434.13	286.24	281.14	674.23	559	168674
16	GM0IBM/P	IBM GREENOCK	518.11	447.16	528.17	376.20	96.11	483	147375
17	GM4AZZ/P	MAGNUM CG	314.8	744.14	627.18	157.18	202.14	528	147168
18	G3NWR/P	WIRRAL ARS	590.13	621.16	743.30	50.4	34.7	552	142660
19	G0JJN/P	ROLLS ROYCE	661.14	342.9	257.16	444.18	357.9	575	138087
20	G3FJE/P	SHEFFORD	464.12	801.18	186.15	171.19	98.15	484	135880
21	G3VGG/P	BROMSGROVE	259.9	581.15	519.21	181.15	146.20	409	134880
22	G4FUH/P	SCUNTHORPE ARC	240.8	227.8	380.23	258.10	224.8	357	75753
23	G3VCP/P	CRYSTAL PALACE	322.12	241.11	349.24	151.18	33.3	253	74528
24	GM3USL/P	CUNNINGHAME	47.7	105.11	670.29	75.6	60.5	262	55506
25	G0INF/P	SHEFFIELD ARC	328.9	184.4	464.24	28.6	17.4	257	47987

RESTRICTED SECTION

1	GX3GRS/P	GRAVESEND RS	432.11	908.23	965.40	304.28	123.14	735	316912
2	G0NRX/P	LORDINGS CG	657.12	626.22	516.38	310.32	270.22	608	300006
3	G3NJA/P	TORBAY ARS	667.14	651.22	844.38	435.28	63.9	685	295260
4	G4ADD/P	OUT B ES B	411.17	497.18	616.37	421.31	173.17	562	254160
5	G3AHD/P	LIVERPOOL & DARS	586.15	712.23	788.37	162.17	108.14	606	249736
6	GM3ZRC/P	GREENOCK	82.8	631.24	1114.42	350.25	118.7	637	243270
7	G3PGU/P	STRATFORD-ON-AVON	516.14	644.19	653.31	432.21	115.14	581	233640
8	G4RFR/P	FLIGHT REFUELLING	356.13	694.18	744.33	417.22	196.8	639	226258
9	GW4EZW/P	NEWPORT ARS	476.12	513.16	596.32	273.22	77.6	472	174150
10	G4FOX/P	MELTON MOWBRAY	611.14	686.22	451.28	158.17	55.7	538	172568
11	G4AYM/P	GLOUCESTER ARS	102.3	802.12	646.32	539.24	42.7	558	166218
12	GS0MVZ/P	YAGIS	409.12	507.16	629.25	184.20	69.8	482	145638
13	GM0ADX/P	KILMARNOCK	592.11	742.17	572.24	105.14	18.4	494	142030
14	G0FDX/P	CENTRAL LANCS ARC 'B'	433.10	455.14	591.31	42.1	157.12	359	114104
15	G3GLL/P	TOLLESBURY CG	58.3	615.21	512.34	160.19	27.4	351	111132
16	G6QM/P	QUEEN MARY CG	581.10	759.19	278.19	97.12	5.1	416	104920
17	G3LRS/P	LEICESTER RS	617.11	531.12	384.22	82.15	8.2	410	100564
18	G6UQ/P	STOCKPORT	247.6	538.12	410.23	100.14	70.13	350	92820
19	G4HRC/P	HAVERING	441.10	469.15	344.26	85.9	24.3	340	85869
20	G0CGG/P	GRIMSBY ARC	477.10	650.17	264.18	79.10	3.1	374	82488
21	G8NT/P	LEISTON ARC	97.6	468.12	285.30	157.18	34.4	272	72870
22	G3BPK/P	DOUGLAS VALLEY ARC	285.9	377.12	181.18	300.21	10.2	280	71486
23	G0DEC/P	BRAINTREE ARS	105.6	705.15	224.21	73.8	25.5	309	62260
24	G3MDG/P	CHESHAM & DARS	5.1	636.16	491.27	13.3	-	314	53815
25	G4TCI/P	WORDSLEY RANGERS	140.5	262.7	288.20	171.16	38.5	203	47647
26	G2XV/P	CAMBRIDGE & DISTRICT	-	-	208.19	228.30	243.19	218	46172
27	G4FUR/P	WIMBLEDON	84.3	425.9	148.18	92.10	117.13	205	45898
28	G0BRC/P	BREDHURST	159.6	258.9	287.19	156.12	23.2	219	42384
29	G5FZ/P	LINCOLN	252.8	385.14	254.16	10.3	-	249	38743

Check Logs received with thanks from G4FRS, K3ZO, YU7KM, YU7SF, YU7LS.

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Microwaves

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

A COUPLE OF 'ODDITIES' GOT through the net in the January column. My apologies, and herewith details. First, Fig 1 was captioned as being the G3WDG high performance converter for 2.3GHz which should, of course, have read 10GHz. The second was in the piece about the experimental Winter Cumulatives which should have read '. . . the informal first Sunday of the month . . .'. Finally, whilst not strictly a correction, the GB3MHX 10GHz beacon is now on the omni-directional antenna reported as being 'a possibility'.

It is also a pleasure to be able to report a series of ongoing and successful 10GHz tests between a number of fixed (home) stations over troposcatter paths. More details when I have them: some of the stations involved (that I know about) have been G3WDG, G4DDK, G3JVL and G3FYX.

Our editor - and the readers - have asked for more photographs of microwave interest, so here are a couple! The first shows the light-weight portable station of the G3ZME group (from Shropshire) operating /P on 10GHz from Coniston Old Man in the Lake District. The second photograph, is the E-M-E dish of ON4UV.

A practical example of large dish construction, by GW3XYW, holder of one of the earliest 1.3GHz WAC awards, was given in some detail in the *Microwave Handbook, Volume 1* (RSGB Publications, see page 94). This leads me on naturally to report progress on Volume 2! It is now ready for press and should be in the process of being printed by the time you read this. You might have noted that the price of Volume 1 has been reduced, largely as a result of being ready for a second printing. It is probable that Volume 2 will be available at a similar price - even more profusely illustrated than Volume 1!

THE UK NOVICE LICENCE AND THE BEGINNER

THIS IS THE YEAR OF THE Novice Licence! Due for implementation this summer, the new licence will allow beginners - of all ages - to sample the magic of radio communication in a practical manner, ie by doing. It may surprise the experienced and avid microwave enthusiast to learn that two of the microwave bands have been included in the Schedule. You might think that microwave technology is far too advanced for the young or inexperienced.

Not so. We were all beginners once! Given a little practical help and guidance from some of the 'older hands' - the proverbial 'you and me', - the Microwave Committee sees no reason why, using some of the simpler techniques, novices should not succeed in getting going on one or both of the designated bands. At the same time, they may well have a great deal of fun, gaining a lot of practical expertise in a field which has often been regarded as 'something for the birds'!

The 1.3 and 10GHz bands in their entirety should be accessible to novices. There will be no difference between the Novice Licence microwave schedule and that of the A or B licence in terms of antennas or modes. The only restriction, which applies also to the other bands in the Schedule (see this month's centre section), is that of power.

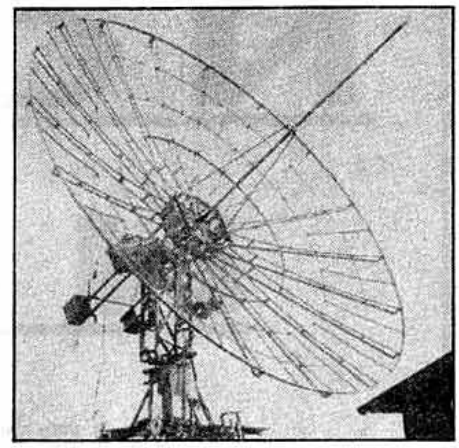
The reasons for choosing these two bands are that both are quite well populated by existing amateurs (so that there is someone to help, and someone to work!), that a wide variety of modes is in use and that, to be effective, relatively simple equipment and quite small (but gainy) antennas can be used. Furthermore, either band can be ideal for such uses as low power telemetry and control, short range links, and very wideband modes such as high speed data and video - in addition to many peoples' favourite pastime of DXing.

Some of these other applications could, for instance, be very usefully employed in the school or college environment as well. Indeed, the 10.6GHz ISM band is already in use for demonstrating the properties of waves: in my school physics (a very long time ago), light was used, often unconvincingly and with difficulty (!). In my childrens' time, it was Gunn oscillators and detectors. What better than to extend this to the broader context of practical experience via amateur communications?

Over the past few issues of *RadCom*, there has been some concentration on furthering the more advanced microwave technologies, for example the G4DDK and G3WDG designs for 2.5 and 10GHz equipment. Having undertaken to try to provide more technical content in this column, *contributions permitting*, what I did not say was that this must include some of the simpler techniques aimed at the 'raw' beginner. In this context, I hope that the older hands amongst you will forgive me for using some of the available space to present, possibly in a different way, some of the things some of you may have seen before, for instance in the *Newsletter* or elsewhere. It might even be useful to consider reprinting some of the earlier articles of microwave interest. What do you think?

If you have some simple designs or uncomplicated ideas (as well as the more complicated ones), send them in and they'll be used. It really doesn't take long to sketch

The G3ZME group's compact 10GHz portable station on Coniston Old Man. G8UGL is seated; G3UKV standing.



ON4UV's 430MHz E-M-E dish which is also suitable for microwave operation!

out a couple of diagrams or write a few hundred words. Nor does your effort need to be particularly 'polished'; information which is concise and unambiguous (including diagrams) can always be processed into something a little more 'presentable'.

I'd also be very glad to hear from anyone willing to offer practical assistance to beginners on a local area basis - for instance by guiding their constructional efforts or even taking them out on, say, a portable or cumulative contest in order to get a 'feel' for microwave operating. Practical guidance in getting a station up and running would also be valuable - every area of the country should be able to provide at least one 'guru' of greater or lesser experience!

NEWCOMERS CORNER

IF YOU ARE NEW TO amateur radio and particularly microwaves - welcome! Over the coming months I'll be trying to explain what microwaves are all about and how you, as a beginner, can use some of the microwave bands which are included in your licence. As for the other bands in the Novice Licence, you will need some basic tools, such as a multimeter, soldering iron and other tools in order to put together a station. For a practical 'minimum' station you will need a receiver, a transmitter, an antenna and a wavemeter to check your frequency.

There is very little ready-made amateur microwave equipment which you can buy (or afford to buy!), so you might have to use modified 'surplus' professional equipment or build your own equipment from scratch. Some designs for you to build will be given: transmitters, converters, antennas and some essential test equipment. If some of the things you may need are too difficult to make, then I will try to suggest how you can get round the problem. The other thing is that microwave equipment often needs components which are not found in 'ordinary' components catalogues, so you'll need to be told where to get these bits and pieces!

Also, microwave construction is sometimes more difficult than at lower frequencies. You might need to ask a more experienced amateur for help - don't be afraid to ask, as most amateurs are very helpful as I found out many years ago when starting out in the hobby. The RSGB Microwave Committee is always willing to assist either directly or

indirectly: if we can't help in some way or another, we're not doing our job! If you have problems or questions, send them to me (address in the header) and I'll ensure they are either answered directly or you will be put in touch with someone who can help. Over the coming months, I shall try to describe a number of bits of useful, simple microwave equipment which you should be able to build or modify at home to get you going on either of the two microwave bands covered by the Novice Licence.

You might well ask if microwaves are 'difficult' and components 'special', why should you be interested? The answer is that many things can be done with microwaves which are not possible in the other amateur bands and, in some cases, more easily and cheaply. For instance, you can enjoy interference-free contacts because the bands are wide and not so crowded. You can transmit and receive TV and data, free from interference and without causing interference. Equipment can be small and low powered and still give you results - the small portable 10GHz station shown in one of the photographs is light enough to be carried up a mountain or, used over short distances without a 'dish' antenna, similar in size to a small TV camera, to transmit high quality video or TV over a cable-less link.

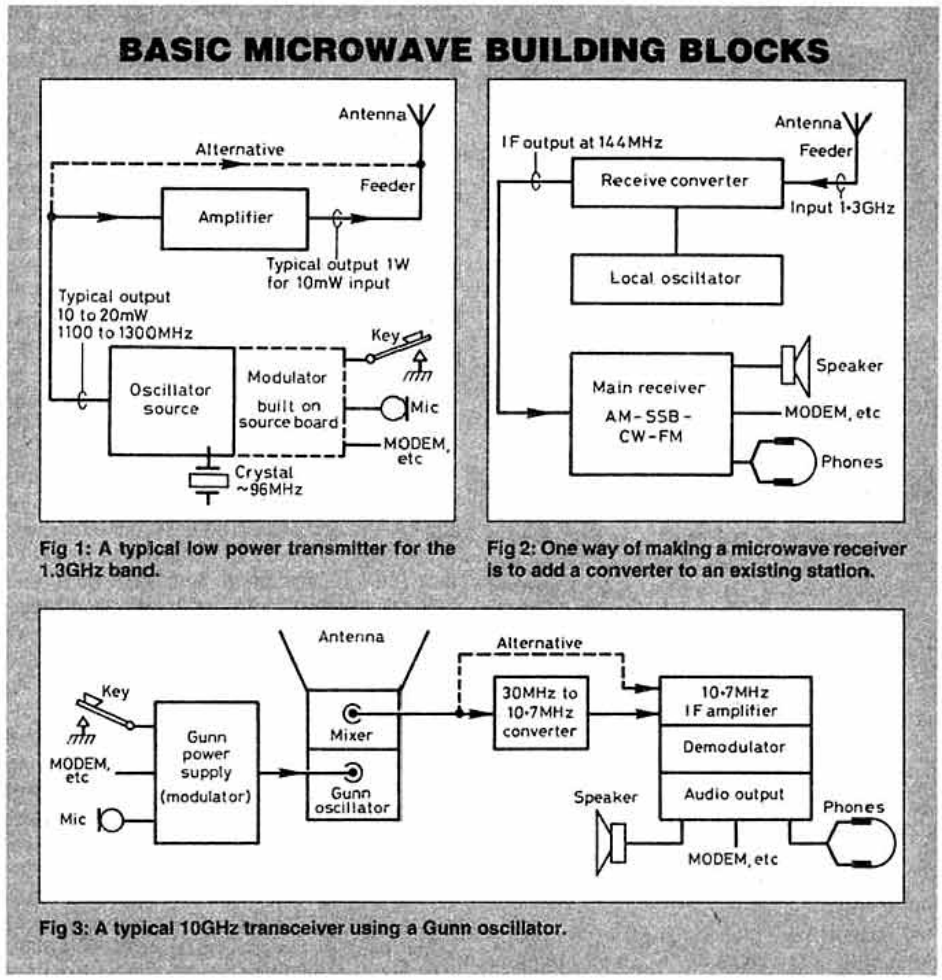
Drawn as 'blocks', a typical low power narrowband transmitter for the 1.3GHz (23cm) band looks something like **Fig 1**. Each block is something which can be built as a separate unit. The whole transmitter starts off with a crystal controlled frequency source which can be used as a low powered transmitter on its own, giving an output of a few milliwatts, quite enough for contacts over short distances with a small antenna, or longer distances with a good antenna. The power output can be increased from a few milliwatts to a Watt (or more) by using an amplifier. The other essentials are a feeder and an antenna, shown as a line and 'aerial'. A Morse key, microphone or other source (TV camera, computer) are needed to modulate the transmitter to transmit some sort of message. The simplest type of modulation is frequency modulation (FM).

Receivers are usually somewhat more complicated. Most amateurs have good receivers which tune HF or VHF and it is usual to use a converter to adapt the shortwave or VHF receiver to tune over the microwave band, or at least, part of it. A microwave to 2m amateur band converter is one of the favourite ways of making a microwave receiver. This is shown in block form in **Fig 2**. Again, an antenna and feeder are needed. By adding a changeover relay, the antenna and feeder can be used on both transmit and receive.

One advantage of the 23cm band is that the antennas can be small and look rather like small TV antennas. This makes it easy to use them for portable operation or for home use without too much objection from 'next-door'!

On the 10GHz (3cm) band, wideband equipment can be much simpler and, again, the easiest form of modulation is FM. For many years, beginners have used ready-made Gunn oscillators and mixers (ex-intruder alarms or doppler radar units) to produce quite effective receivers and low power transmitters, and it is suggested that this is still where the beginner should start.

Fig 3 is a block digram of a typical 10GHz transmitter/receiver (transceiver). It consists of a Gunn oscillator which acts as both the transmitter and the receiver local-oscillator to a built-in diode mixer. The power supply for the Gunn oscillator also acts as the modulator for tone-modulated Morse, speech or any other form of signal. On this band it is not usual to feed the output of the receive converter (mixer) into an amateur band receiver, because the bandwidth used is much wider than the bandwidth of the filters in the amateur receiver. To complete the receiver, it is usual to build something like a 10.7MHz receiver consisting of two or three integrated circuits which amplify the 10.7MHz output of the mixer, demodulate it and provide such things as audio output, S-meter driver and so-on. Occasionally, double conversion is used, first to 30MHz and then to 10.7MHz. It just so happens that there are many cheap 10.7MHz FM receiver boards available which will do the job and so save building from scratch.



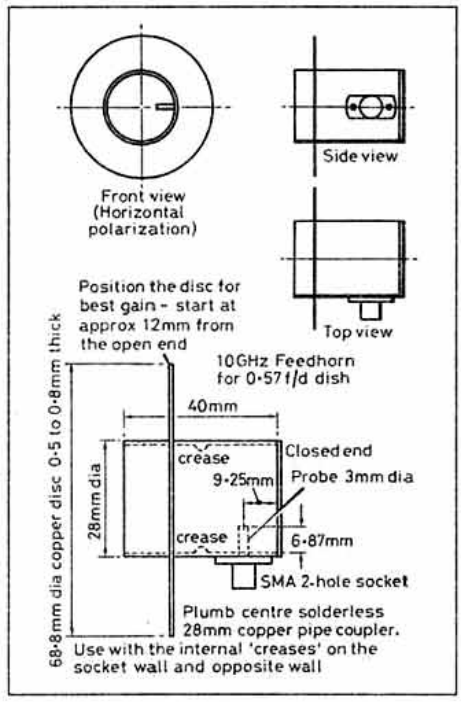
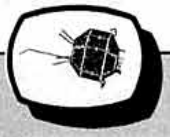


Fig 4: G4DDK's simple circular feedhorn.

TECHNICAL CORNER

THERE ARE SOME 60cm dishes available for amateur use with an f/D ratio of about 0.57. In a recent edition of the *Microwave Newsletter*, Sam Jewell, G4DDK, described a simple circular feedhorn suitable for such dishes which I felt was worth reproducing here. **Fig 4** is a diagram of the form of construction. The horn is made from a standard plumbing fitting - a solderless 28mm pipe coupler - with one end closed by a shorting plate made from 0.5 to 0.8mm thick copper or brass sheet. The open end has a circular 'splash-plate' soldered on the outside and the feed is a $\lambda/4$ probe on an SMA socket. The best position for the splashplate should be determined before soldering in place, but I wouldn't imagine it is too critical. The length of the probe and its spacing from the endplate are probably rather more critical.

See you at the VHF Convention



Satellites

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

PRIOR TO THE REGION 1 IARU Conference in Spain last year, Ron Broadbent, G3AAJ, with his IARU 'hat' on, discussed with DJ4ZC, Karl Meinzer, President of AMSAT-DL, the possibility of the latter attending the Conference. Ron had also persuaded Doug Loughmiller, KO5I, President of AMSAT-NA, to be present as Ron's 'guest'. As Ron says in his report on this meeting (*OSCAR News*, October 1990), it seemed a good idea that satellite officials with up-to-date knowledge of future trends in the AMSAT organisations, should be able to give this triennial international conference, valuable information on satellite matters, particularly in the sphere of future satellite planning.

Karl was unable to spare the time to attend, but he suggested that Doug and Ron should go to Marburg immediately after the meeting to discuss results. It was hoped that JR1SWB from JAMSAT would be in Marburg at the same time.

The meeting was a success, a report was submitted to the AMSAT-UK's Management Committee on Ron's return and this served to some extent to shape the International Meeting at the AMSAT-UK Colloquium last July. One of the suggestions made was that a survey, similar to one done by AMSAT-DL a few weeks earlier, should be carried out by AMSAT-NA and AMSAT-UK. This was intended to gauge what satellite people and others not yet committed wanted in the future.

A simple question/reaction questionnaire was drawn up and distributed at Dayton for the USA, at the RSGB's National Convention for the UK, and to various amateur radio magazines. In all some 40,000 copies were distributed!

As is usual with these questionnaires, very few responses were returned - less than a thousand! Two interesting charts accompany Ron's write-up in the *OSCAR News* mentioned above, from which it would seem that, of those who did respond, SSB and CW modes were almost level and headed the preference list. Packet and RTTY came second. Of the preferred frequencies, 2m and 70cm headed the list, which included 10m as well as 1.2, 2.4 and 10GHz.

The results of the German survey are reported in detail in the *AMSAT Journal*, Vol.13, No 5, November 1990. This again showed a preference of 75% for 145MHz downlink and 95% for 435MHz up. Approximately 80% opted for 145MHz down; over 90% for 435 down; 90% for 145 up and 90% for 435MHz up.

The writer's feeling about these types of questionnaire is that it is only those with strong feelings about a particular topic who respond. If you are an enthusiast for one particular mode you will be a respondent. But the great majority who presumably are satisfied with things as they are, don't bother. The best that one can conclude from these surveys is that there is still an almost equal number of folk who want the simpler mode of 2m/70cm retained for amateur radio communications (and are not unduly concerned which frequency is used for the uplink or downlink) as there are folk who would prefer a move into the higher frequencies. There was even some support for a 10m channel to be retained in future planning and the writer has had some requests that the satellite frequency allocations in the lower frequency bands such as 15m should be included in future satellite building plans. As we have said before, whilst it is essential for the continued wellbeing of the amateur radio satellite scene that the experimental and developmental aspects of the technology should be kept to the fore, we must keep in mind that amateur radio satellites are intended primarily to provide a new field of amateur radio communication facilities.

SATELLITES AND SWLS

I MENTIONED IN THIS COLUMN a couple of months or so ago, the contribution that Louis Meyer, an enthusiastic SWL, made to the AMSAT-UK AGM on behalf of the SWL fraternity. Since then we have in AMSAT-UK tried to encourage SWLs to participate in the satellite scene. Hon Sec AMSAT-UK, Ron Broadbent, G3AAJ, mentioned the possibility of putting a page in *OSCAR News* for the SWL if there was sufficient call for it. He asked for news and reports from any listeners who were interested enough to listen for satellites. He only had two replies! These were from *OSCAR News* readers who said they thought it was a good idea, but no one sent in any reports. This apparent indifference to the satellite scene is, one suspects, due to other reasons than lack of interest. It still seems to be thought that satellite activity can only be successful if one has a lot of technical knowledge and if one is prepared to spend a lot of money on setting up new gear for it. There is a lot of literature available now for the beginner covering all aspects of 'How to get started on Satellites' which, one way and another, covers all you need to get you started. By the time you read this, Richard Limebear's (G3RWL) new edition of *Guide to Oscar Operating* should be out and this is a very good introduction to get started with. AMSAT-UK has numerous other publications available for the newcomer so drop an SAE to the Hon Sec for details.

We continue to get letters - and even phone calls - asking "Please can you tell me how to get started on satellites?" The saddest enquirers of all are those who tell us that they have spent hundreds of pounds on a super-VHF transceiver, put up an expensive aerial array, bought a computer and "haven't heard a thing!" This is surprising because much has been written in the radio magazines recently about getting going on satellites and one would have thought that by now the message would have got around that this is not the way to go about it. You must start simple and work your way up. Begin by getting the receiving side of the project going nicely and don't try transmitting until you have a reliable receiving set-up. Don't use too elaborate an aerial system, as this is likely to be of a very narrow bandwidth which increases your difficulties in directing it at the satellites. Listen for the RS 10/11 on 29.357MHz and add another dimension to your listening.

SATELLITE FREQUENCY MODES

IT HAS BECOME ACCEPTED THAT the type of satellite be indicated by a mode type-letter. **Mode A** transponders are those with an uplink in the 2m band and a downlink in the 10m band. OSCAR 8 was an example of this type, with an uplink in the 145.850 to 145.950MHz range, and a downlink between 29.4 to 29.5MHz.

Mode B satellites have an uplink in the 70cm band and a downlink in the 2m band. Frequencies are between 435 and 438MHz - like OSCAR 10 - for the uplink and 145.8 to 146.0MHz for the downlink.

Mode C is similar to Mode B but has less power. Mode D is when the satellite is switched off for battery charging.

Mode J is the designation for the Japanese FUGI satellites such as FO12 and FO20 with their uplinks in the 2m band and downlinks in the 70cm band.

On **Mode L**, the uplink is on 23cm (around 1269MHz) and the down link on 70cm (435 to 438MHz).

Mode S is 70cm up; 13cm down (435.603 to 435.630 and 2400.711 to 2400.664MHz).

Some satellites carry several transponders in differing Modes, ie OSCAR 13 which has Mode B, Mode JL, Mode S transponders and Beacons on Mode B, Mode JL and S. They do not, of course, have them all on at the same time. Programme schedules are issued from time to time by the operators giving the times of particular modes. The Microsats do not follow this designation and the Russian RS 10/11 satellites have their own set of frequency designations as follows:-

Mode A	2m up, 10m down
Mode K	2m up, 10m down 15m up, 10m down
Mode T	15m up, 2m down
Mode KA	15m and 2m up, 10m down
Mode KT	15m up and 10m and 2m down.

DataComms

No Datacomms column was received from Neil Lasher this month. We regret any inconvenience this may have caused.

PRODUCT NEWS

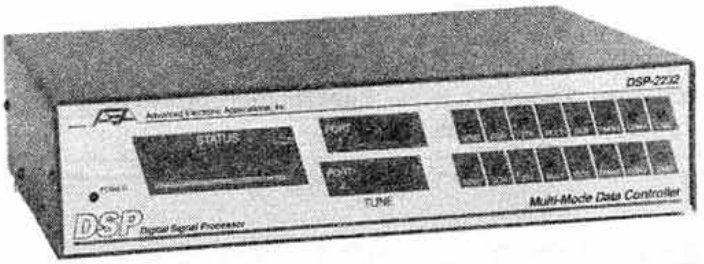
Note: Product news is compiled from press releases sent in by the manufacturers and distributors concerned. Details are published in good faith but *Radio Communication* cannot be held responsible for false or exaggerated claims made in the source material.

A MAJOR PROBLEM WITH today's delicate circuits is ESD - Electro-Static Discharge. The tiny spark which jumps between the component and a soldering iron (or pliers, fingers etc.) can destroy or at least permanently damage many devices, particularly those using C-MOS technology. Described as ESD-safe, a new Soldering Station from Ungar, the 2110, features "a soft-touch, cool-grip 24V micro-sized handpiece rated at 60W - safe at the bench and powerful enough for the heaviest boards". It has a long-life ceramic element and a spike-free zero-switching closed-loop variable temperature control circuit. Cost is "under £70".

UNGAR: Eldon Industries UK Ltd, Unit 1, Clifton Rd, Shefford, Beds, SG17 5AB. Tel 0462 814914.

ONE OF THE NEW data buzzwords is Digital Signal Processing (actually three words) which was described in *DataComms* (*RadCom*, Jan 91). ICS have issued a sneak preview of the AEA DSP-1232 and 2232 which will be based on DSP technology "which has until now been so expensive as to be used only in military systems". Many data modes are built into this super-TNC, but the beauty of DSP is that any new modes can be installed simply by adding firmware, rather than buying new hardware.

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



THE RSGB's NATIONAL HF convention was the scene for the launch of SHACKLOG, a new amateur radio station logging software package for the IMB PC and compatibles. Its main features are: Simplicity of operation, real-time QSO logging with most data automatically entered, CQ and closedown logging, QSL label printing, QSO update mode, contest mode, extensive search/select/sort capability, report generator for user defined reports, standard report writer, and a macro feature. The price "a modest £18.50" includes a donation to the RSGB HF DXpedition fund.

G3PMR Software: 30 West St, Great Gransden, Sandy, SG19 3AU.

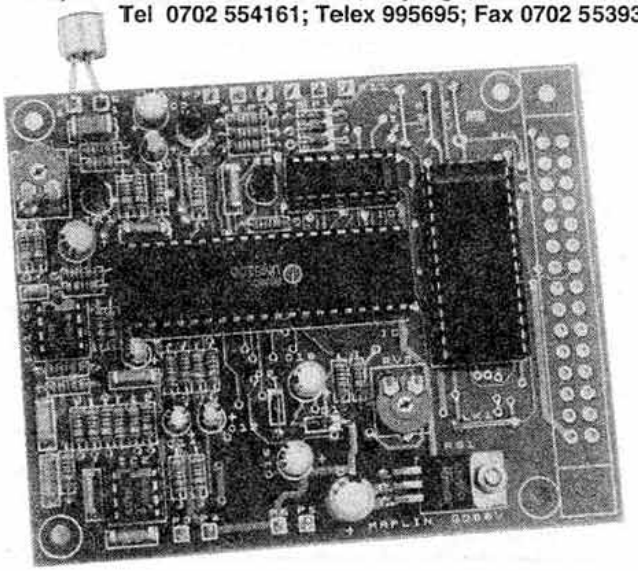
ONE OF THE MORE popular uses of *Helplines* and the packet radio network is locating workshop manuals for equipment which has outlasted its paperwork. RSGB member, Maurice Small, G0HJC, is the proprietor of MTS which specialises in the supply of workshop manuals for "almost any type of equipment, no matter what it is or what its age". They have a very good section on amateur radio and related equipment. Over 100,000 different makes and models are covered from the earliest vintage valve wireless set to the latest TVs and videos. A "unique search and trace service" is operated "in the unlikely event" that MTS do not have the information required.

MTS also supply a range of books on servicing all sorts of radio and electronic equipment, some of it aimed at those who do not do such repairs for a living. Now, where did I put that derelict Betamax VCR?

Mauritron Technical Services: 8 Cherry Tree Road, Chinnor, Oxon, OX9 4QY. Tel 0844 51694; Fax 0844 52554.

METEOR SCATTER DXers OR CONTEST ENTHUSIASTS may like to build Maplin's Digital Speech Record and Playback Module which can store speech digitally and then play it back at the push of a button. Based round the UM5100 chip, the unit does not suffer the wear and tear of a tape recorder. Up to 20 seconds of speech is available making it ideal for sending "CQ Contest" effortlessly. Non-volatile storage is available with an add-on EPROM programmer. Available only as a kit, the Record and Playback Module is £35.95 and the optional programmer kit is £14.95.

Maplin Electronics: P O Box 3, Rayleigh, Essex, SS6 8LR. Tel 0702 554161; Telex 995695; Fax 0702 553935.



THE BRITISH AMATEUR Radio Teledata Group (BARTG) has supported RTTY and data operators for many years with a range of PCBs associated with cicuits in their magazine *Datacom*. The latest board is for the R5 Audio Filter which combines low pass and high pass to make a band pass filter which can be tailored to individual requirements in approximately 100Hz steps from 40Hz to 3,600Hz. The PCB is £5.50 inc P&P and comes complete with instructions, though not the components.

BARTG: Components Manager, Mr E J Hatch, G3ISD, 147 Borden Lane, Sittingbourne, Kent, ME10 1BY. Tel 0795 77431.

ANOTHER SPECIALIST group is AMSAT-UK which looks after the interests of satellite enthusiasts, including substantial funding for the 'birds' themselves. One of their services is a Hardware, Software and Books Catalogue. Products are available for all but, not unreasonably, AMSAT-UK members get a discount. Nearly 100 items are listed in the 36 page A5 book which costs £3, but includes a £3 voucher off your first purchase.

AMSAT-UK: 94 Herongate Rd, Wanstead Park, London, E12 5EQ. Tel 081 989 6741.

WATERS AND STANTON have a new 7000 sq ft 'Electronics Super Store' at 22 Main Rd, Hockley, Essex. The store includes "a large self-contained amateur radio department, fully equipped working HF and VHF radio stations, a comprehensive aerial system and private car parking." The new premises also house bigger offices "a new streamlined mail order dept and superbly equipped service dept". W&S boast 'the largest amateur radio retailing complex in S E England with stocks to match'.

Many Waters and Stanton products are now included in the Maplin Electronics Catalogue. Nice to see a success story at a time of recession.

Waters and Stanton Electronics: 18-20 Main Road, Hockley, Essex, SS5 4QS. Tel 0702 206835; Fax 0702 207488.

WANT TO LISTEN TO THE BBC whilst in your car anywhere in the World? Phillips have launched the DC777, a car radio which includes a ten band short wave receiver with 20 memories and a timer so you don't miss your favourite programme.

All the usual LW/MW/FM facilities are built in as well as an autoreverse cassette deck and a 50W audio amp. Having paid £299 for it, you will be pleased to note the security coding feature.

Information from: Andrew Burslem, Mathieu Thomas Ltd, 8 Westminster Palace Gardens, Artillery Row, London, SW1P 1RL. Tel 071 222 0833.

AN ESSENTIAL field day accessory is a battery powered soldering iron. For only £4.95, Maplin will supply an iron powered either by 4 alkaline C cells or two Ni-Cd C cells. Correct working temperature is reached within 10S of switching on, and for safety and protection the combined low voltage element/bit retracts when not in use. A charger socket is provided. The unit includes two bits and some solder, but no batteries. For bigger jobs, use Maplin's portable rechargeable iron which has rapid heating, and a light bulb to illuminate the job. It comes complete with charger at £19.95.

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

SCANNER USERS OFTEN require a compact antenna giving a very wide frequency range. The Howes AA4 Active Antenna covers 25 to 1300MHz and is only 16.1" long by 1.2" wide. Incorporating a 3dB noise figure, 15dB gain, IC amplifier and a 10dB switched attenuator, the unit costs £18.80 as a kit, or £24.90 ready-built (P&P is £1 extra).

C M Howes Communications: Eydon, Daventry, Northants, NN11 6PT. Tel 0327 60178.

ATARI ST OWNERS MAY like to know of "a powerful new packet radio / multimode terminal program" from Siskin. Features include split screen, mouse driven, drop down menus, back-scrolling Rx buffer, save and print to disk from buffer, user-definable menu commands, command recall, and a full user manual. Siskin also ask users to tell them what enhancements are wanted and they will be provided. Can't say fairer than that!

Minimum hardware requirements are an Atari ST with 512k RAM, mono hi-res display, single or double 3.5" drive and TOS 1.0 or later. Mr Siskin himself, Phil Bridges, G6DLJ, offers a £5 discount on the normal £19.95 (inc P&P) if you mention *RadCom*. Sounds like an offer you can't refuse.

Siskin Electronics Ltd: PC House, 2 South St, Hythe, Southampton, SO4 6EB. Tel 0703 207155; Fax 0703 847754.

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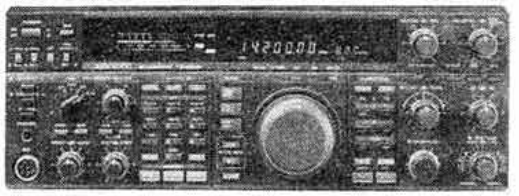

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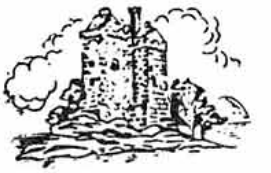

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LONDON AMATEUR RADIO SHOW

CONTEST NEWS

HF RULES

COUNTY ROUNDUP CONTEST 1991 - RULES

THE GENERAL RULES FOR RSGB HF CONTESTS PUBLISHED IN *Radio Communication*, January 1991 will apply.

1. When: Section A: 0800 - 1100GMT, 18th May 1991

Section B: 0800 - 1100GMT, 19th May 1991

2. Sections: A - SSB, B - CW, single-operator only. Entrants may submit logs for either or both sections.

3. Frequencies: 3.5 and 7MHz bands only:

Section A: 3.600 - 3.775MHz and 7.050 - 7.100MHz

Section B: 3.520 - 3.560MHz and 7.010 - 7.040MHz

4. Exchange: RS or RST plus serial number commencing with 001 in each section, plus county code as published in the January 1991 edition of *Radio Communication*.

5. Scoring:

(1) Points:- Three points for each completed contact. Points may be claimed for contacts with stations located outside the UK. Stations may be contacted for points once on each band in each section (possible 4 QSOs).

(2) Multiplier:- One for each UK COUNTY worked on each band. NB - There is no multiplier for overseas COUNTRIES.

Each section is to be scored as if it were a separate contest.

6. Logs: Form of logs and address for entries as in General Rules.

7. Awards: Certificates of Merit will be awarded to the leading three stations in each section.

HF RESULTS

COUNTY ROUNDUP 1990 - AMENDED RESULTS

A total of 21 logs from 15 different entrants most unfortunately went astray before the adjudication of this event . . . . these have now come to light, the contest has been re-checked and the corrected table of results is published below. Sincerest apologies are offered to those who were disappointed when the results were originally published *(December 1990)* and to those who now find their ranking revised. All the missing logs were posted in good time, and the fault is entirely mine.

G3LET

CW SECTION

Posn		Call	QSOs	Mult	Points
1	*	G3TBK	112	66	22176
2	*	G3NOM	112	62	21204
3	*	G5LP	107	65	20865
4		G3NKC	98	64	18816
5		G3KHZ	100	61	18300
6		GM4OBK	105	57	17955
7		G3JJG	97	60	17460
8		G4ARI	98	57	16758
9		G0KGK	97	57	16587
10		G3GLL	98	56	16464
11		G3MA	94	56	15792
12		G3MPB	91	57	15561
13		G3OXC	96	54	15552
14		G4OGB	85	56	14280
15		G3VYI	91	51	13923
16		G3RSC/P	81	55	13365
17		G4IQM	85	50	12750
18		G4ECI	81	48	11664
19		G0IDE	77	50	11550
20		G5MY	75	49	11025
21		G3HKO	78	47	10998
22		G3BPM	71	46	9798
23		GW3JI	68	44	8976
24		G4XPE	62	44	8184
25		G3DPX	62	41	7626
26		G3GMS	56	40	6720
27		G0JNZ	55	36	5940
28		G0CGB	58	34	5916
29		GM3IZD	63	31	5859
30		G0CGV	56	30	5040
31		GM3UM	43	32	4128
32		G3SB/P	43	31	3999
33		G0KJV	40	29	3840
34		G4PTE	41	29	3567
35		G3GMM	34	29	2958
36		G4ZME	33	21	2079
37		G4AGQ/M	26	23	1794
38		G3EAO	22	17	1122

SSB SECTION

1	*	G3NLY/P	149	87	38889
2	*	G5LP	165	63	31185
3	*	G4ARI	122	72	26352
4		G3TBK	123	66	24354
5		G3MA	114	65	22230
6		G3NOM	113	65	22035
7		G4MET	118	56	19824
8		G3VHB	86	62	15996
9		G4IQM	93	53	14787
10		GM0ALS	94	51	14382
11		G4JQL	88	52	13728
12		G2AFV	75	56	12600
13		G0JNZ	75	51	11475
14		G3NKC	68	53	10812
15		G3BPM	67	43	8643
16		GM3IZD	59	41	7257
17		G4ECI	53	38	6042
18		G0NBI	49	35	5145
19		G0IJM	30	24	2160
20		G4XPE	25	23	1725
21		G3GMM	19	17	969
22		G3TKR	17	16	816
23		G4PTE	14	12	504
24		G4AGQ/M	5	5	75

Check log gratefully acknowledged from G2FWX.

CLUB CALLS CONTEST 'CCC' 1990 RESULTS

This is probably the only 'no holds barred' contest in the calendar; where all modes, single or multi operator stations, members of RSGB and non members (as long as they belong to an Affiliated Club) are all permitted. However, one thing that is not allowed in RSGB contests is the use of special event callsigns, e.g. GB, GX, etc. As there has been some confusion and ambiguity recently, those entering using SES privileges have not been disqualified this time but I refer you to General Rules '5' as published in January 1991 *Radio Communication*.

Equipment used by leading stations GX3WAS - TS940, dipole at 110ft; G3VER/P - IC735, dipole at 60ft; G2BBC - IC735, dipoles at 130ft (EW) 50ft (NS). G2BBC had 181 contacts logged; 46 club calls were logged. Many reported having a fun social evening. Yes, the HQ station was on the air and, yes, I will be proposing an extension to the frequency allocation next year.

G4JKS

TRANSMITTING SECTION

1.	GX3WAS	C	1790*
2.	G3VER/P	C	1599
3.	G2BBC	C	1575
4.	G4RFR	C	1506
5.	(G6RC (G3WOI/P	C C	1451
7.	G4SUP	M	1385+
8.	GW4CC	C	1356
9.	GC0EJE/P	C	1346
10.	GX5BK	C	1337
11.	G4NOK	C	1333
12.	GC4WXM	C	1324
13.	G3NKS	M	1290
14.	G0JJN	C	1259
15.	(G0KAQ (GX4NHT	M C	1227
17.	G0BWD	C	1209
18.	G4ENA	M	1208
19.	GX0IVR	C	1177
20.	G0CGG	C	1108
21.	GX4LSF/P	C	1078
22.	G3FFH	M	1046
23.	GX3ASR	C	1038
24.	GX3YDD/P	C	1004
25.	G4IUZ	M	995
26.	G3FNM	M	991
27.	G0OCE	C	977
28.	GX3PRC/P	C	970
29.	GX0BRC/P	C	938
30.	GM3HAM	C	875
31.	GX4LAD	C	859
32.	G3SAD/P	C	817
33.	GX8CA	C	738
34.	G0LTB/P	M	704
35.	G4LRT	NM	703*
36.	G6UQ/P	C	674
37.	G3JSR	M	662
38.	G3CNX/P	C	655
39.	G3NLY	M	637
40.	G4IVJ	M	563

41.	G4JXG/P	C	544
42.	G3VNG	M	526
43.	G0HRW	C	462
44.	G0DAY	M	383
45.	G3VGG/P	C	366
46.	G0LRJ	M	356
47.	G4QFR	M	327
48.	GM4WLN	M	321
49.	G0JYC	M	279
50.	GW6TM	C	243
51.	G0NIF	M	232
52.	G4ISO	M	204
53.	G0KYE	M	84
54.	G3KDB	M	56
55.	G0LSJ	M	36
56.	G0KZQ	M	28

SWL SECTION

1.	BRS28198	1076#
2.	G1EMD	966
3.	BRS20249	941
4.	G8FM	666

* The Ariel Trophy - Leading Club
+ Cert to Leading Member
* Cert to Leading Non Club Member
# Cert to Leading SWL

21-28MHZ SSB CONTEST 1990 RESULTS

This event coincided with an excellent spell of conditions, particularly on 28MHz, where well over 150 different country/prefix multipliers appeared in the logs from UK entrants. There were 612 different UK callsigns listed in the check sheets from overseas entrants . . . . it is disappointing that only 46 of these sent in logs for checking, compared to the 129 logs from overseas. It was pleasing to receive so many checklogs but, alas, these also were nearly all from overseas stations.

The top UK Single-operator, G3NLY, made a total of 1136 contacts, with 811 of these being on 28MHz. This excellent performance wins him both the Whitworth trophy as overall leader and the Powditch trophy for the highest 28MHz score.

Once again the Martlesham Contest Group entered two stations in the UK Multi-operator section and battled it out for first and second places. Although their QSO totals were similar, G0KPW triumphed by finding two more multipliers. Congratulations also to all the certificate winners.

It is curious that while SWL members complain about the lack of trophies available to them and ask for more contests with Receiving sections, only three made the effort to enter this event, where two separate listener trophies are awarded. Once again BRS32525 has scooped the pool and wins both the Metcalf trophy as overall leader and the Powditch Receiving trophy for his 28MHz score. The Committee, in line with IARU Region 1 policy, try to include SWL sections in as many HF contests as possible, but unless there is more support this policy may have to be reviewed.

The standard of the logs was of a high order with many being computer prepared. There was a minimum of unmarked duplicates and although there were errors, these mainly consisted of one or two characters incorrectly copied in callsigns, or over-optimistic claims for multipliers. The change to counties as the basis for the overseas multipliers was well received, the only complaint being from GW4BLE (checklog), who felt the prefix multiplier to be better.

G6LX

UK SINGLE OPERATOR SECTION

POS	CALL	OVERALL SCORE TOTAL	MULT	28MHz SCORE POS	SCORE	MULT.
1	G3NLY*#	497568	146	1	182475	75
2	G4CNY*	430554	146	3	126309	71
3	G3OZF*	410733	141	4	107712	68
4	GW0ARK	346647	119	7	88740	51
5	GM0ECO	340992	128	9	65790	51
6	G3TBK	311736	124	8	80040	58
7	G4FMO	228390	115	12	41052	44
8	G3VHB	182352	116	15	34416	48
9	G3FFH	170130	107	16	30381	41
10	G3MGW/P	152352	92	11	41832	42
11	G4UDU	132240	58	2	132240	58
12	G3WRS	107892	81	14	35490	35
13	G6LX	103500	75	5	103500	75
14	G4IUF	97680	55	6	97680	55
15	G4FPQ/P	94563	79	13	37752	44
16	G4LYM	92904	79	21	12690	30
17	GM3ULG	88970	78	18	17205	31
18	G4IQM	75276	82	19	16539	37
19	GW4HSH	63516	79	22	11781	33
20	G0FGI	61344	71	23	7848	24
21	G2QT	57834	51	10	57834	51
22	GW4OXB	45012	62	26	5250	25
23	G3NKC	33432	56	25	5625	25
24	G3UFY	29394	46	17	29394	46
25	G0AHC	28056	56	27	2862	18
26	G0KTN	18093	37	20	14784	32
27	GW0AJI	17388	42	30	1122	34
28	GM4HQF	16065	45	28	2700	20
29	GM3CFS	11934	39	29	1680	16
30	G4PTE	10710	34	31	1023	31
31	G0GGX	10530	30	24	6900	23
32	GM0GNT	10488	23	32	0	0

UK MULTI-OPERATOR SECTION

1	G0KPU*	534150	150	7	G3VER/P	301644	108
2	G4PIQ/P	529692	148	8	G4YME	262350	110
3	GX3GRS	438606	177	9	GX4IRC/P	209880	110
4	GX0MCG	388395	135	10	G4NOK	206415	99
5	GX0FDX	370464	136	11	G0NYL	79650	75
6	GD3CSA/P	305244	122				

UK RECEIVING SECTION

1	BRS32525*#	116412	109	1	26772	46
2	BRS20249	25983	63	3	6132	28
3	BRS28198	23100	70	2	8040	40

OVERSEAS SINGLE-OPERATOR SECTION

AFRICA

1	G4WYG/ST2*	8910	2	S89SA	420

ASIA

1	UA9CDT*	226320	14	JL7FLY	1122
2	JA7SN	21105	15	JA6EFT	1083
3	JA6GT	12600	16	UA9FLN	1140
4	UL7FCW	11826	17	JR7LVK	912
5	RW9HZ	9711	18	UA9XBE	864
6	JH1BXH	6318	19	UA9UDV	630
7	JA3LDH	4752	20	JL1MWI	507
8	JE7DOT	4515	21	JR9GOP	189
9	9M2CX	3720	22	JH2WHS	27
10	JG2REJ	2626	23	JL1UMX	15
11	UM8MGO	2400	24	JL6IPK	12
12	UA9CI	1419	25	JL1KUH	3
13	JE1CCD	1242			

EUROPE

1	9H1GU*	203760	21	IK3MAW	4884
2	LZ2AO*	104430	22	HA2KMR	3375
3	UB4QWW	91512	23	IK3IEQ	2844
4	RB5QW	83160	24	YO7ARZ	2652
5	LZ1ZX	68355	25	YO7LFV	2649
6	YO7AOP	40800	26	EA4CQF	2277
7	UA3AGN	37914	27	UB5VDA	2262
8	UA3DPX	28575	28	RB5SA	2232
9	CT1/G0AEV	27435	29	UB5AF	2229
10	UY5TE	26520	30	UA1WFP	1908
11	RB4EXN	26246	31	YU7KM	1578
12	HA9CD	25145	32	OH7NW	1575
13	UB3MW	22110	33	UB5ZME	1572
14	UZ1TWC	16182	34	SM4BTF	1242
15	LY2BJV	11475	35	SP7FQI	957
16	YO6VZ	10692	36	OK3CXS	546
17	YU7LS	9150	37	RB5TBS	510
18	OH2MPO	5508	38	I4CSP	240
19	UV3DPP	5460	39	ON5FV	168
20	RA3DAN	4956	40	DK5KJ	165

NORTH AMERICA

1	K2TCK*	118422	6	VE3NYT	2880
2	K7QQ	94941	7	W9CNF/M	2673
3	W1/G4DZC	78174	8	N2KLJ	2205
4	N6JM	3444	9	W5EIJ	1008
5	WK4F	3024	10	AA8AW	464

OCEANIA

1	ZL2BED*	6120	2	VK2PWS	540

OVERSEAS MULTI-OPERATOR SECTION

1	LZ5Z*	175968	4	UZ3QYA	3618
2	UZ3XWC	83490	5	UZ0SXC	1845
3	UZ4WWQ	19206	6	UB4JWO	1716

OVERSEAS RECEIVING SECTION

1	LZ1-M333*	42570	4	IA5-2304-FI	2001
2	UA4-156907	6750	5	OE1-0140	840
3	SP0182-67	5232	6	SWL-JG4SNR	3

= Trophy Winner.
* = Certificate Winner.

Checklogs gratefully received from:FG8/KK4A, G0CLP, G3KZJ, G4AGQ/M, GW4BLE, HA2MJ, JA0FFF, JG6CFD, LA4YW, LY1ZD, LY3BA, LY3DO, LZ1DM, LZ1KWZ, LZ1MM, N0GOS, SM4SET, UA1ANA, UA3TAM, UA4PDX, UA4PKN, UA4PKZ, UA9UDX, UA0SFN, UB4XWK, UB5QFD, UB5VMR, UB5YKC, UB5XEG, UL7RER, UV3DN, UZ4RRF, VE1TH, VE7ZC, Y48GN.

HF CONTESTS CALENDAR - 1991

Mar 2/3	*ARRL DX SSB (p17, Jan 91)*
Mar 9/10	Commonwealth (Dec 90)
Mar 16/17	*Bermuda (p17, Mar 91)*
Mar 23/24	1.8MHz SSB (Feb 91)
Mar 23/24	*CQ WPX SSB*
Apr 7	**Ropoco 1** (Jan 91)
Apr 14	28MHz Cumulative (Feb 91)
Apr 21	Low Power (Feb 91)
Apr 22	28MHz Cumulative
Apr 27/28	*Helvetia (CW/SSB) (p17, Mar 91)*
Apr 30	28MHz Cumulative
May 8	28MHz Cumulative
May 11/12	*CQ-M (CW/SSB)*
May 16	28MHz Cumulative
May 18	County Roundup SSB (Mar 91)
May 19	County Roundup CW
May 25/26	*CQ WPX (CW)*
Jun 1/2	NATIONAL FIELD DAY

Full details of all RSGB HF Contests can be obtained from the Chairman of the HF Contests Committee, Dave Lawley, G4BUO, who is QTHR.

The typeface in *Contest News* has been reduced at the request of the HF Contests Committee in order to do justice to the large amount of contest information requiring publication, whilst retaining the same page allocation.

SSB FIELD DAY 1990 RESULTS

Record scores were made in the open section (the leaders averaging 73+ QSOs per hour) and strategy proved vital . . . . Cambridge's superior QSO rate being overcome by Lichfield's extra multipliers on 3.5MHz to give the Midlands group their 4th win in five years (with a lineup of TS940, TL922, TH6, 3.5MHz Delta Loop & 7MHz 2-ele rotary quad they are clearly going to take some beating!). However, the restricted section was the more competitive, providing the closest finish for some years. There was much adverse comment regarding the use of 'GX' and 'GS' calls, and this has been noted by the HFCC.

Comments received included: The 7MHz quad was a source of disbelief and wonder *(G3WAS)*; Operated by candlelight after main generator failed *(G3GLL)*; Very little contest experience but everyone enjoyed themselves *(G8NT)*

G3KDB

OPEN SECTION

Psn	Call	Points.Multipliers Group	3.5	7	14	21	28	QSOs	Score
1	G3WAS/P	LICHFIELD ARC	513.22	1008.35	1075.52	1429.47	1469.45	1701	1102485
2	GX6UW/P	CAMBRIDGE UNIV RS	249.12	811.34	1946.56	1460.45	1043.45	1771	1057728
3	GD3FVA/P	S MANCHESTER	552.17	1010.36	1543.51	1156.39	359.35	1406	822360
4	G4OBK/P	CENTRAL LANCS ARC 'A'	490.17	736.31	1248.49	1641.53	498.26	1341	811888
5	GM5VG/P	WINDY-YETT CG	562.19	821.28	1051.53	1609.39	571.31	1361	784380
6	GW4CC/P	SWANSEA RS	602.11	884.26	632.36	1013.36	874.32	1128	548685
7	G4HRS/P	HORSHAM ARC	816.21	823.26	554.30	949.35	212.60	932	442728
8	G3VHB/P	TOWER SNATCHERS	836.22	1192.25	765.43	368.28	96.13	916	426567
9	G3XEP/P	WHITE ROSE RS	511.9	423.8	395.27	1769.47	797.17	1154	420660
10	G4FRS/P	FARNBOROUGH & DRS	628.16	708.20	608.39	1190.39	215.6	978	401880
11	G3SFG/P	SOUTHGATE ARC	523.13	529.18	979.38	1022.34	390.9	992	385616
12	GM3ZET/P	LERWICK RC	169.7	632.20	708.29	1302.39	45.6	806	291210
13	GX3ASR/P	EDGWARE	532.17	902.22	522.36	561.20	292.6	779	283709
14	GX4IRC/P	IPSWICH RS	359.8	1198.32	356.34	147.23	2.1	631	210324
15	G3GHN/P	CLIFTON ARS	382.8	434.13	286.24	281.14	674.23	559	168674
16	GM0IBM/P	IBM GREENOCK	518.11	447.16	528.17	376.20	96.11	483	147375
17	GM4AZZ/P	MAGNUM CG	314.8	744.14	627.18	157.18	202.14	528	147168
18	G3NWR/P	WIRRAL ARS	590.13	621.16	743.30	50.4	34.7	552	142660
19	G0JJN/P	ROLLS ROYCE	661.14	342.9	257.16	444.18	357.9	575	138087
20	G3FJE/P	SHEFFORD	464.12	801.18	186.15	171.19	98.15	484	135880
21	G3VGG/P	BROMSGROVE	259.9	581.15	519.21	181.15	146.20	409	134880
22	G4FUH/P	SCUNTHORPE ARC	240.8	227.8	380.23	258.10	224.8	357	75753
23	G3VCP/P	CRYSTAL PALACE	322.12	241.11	349.24	151.18	33.3	253	74528
24	GM3USL/P	CUNNINGHAME	47.7	105.11	670.29	75.6	60.5	262	55506
25	G0INF/P	SHEFFIELD ARC	328.9	184.4	464.24	28.6	17.4	257	47987

RESTRICTED SECTION

1	GX3GRS/P	GRAVESEND RS	432.11	908.23	965.40	304.28	123.14	735	316912
2	G0NRX/P	LORDINGS CG	657.12	626.22	518.38	310.32	270.22	608	300006
3	G3NJA/P	TORBAY ARS	667.14	651.22	844.38	435.28	63.9	685	295260
4	G4ADD/P	OUT B ES B	411.17	497.18	616.37	421.31	173.17	562	254160
5	G3AHD/P	LIVERPOOL & DARS	586.15	712.23	788.37	162.17	108.14	606	249736
6	GM3ZRC/P	GREENOCK	82.8	631.24	1114.42	350.25	118.7	637	243270
7	G3PGU/P	STRATFORD-ON-AVON	516.14	644.19	653.31	432.21	115.14	581	233640
8	G4RFR/P	FLIGHT REFUELLING	356.13	694.18	744.33	417.22	196.8	639	226258
9	GW4EZW/P	NEWPORT ARS	476.12	513.16	596.32	273.22	77.8	472	174150
10	G4FOX/P	MELTON MOWBRAY	611.14	686.22	451.28	158.17	55.7	538	172568
11	G4AYM/P	GLOUCESTER ARS	102.3	802.12	646.32	539.24	42.7	558	166218
12	GS0MVZ/P	YAGIS	409.12	507.16	629.25	184.20	69.8	482	145638
13	GM0ADX/P	KILMARNOCK	592.11	742.17	572.24	105.14	18.4	494	142030
14	G0FDX/P	CENTRAL LANCS ARC 'B'	433.10	455.14	591.31	42.1	157.12	359	114104
15	G3GLL/P	TOLLESBURY CG	58.3	615.21	512.34	160.19	27.4	351	111132
16	G6QM/P	QUEEN MARY CG	581.10	759.19	278.19	97.12	5.1	416	104920
17	G3LRS/P	LEICESTER RS	617.11	531.12	384.22	82.15	8.2	410	100564
18	G6UQ/P	STOCKPORT	247.6	538.12	410.23	100.14	70.13	350	92820
19	G4HRC/P	HAVERING	441.10	469.15	344.26	85.9	24.3	340	85869
20	G0CGG/P	GRIMSBY ARC	477.10	650.17	264.18	79.10	3.1	374	82488
21	G8NT/P	LEISTON ARC	97.6	468.12	285.30	157.18	34.4	272	72870
22	G3BPK/P	DOUGLAS VALLEY ARC	285.9	377.12	181.18	300.21	10.2	280	71486
23	G0DEC/P	BRAINTREE ARS	105.6	705.15	224.21	73.8	25.5	309	62260
24	G3MDG/P	CHESHAM & DARS	5.1	636.16	491.27	13.3	-	314	53815
25	G4TCI/P	WORDSLEY RANGERS	140.5	262.7	288.20	171.16	38.5	203	47647
26	G2XV/P	CAMBRIDGE & DISTRICT	-	-	208.19	228.30	243.19	218	46172
27	G4FUR/P	WIMBLEDON	84.3	425.9	148.18	92.10	117.13	295	45898
28	G0BRC/P	BREDHURST	159.6	258.9	287.19	156.12	23.2	219	42384
29	G5FZ/P	LINCOLN	252.8	385.14	254.18	10.3	-	249	38743

Check Logs received with thanks from G4FRS, K3ZO, YU7KM, YU7SF, YU7LS.

VHF RULES

RSGB VHF/UHF/ SHF CONTESTS

432MHz Trophy/SWL
23 Jun: 0900-1700GMT
General rules apply
Sections: F Single operator fixed; S Single operator portable; O All others; L Listeners
The 1951 Council Cup will be awarded to the overall winners.
Adjudicator: G3ZXX, D Boniface, 59 Cale Way, Wincanton, Somerset

VHF Field Day
6/7 Jul: 1400-1400GMT
Rules to be published later

144MHz Low Power/SWL
27 Jul: 1500-2300GMT
General rules apply. Plus rule 24 (see above).
25W PEP output from Tx
Sections: F Single operator fixed; S Single operator portable; O All others; L Listeners
Adjudicator: G8XVJ, E Gedvilas, 518 Manchester Road, Paddington, Warrington, Cheshire,WA1 3TZ

432MHz Low Power/SWL
28 Jul: 0900-1500GMT
General rules apply. Plus rule 24 (see above)
25W PEP output from Tx
Sections: F Single operator fixed; S Single operator portable; O All others; L Listeners
Adjudicator: G8XVJ, E Gedvilas, 518 Manchester Road, Paddington, Warrington, Cheshire, WA1 3TZ

432MHz Fixed/SWL
25 Aug: 1600-2000GMT
General rules apply
Sections: S Single operator fixed; M Multi operator fixed; L Listeners
Adjudicator: G4OUT, I Cornes, 6 Haywood Heights, Little Haywood, Stafford, ST18 0UR

144MHz Trophy/SWL
7/8 Sep: 1400-1400GMT
General rules apply
Sections: F Single operator fixed; S Single operator portable; O All others; L Listeners
IARU contest. Please score 1pt per kilometre for IARU entry and also radial ring for *RSGB*. Entries scored by kilometres will be entered into IARU contest.
Adjudicator: G8HHI, J Pilags, 43 Bartons Drive, Dungells Lane, Yateley, Camberley, Surrey GU17 7DW

144MHz CW Cumulatives
4 Sep, 20 Sep, 7 Oct, 23 Oct, 8 Nov:
2030-2300 Local
General rules apply
Please use 4422 summary sheet, best three days will be totalled. Please send all logs. Single 427 cover sheet for entry.
Rule 10 applies
Sections: F Single operator fixed; L Listeners
Adjudicator: GI4KIS, BJ Sheepwash, 204 Donore Cresent, Antrim, Northern Ireland.

50MHz CW
22 Sep: 1200-1700GMT
General rules apply.
Maximum points per QSO 25. Radial ring.
Sections: F Single operator fixed; O All others; L Listeners
Adjudicator: G4PIQ, Andy Cook, Fishers Farm, Tendring, Clacton-on-Sea, Essex. CO16 9AA

70 MHz Trophy/SWL
29 Sep: 0900-1600GMT
General rules apply.
Rule 14 applies (County/Country multipliers)
QTH and QRA information including county code or county name to be exchanged.
Sections: F Single operator fixed; O All other; L Listeners
The overall winner will receive the VHF Managers Trophy
Adjudicator: G4DEZ, B Llewellyn, 110 South Avenue, Southend, Essex, SS2 4HU

432MHz - 24GHz RSGB SWL and IARU
5/6 Oct: 1400-1400GMT
General rules apply.
Sections: S Single operator; M Multi operator; L Listeners
Scoring: *RSGB* radial ring. *IARU* 1pt per kilometre (logs will be forwarded)
Entrants who are NOT RSGB members will be entered into IARU contest only (please score 1pt per kilometre). No high power licenses to be used. Only one transmitter to be used on each band at a time. Separate cover sheets for RSGB and IARU (if you want to enter both contests that means TWO 427's and 4422's).
A single copy of the log sheets is sufficient.
Adjudicator: D Boniface, 59 Cale Way, Wincanton, Somerset.

1.3 & 2.3GHz Cumulatives
8 Oct, 24 Oct, 9 Nov, 25 Nov, 10 Dec: 2030-2300 Local
General rules apply, including rule 10.
Sections: S Single operator fixed; O All others; L Listeners
One summary sheet including all entries, plus a cover sheet.
Best three logs of maximum five days, please send all logs for checking purposes.
Adjudicator: G4PIQ, Andy Cook, Fishers Farm,Tendring, Clacton-on-Sea, Essex CO16 9AA

432MHz Cumulatives
16 Oct, 1 Nov, 17 Nov, 3 Dec, 18 Dec: 2030-2300 Local
General rules apply, including rule 10.
Sections S Single operator fixed; O All others; L Listeners
One summary sheet including all entries, plus a cover sheet.
Best three logs of maximum five days, please send all logs for checking purposes.
Adjudicator: G4OUT, I Cornes, 6 Haywood Heights, Little Haywood, Stafford ST18 0UR

70MHz CW
20 Oct: 0800-1200GMT
General rules apply.
Full QTH and QRA required to be exchanged. Rule 13.
Scoring radial ring
Sections: S Single Operator Fixed; O All others; L Listeners
Adjudicator: G4DEZ, B Llewellyn, 110 South Avenue, Southend, Essex, SS2 4HU

2nd 1296MHz Fixed/SWL
27 Oct: 1600-2000GMT
General rules apply.
Sections: S Single operator fixed; M Multi operator fixed; L Listeners
Adjudicator: G8XVJ, E Gedvilas, 518 Manchester Road, Paddington, Warrington, Cheshire, WA1 3TZ

144MHz RSGB CW 6 hour
144MHz CW Marconi/RSGB 24 Hour
3 Nov (6 hr): 0800-1400GMT
2/3 Nov (24 hr): 1400-1400GMT
General rules apply.
1 Pt per Kilometre.
Sections (each contest): S Single operator fixed; O All others; L Listeners
Logs for Marconi contest will be forwarded.
Please send two cover sheets and two copies of the log if you are entering both contests.
Adjudicator: For each contest - G8HHI, J Pilags, 43 Bartons Drive, Dungells Lane, Yateley, Camberley, GU17 7DW

144MHz AFS & Fixed & SWL
1 Dec: 0900-1700GMT
General rules apply.
Sections: A AFS groups (up to 5 stations acting as a team, where total points of each individual are added to make team total). Clubs or groups must be affiliated to the RSGB (individual operators do not have to be RSGB members). Clubs or groups can submit as many teams as they wish, please mark entries team A B C etc.
S Single operator; M Multi operator; L Listeners
Scoring radial ring.
Adjudicator: G3ZXX, c/o Three Counties CG, D Boniface, 59 Cale Way, Wincanton, Somerset, BA9 9BS.

70 144 and 432MHz Fixed Station
28/29/30/31 Dec: 1400-1600GMT
General rules apply
Each band serial starts 001
Each day carry on with sequential serial number (if on first day you worked 20 stations then on day two start with serial 021)
Single band entries will be accepted.
Rule 14 applies (County and Country multiplier)
Scoring: use radial ring for all distances.
County and Country multiplier can be be claimed for each band.
Example, on day 1 you work 5 stations on 2 metres for 30 radial points, and 4 counties and 3 countries, and on the same day work 11 stations on 70cm in 5 counties and 2 countries, with 50 radial ring points the days total will be (4 + 3) x 30 + (5 + 2) x 50.
Totalling up you get 7 x 30 = 210 and 7 x 50 = 350, equals 560 points. It does not matter that on 4, 2 or 70 you worked the same counties or countries or even the same stations. On the next day you start again with the counties or countries (you can work the same county or country on each day and on each band, all will count as multipliers).
Please include check list of county/ country multipliers for each day, and band.
Once you have totalled each day then just add all the daily totals together to get your final score!
Adjudicator: G8XVJ, E Gedvilas, 518 Manchester Road, Paddington, Warrington, Cheshire, WA1 3TZ

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 subcommittee 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

VHF FIELD DAY:

To liven you up a bit during VHF Field Day, all portable stations who register for the event will receive a 5 letter/figure code which will be totally random. Those groups amongst you that use a computer database to 'correct' your entries will lose that advantage! The code group will only be needed when working between portable UK stations thus it will not interfere with contacts with stations 'just on to give away a few points' or with contacts with foreign stations.

Some contestants have said that I am a Devious ******, well maybe I am, but I have to be, to deal with some of the tricks that some stations try to get up to! Do not be surprised if you are inspected; you may find out at the time, or you may not. Inspectors do not have to make themselves known to you if they feel it imprudent to do so.

An apology is in order from the VHFCC in that the 70 MHz Cumulative Contest results for 1988 were lost, sorry but we have searched for them but to no avail.

If you have any comments, complaints (any more than usual!), suggestions then please write to the VHFCC, most of us can read so please put pen to paper or draw pictures!

Happy new year from the VHFCC, see you in the contest. ***G4DEZ***

VHF RESULTS

432 MHZ ACTIVITY CONTEST 1990

Although there was a 500% increase in the number of entrants this year (5 entries instead of 1 !!) I wonder if trying to get more contest activity on the band is worthwhile. The 70cm band is a prime area for commercial interests, you have been warned, use it or lose it!

The lack of use cannot have been due to poor conditions; the beginning of the month showed a big opening into Scandinavia which coincided with the Scandinavian activity period. The contest could have been won with just one 2 hour entry!

Congratulations to both the winner and the runner-up, certificates will be forwarded shortly. David Buttimore, G1NMF, showed his interest (and a certain amount of deviousness) by submitting two entries, (I think he felt sorry for us for the lack of entrants) one of which won the contest. Tony Jarvis, G6TTL, this year takes the runners-up certificate. ***G4DEZ***

Pos	Callsign	QSO	1	2	3	4	5	Tot	Best DX	Km
1	G1NMF	76	419	87	109	85	248	948	SM4JHK	1194
2	G6TTL	76	74	346	124	222	62	808	LA3DV	1015
3	G1LSB	33	679	21	26	15	15	741	SM4DHN	1187
4	G0EHV	24	113	420	8	9	-	550	SM7ECM	930
5	G1NMF	45	61	73	51	61	34	280	DF5LQ	700
6	G4AGE	8	38	1	3	7	17	66	OZ1JPT	905

EQUIPMENT

Pos	Rig	Linear	Pwr	Ant	AGLm	ASLm
1	IC490E	BNOS	50	88	10	46
2	FT790		40	17	10	40
3	IC471H		80	21	16	00
4	TS830+MM	BNOS	50	21	8	150
5	IC490E	BNOS	50	88	10	46
6	———		10	21	—	—

DIRECTION FINDING

RESULTS OF SLADE SHIELD NIGHT D/F EVENT

The Slade double night event, the first of the two autumn night DFs, was held on Saturday 13 October, and was organized by the Northampton Radio Club.

Twelve teams assembled at the start at Pitsford reservoir car park. Two good signals were heard at the start, although Transmitter 'B' was a few minutes late coming on the air, due to the temporary loss of the earth, and started a little uncertainty among the teams. However, none of the competitors required an approximate bearing, and all teams soon cleared the start.

Station A was situated in Great Wood, some 18km south east of the start and was manned by G4YJP/P. The station was hidden deep in the wood, with a very long aerial on the other side of a track, causing some problems for the two competitors who had chosen to visit this station first.

The other ten competitors chose to visit station B (G4MZX/P) first. This was situated in a thick wood near Brockhall, and was between the canal and the railway line. Once again a very long aerial was erected, which contrived to go under the canal to the towpath side, and also under the railway into another wood.

After the contest, supper was served in the village hall at Pottersbury, where the results were announced and the prizes and Slade Shield were presented. The first and second competitors then told how they had 'done it' and the organisers told how they had tried to stop them 'doing it'.

Thanks are due to the two transmitter crews, and to Mrs Sue Lineham for an excellent supper.

RESULTS

Positn	Name	Club	Time at TX 'A'	Time at TX 'B'
1	G Wrenham	Coventry	10.08	8.53
2	C Plummer	S Manchester	10.14	8.51
3	B Bristow	Mid Thames	10.18	8.52
4	P Tyler	Mid Thames	10.32	8.53
5	D Holland	S Manchester	10.32.30	9.29
6	A Collett	Chelmsford	10.55	9.14
7	J Hall	Ripon	10.56	9.14.30
8	D Newman	Northampton	11.02	9.35
9	M Hawkins	Chelmsford	11.20	9.27
10	C Wells	S Manchester	11.26	8.52
11	B Gray	Mid Thames	10.10	11.29
12	A Simmonds	Mid Thames	10.09	-

RSGB VHF CONTESTS CALENDAR - 1991

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 (Feb 91)
14 Apr	1st 1296MHz Fixed/SWL (Feb 91)
4/5 May	432MHz to 24GHz (Feb 91)
18/19 May	144MHz and SWL Single/All Others (Feb 91)

2 Jun	1.3GHz Trophy (Feb 91)
2 Jun	2.3GHz Trophy (Feb 91)
22 Jun	432MHz FM Fixed and Open (Feb 91)
22 Jun	432MHz CW Single/Multi Op (Feb 91)
23 Jun	432MHz Trophy/SWL (Feb 91)
6/7 Jul	VHF Field Day

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.

Members' Ads

RSGB Members wishing to place an advertisement in this section must use the official form incorporated on the label carrier of Radio Communication. This will prove membership and must be for the current month. No acknowledgment will be sent. Ads not clearly worded, or which do not comply with these conditions will be returned. If an ad is cancelled no refund will be due. An advertisement longer than 60 words will be charged pro rata. Trade or business ads, even from members, will not be accepted. Traders who wish to use this facility must send a signed declaration that the items for sale are part of, or intended for, their own personal amateur station. The RSGB reserves the right to refuse ads, and accepts no responsibility for errors or omissions, or for the quality of goods for sale or exchange. Ads for CB equipment will not be accepted. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain. Please note that because this is a subsidised service to members, no correspondence can be entered into. Licensed members are asked to use their callsign and QTHR, provided their address in the current edition of the RSGB Amateur Callbook is correct. BRS & A members will have to provide their name and address or telephone number. Please include your town and phone number in the free boxes provided to assist readers.

Warning: Members are advised to ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The 'purchase' of goods legally owned by a finance company could result in the 'purchaser' losing both the goods and the cash paid.

FOR SALE

132ft long wire possible! QTH, 3 bed semi, conservatory, long garden, urban setting, fertile soil, rotovator, garage, sea! G3DGT not QTHR (Portchester) 083 483 369.

2M 12 ELEMENT ZL Yagi: £50. Tonna 9/19 2m/70cm crossed Yagi: £45. 2m converter: £20. Weather satellite converter 136-138 to 144-146: £45. BBC computer teletext adaptor: £45. Modem 1200/75: £75. Various KEF loudspkrs. (Portsmouth) 0705 413430.

2METRE high power amplifier, free standing floor cabinet, pair 4CX250B's, control unit, heavy duty power supply: £275. Trio 2m m/mode TS700 with fitted Mutek preamp: £275. 2m valve amplifier QQVO6-40A 80W output. Nominal sum secures. Sell separately. Martyn G0GMB QTHR (Stony Stratford) 0908 560026.

6M MICROWAVE modules MMT50/28S tnsvtr, as new, 20W O/P with handbk. Bargain: £150. G3JZL QTHR (Coventry) 0203 543382.

A1 CONDITION, Icom IC471E 70cm m/mode tcvr, 24W output, with 19-ele Tonna crossed ant: £450. Realistic PRO2009 keyboard entry mains operated scanner: £55. Realistic PRO2005 scanner, 6 months old, with Skyband Discone (brand new): £225. Buyer collects. G0DGV QTHR (Walsall) 0922 493994.

AFTRONICS superscag audio filter: £60. SSB CW RTTY AMTOR or SSTV reviewed P/Wireless May 1988. C. Page G4BUE. Price includes postage. G0GPO QTHR (Canterbury) 0227 711261.

ALLWELD AT32 two section mast (base plate mount) and head unit (32ft) high, ex cond: £295ono. Kantronics KAM (V3.0): £240. KPC4 (V3.0): £205. DRSI PC dual port packet card BBQ s/ware etc: £110. Dartcom weather sat Rx module LCD frequency display: £110. Paul, G4XHF QTHR (Crawley) 0293 515201 (evenings) or 081-760 339 (daytime)

ALTRON Tower AT42, 4 yrs old, with new telescopic and tiltover wires, new telescopic winch and ground post. Offers. G4ZEK (Colchester) 0206 851343.

ALUMINIUM tube make ideal mast. Three 5m lengths, 2.50 OD 2.25 ID: £20 per 5 metre length. Buyer collects. Mike G0IAM (Tamworth) 0827 872959.

AMSTRAD 1640DD colour EGA 3.5 plus 5.25 floppy drives, 20MB hard card, lots of s/ware: £700ono. Dave G8LNC QTHR (Portsmouth) 0705 267540.

AMSTRAD portable computer PPC640 with LCD display & 12in green screen monitor, current model: £195. FT9600 HF to 960MHz: £365. FTPA100 100W linear ready bolt on for FT707/FT77: £75. FT75B with 20/80M VFO DC/PSU AC/PU: £125. B&W 13in monitor: £10. Model makers lathe BGSC: £200. All ono or WHU. G3BDK QTHR (Northants area) 0327 52309.

ANTENNA space, one acre, detached bungalow, garage, stables, near M25 A3: £145,000ono. Very long wire easy, etc. (Epsom) 0372 741788.

APPLE II + 48K computer, two disk drives, controller, 16K language card, monochrome monitor, parallel printer card: £75ono. John G1ODY QTHR (Watford) 0923 268253.

APRICOT ptble computer LCD screen 3.50in disk drive MS-DOS2.11 IBM emulator. Plus GWBasic, superwriter, supercalc, superplanner and all manuals. Real time clock, opto coupled keyboard, green screen monitor. Carry case and leads: £160. Peter G8EUX (Towcester) 0327 53522.

ATV Tonna Yagi: £30. Heavy duty rotator: £100. Racal RA17 Rx: £100. Hitachi monochrome monitor: £20. Half size G5RV: £10. TI-59 programmable calculator: £10. Epson P40S printer: £10. Bound volumes RadCom £15/year. Telequipment D37 scope, nonwking, for spares: £10. Dutch linguaphone course: £50. L.handed golf clubs: £50. Semiconductor circuit design: £10. Moulton deluxe bike: £50. CV89 RTTY-TU: free. G8KNJ (Milton Common) 0844 278933.

AVIATION Icom ICA20 tcvr with HS20SB switch box for standard aviation headset, as new: £250. Sony ICF PRO80 Rx, as new: £175. Mike G4HLT (Reading) 0734 693766.

AVR2002 Rx. Covers 25-550MHz and 800-1300MHz incl 2M, 70cms, 70MHz and 1.3GHz bands plus VHF broadcast and UHF TV sound in wideband FM. Many more frequencies UF interest. Mint, boxed with antenna, PSU and manual: £295. David G4JLU (Harrow) 081-954 9180.

BARGAIN Trio TR9000 2M all mode tcvr plus unused 100W 2M Linear Amplifier, both units with instruction manuals and unmarked: £450. (Nottingham) 0602 204083.

BBC Master 128 plus extras: £275. Taxan supervision hi-res colour monitor: £125. M128 turbo module: £65. Morley AA-ROM board: £30. Morley Eprom blower: £20. ROMS - viewstore: £20. ACP-DFS: £10. Pointer: £10. Casio FX702P programmable calculator and interface: £25. G4UEN QTHR (Southampton) 0703 433837.

BELCOM LS102L 10M C/W mic and manual, ex cond: £125. G4VRP QTHR (Bristol) 0275 822641.

BUTTERNUT HF6V 8-10 use 1 year, prefer buyer inspect: £120. Welz ATU 80-10 200W: £60. Airband discone, bxd, unused: £20. (Manchester) 061-445 1026.

CAPCO motor and variable capacitor unit for construction of 14-30MHz magnetic loop antenna; barely used: £60. G3UFQ (Solihull) 0564 777802.

CASSETTE adaptor will enable to listen to your handy rtx through the car radio/cassette player system: £10. VHF Packet radio modem + digicom program for C64: £35. 25XWW Crispino Messina, via di Porto 10, 50058 Signa FI, Italy.

CLEARANCE. FT902DM HF tcvr, SSB/CW/FM filters, SP901 spkr, YD148 mic: £475. FT747GX all filters, MH-1B8 mic: £375. Heathkit HW101 HF tcvr, H/B PSU: £95. Grundig satellit 1400SL rcvr, LW/MW/FM plus full SW coverage. Digital readout: £90. Collins 75A1 rcvr, some internal mods, golden oldie. Marconi Atalanta marine rcvr 10 bands. Offers. All handbks available. RadComs Feb 73 - Dec 89, complete: £25. G4KGK QTHR (Southport) 0704 24700.

COLLINS 30L-1 linear amplifier 70W input 500W output HF ALC, in ex wking order and appearance: £450. G3HEE (Stamford) 0780-55001.

COMMAND Rx Dynamotors DM32 brand new, makers packing: £12 each. Control boxes C26/ARC5 for above with dials, new: £5 each. Canadian Air Force (WW2) Aldis lamp with spare lens, as new: £30. Postage extra. G4DVH QTHR (Ulverston) 0229 54466.

COMMODORE 64, 1541 disk drive, MPS801 printer, data recorder, green monitor, joystick, books, s/ware, incl WP & DB, gwo: £250. G3RXW QTHR (Hitchin) 812611.

COMMODORE C64, disk drive, cassette deck, MSPS803 printer with lots of paper, green screen monitor. Built in "fast-load" and comes with Packet modem and some s/ware. Forms complete Packet station! Prefer buyer collects or carriage at cost: £250. G4UHM (Ingatestone) 0277 355731.

COMPLETE HF working station, one owner, FT101ZD FAN FM - Tx. Used approx 30 hours. Matching FC902 ATU - Drake 1550 dummy load - Telco XLP500 low pass filter - YH55 fones Shure desk mic - YE7A hand mic. All mint, in orig boxes, with manuals: £650ono. GM4SLO (nr Edinburgh) 031-665 3535.

COMPONENTS pre-war and WW2. 50 yrs accumulation. Condensers, trnsfrmrs, tank coils, crystals, meters, valve holders, relays, dials, knobs, jacks, switches, plugs etc. No lists. View by apptmt. Prefer clear lot for £300. G5WW QTHR (Gt Yarmouth) 0493 740033. Please no time wasters.

CUSHCRAFT R5 vertical 20-10MHz: £185. Bantex vertical 015-30MHz 11m high, 4 section fitting kit: £65. Murphy B40D Rx 025-30MHz, gwo, heavy: £45. (Cheshire) 0565 873194.

DENTRON GLA-1000B linear amp, easily run British legal limit. Recent new valves. Covers 80-10 but not WARC bands: £275ono. Prefer buyer to inspect and collect. G0MLU (Bracknell) 0344 488847.

DRAKE "C" Line. R4C 4NB noise blanker 1.5KHz 500Hz 250Hz CW filters. WARC bands plus others. MS4 spkr T4XC AC4 PSU. Various spares incl PA's/Driver. Shure 444 mic dummy load: £650. DATONG ASP: £50. G4DJC QTHR 0245 256416.

DRAKE 2B with Q multiplier plus h/book, mint cond: £90. G4ILR QTHR (Aylsham, Norfolk) 0263 761612.

DRAKE C-Line R4C T4xC, MS-4, AC-4, immac: £575. TR7 with PSU, mint: £675. L-7 linear with PSU, barely used, as new: £1275. MN-2700 ATU, mint: £375. NRD-515 Rx with memory unit and spkr, NSD-515 Tx with PSU, all filters, set in mint cond: £1075 only. R-5000 Kenwood Rx, hardly used, 110v: £575 only. Moved to flat so must sell. All, G0MNA (St John's Wood) 071-722 7049. After 6pm wkdays, anytime wkends.

ELECTRONIC keyer by G3KHZ, uses PP3 battery, brass mechanism, heavy steel base, little used, CW circuit: £25 pp G0EBV not QTHR (Chester-le-Street) 091-3886057.

FDK MULTI 8500D 25W mobile plus safety eight external freq display unit, mint, bxd: £300. (Yorks) 0943 74794.

FLDX 2000 linear with 4 new 6KD6 valves: £220. Buyer collects. G2CCH QTHR (Bexleyheath) 0322 337073.

FRG7 Rx CCT Mod 8 switched SSB/CW filters, vgc: £95. Nevada Ant tuner TM1000, unused: £95. Transistor signal injector, new: £8. G3FK QTHR (Ferndown) 0202 873175.

FT1012D Mk3, just serviced: £530 or exchange for FT757GX 4405/930 or any similar solid state. Also required AVSWR & power bridge HF up to 2kW. 07104 880345.

FT101ZD MkIII Owners! Make your rig look brand new again. Unused mint cond complete front panel. Rare item? only £15 plus post. G0KPH QTHR (Leamington Spa) 0926 429719.

FT102 with FM narrow CW SSB filters amplified desk mic FC102 with FAS14R remote antenna switch, also with 1500W dummy load fan cooled matching unit with the FC102 FL2100Z amp imac 1200W output TB 3-el tribander 1-el rotary dipole 12 and 17M. Also got spare traps for 12 & 17M, also 2 7MHz traps, various home built antennas for HF. All the radio gear is in matching colours and good cond. Bargain £1350 the lot. (Bristol) 0272 642867.

FT102 with SP102 (standby rig), workshop manual: £450. Amstrad PCW8512 word processor, handbook and disks: £300. Sinclair QL, handbk and cassettes: £50. Epson FX80 printer: £40. Textronic scope Type 547 2xCA units 1xL unit, handbks: £50. Sanyo Beta video recorder: £30. Vibroplex key s/n 40133: £50. Buyers collect. Bill G4TFI QTHR (Danbury) 0245-41 3249 after 7pm.

FT200 (80-10m tcvr) with PSU, loudspkr, mic and manual: £175ono. FT690R Mk 2, mint: £245. Nevada 6m 15w linear to match: £20 or £260 the pair. Several early FT101 PCBs: phone for details. G4CCN, QTHR (Woodbridge) 03943 6529.

FT200 with mic and FP200: £150. FL2100B: £450ovno. Prefer buyer inspect and collect. Paul G0ODP QTHR (Nr Peterborough) 0778 344852.

FT209 h/h 2M rig, immac cond, bxd with two chargers, wall and car: £140. Pye PF2UB body worn rig with battery, charger, and case, excellent cond, fitted RB4 crystal: £35. G0HHH QTHR (Kidderminster) 0562 67026 any time.

FT726 70cm module required. 23cm rig wanted. Standard 528 desk charger. Mike G0GNV 142 Junction Road, Burgess Hill, Sussex. 0444 241407.

FT726R m/mode base tcvr 2M 70 Sat.Unt mic: £650. MML432/100: £150. BNOS LPM14470-100: £100. 70cm masthead preamps by Landwehr Electronic: £70. Manuals & packing as new. TS830S tcvr mic manuals & packing as new: £650. 70cm 23-ele CUE DEE Beam: £30. 2m 14-ele Cushcrasft 214B beam: £30. No offers please, buyers collect or pay carriage. (Barnsley) 0226 292983 after 6pm.

FT727R dual-band h/h, 5W, FNB4 nicad charger case boxed post paid immac: £280. Tektronix 545A scope manual 2xplug-ins complete no EHT: £30. GYDDD QTHR (Solihull) 021 744 1536.

FT757GX HF Tx, FP757GX power supply, FC757AT Auto ATU, MH1B8 mic: £750. Also available Datong auto speech processor: £60. Heil desk mic: £40. Together sound better than full legal linear. G0EUZ QTHR (Bolton) 0204 57137.

HARD Disk. Conner CP-342 40Mb IDE with PC/AT bus controller. As new: £125. Also Seagate ST125 20Mb drive. C/W external case, PSU, controller and cables: £150. Also VGA monitors. One vanilla 14in colour 800x600, new and bxd: £150. One Philips 14in colour 800x600 with tilt and swivel stand, as new: £175. Also PC/XT clone, twinhead superset 100 mini-PC, 2 3.5in disk drives, serial parallel ports, bus mouse port with Microsoft mouse. C/W keyboard and 12in Hercules mono monitor. Good cond: £225. Exchange considered on any of above for Marconi TF2171 synchroniser (for TF2015) or Pye PMR kit (UHF/VHF PFX's, 4M Pye Whitehall etc) WHY. All above plus carriage at cost. Mark G7HVN not QTHR (Bristol) 0272 354901 6-10pm.

HEATHKIT HW9 HWA9 complete, all documentation and history. (Taunton) 0823 336897.

HEATHKIT SB101 80-10M 100W SSB/CW tcvr + 2nd VFO spkr mains PSU: £200.

HEWLETT Packard 1707B solid state twin beam oscilloscope DC-75MHz. Well used but gwo, full circuits and manual: £130. SOMERKAMP YC355D frequency counter 5Hz-200MHz manual: £65, gwo. HEATH MM-1V multimeter: £6. GM3HAT MPDD 7-28L multiband dipole: £20, gwo. DATONG FL2 audio filter, gwo: £65. All carriage extra. Bill GM3TBV QTHR (Blairgowrie) 0250-2520.

HF BEAM and 55ft tower TH3, Yaesu RC400 rotator. All 3 months old: £450ono. Martyn (Huntingdon) 0480 492754 after 6pm.

HP 431C power meter with 478A coaxial head 10MHz - 10GHz, vgc and full working order: £180. Carriage extra. (New Milton) 0425 615143.

IC735 250Hz CW filter internal keyer plus PS55 PSU, both bxd as new: £875ono. G4FUI QTHR (Penrith) 0768 66728.

ICOM 7000 with Icom AH-700 discone. Pur-

chased new Aug 1990, absolutely mint, boxed, with instructions, almost unused. List £1071, sale: £750. LNA3000 masthead amplifier 50-3000MHz. Purchased new Oct 1990, list £112, mint/boxed, instructions: £75. Weather/Sat decoder. Module APT1. Brand new, with stabilised 5V PSU, specially cased, with connectors & instructions etc: £45. No offers. G2FZU QTHR (Southwell, Notts) 0636 813847.

ICOM 751A fitted FL52A, CR64, RC10, and hand mic: £1300ono. Icom AT500 ATU: £400ono. Icom SM6 desk mic: £38. All items used receive only. 18 months old. Near mint cond. G6SFD QTHR (Nr Chesterfield) 0246 413413.

ICOM Dual band h/h IC32E, bxd, complete with acccessories Base charger BP30 2xBP2 fast charge batteries, 2xBP3 batteries. 2xICDCI adaptors: £300. or may split. Icom IC240 2m mobile complete bxd: £110. Upgrading all in gd order. Carriage extra. G4LUE QTHR (Barnsley) 0226 716339.

ICOM IC-02E 2M h/held C/W BC-25 desk charger BP4 battery case BP8 battery HS-10 headset HS-10SB switch box LC-12 & LC-14 soft cases: £230. Icom IC-R1 h/held scanner C/W BP90 battery case BP83 battery BC-74 charger LC-59 soft case: £320. All above in pristine and full working condition. G0GPE QTHR (Crowborough) 0892 653154.

ICOM IC-475H 70cm all-mode base stn, 75W, 500Hz CW narrow filter, high stability xtal unit. As new with orig packing: £830ono. Bruce G4WVX not QTHR (Bucks) 0628 664415 or 0831 135604 anytime.

ICOM IC725 with FM board and tone unit: £550. AH3 auto ATU FOC. IC725: £250. AH2 mobile whip: £75. KR1000 rotator: £75. FT726 HF unit: £115. FT101EE: £200. Kenwood TM221E 2m tncvr: £140. KPC2 packet communicator: £70. Kenwood 721E 2m/70cm tncvr: £125. G0KVX QTHR (Steyning) 0903 815802.

KENWOOD TR751E 2m FM/SSB/CW, unmarked, bxd: £495. Kenwood 2m h/h TH2125E, charger, 2 nicads PB2: £195. RA17, not cabinet, spare valves: £105. Co-ax switch 4-way: £12. SWR meter: £5. Silent key sale. G1FLP (Suffolk) 0502 724312.

KENWOOD Trio 430S FM board: £590 + packing & carr. G3GHS (St. Austell) 0726 843487.

KENWOOD Trio TS930S extras built in auto tuner AT930 plus external spkr SP930 with filters plus MC60 mic, all bxd, with receipts, not grey import, reluctant sale, less than 18 months use: £1200ovno. Nigel (Lewes) 0273 478264.

KENWOOD TS530S with 500Hz, 1.8kHz narrow filters, and DFC230 external VFO with memories. Wired for 110V and includes a 110/220V step-up trnsfrmr. Prefer you collect but will ship: £625ono. Kelly G0MKT not QTHR (Newmarket) 0638 666596.

KENWOOD TS530SP incl MC35S mic, HK717 key LPF LF30A dummy load DL60: £550. ATU AT230: £130. All mint, bxd and hardly used since new. Also secondhand purchase from Lowes TR7930 2m FM 5/25W 21 memories used only as base station, includes J.Beam colinear ANT and 10amp PSU: £145. Keith G0JLM QTHR (Swindon) 0793 533783.

KENWOOD TS680S with YK455C1 filter, used less than two hours, boxed: £700. H/D lorry battery with power charger: £40. Hand up/down mic 43S: £15. MFJ 949C ATU load: £115. H/mound key: £10. Butternut HF6V: £80. Buyer collects. Complete station for £900. G2DTS QTR (Cheltenham) 0451 30154.

KENWOOD TS950SD, SP950 (matching spkr), under warranty: £2800. Kenwood TR9500: £320. Alan G0NQA (Grimsby) 0472 251352 after 3pm.

KR400 rotator: £75. KR500 elevator: £75. PBM18 70cm Yagi: £25. 2M 9ele Yagi: £15. G0FQG QTHR (Northwich) 0606 74776.

KW VESPAii P/Unit mic manual recent KW overhaul Lafayett HA350 Rx good starter outfit: £160ono. Scope telequipment S61 X10 probe manual as new: £55. VDU green for BBC computer: £20. Eddystone 640 Rx: £50. Eddystone bug: £40. Advance B4A RF/AF sig gen: £25. US Army vibroplex bug: £40. Heavy duty rotator base with gears bearings 2in mast with bearings desk controller with P. unit compass heading: £50. (Stoke-on-Trent) 0538 722287.

KW2000 with spare valves, manual and PSU, basically sound and working but needs some slight attn: £120 + carriage. G4ZDT (Wymondham) 0953 607594.

KW204: £90. Nebula GC Rx 10kHz to 30MHz triple conv: £150. FT200 plus FP200: £90. MMT144/28: £60. MMT432/28S: £60 or exchange for VHF equipment. (Derby) 0332 834228.

LATTICE Tower, Altron, two section telescopic, 34ft, post mounted, only 4 yrs old: £250. Jaybeam TB3: £140. CDE CD44 Med duty rotator and controller: £50. Co-ax and screened control cable: £30. If bought complete: £400. Cash only please. (Bucks) 024024 5488.

LINEAR G2DAF QRO 1xQY3250 spare tubes int 3/4KV PSU step start vacuum variable in P tank 3 meters: £180. Parts for linear, 1.1KV at 0.5A trnsfrmr 2KV rectifiers 40MFD electrolytics P.coil HD band switch, wide spaced variable 2xQY3-125: £65. Mosley Mustang QRO 3el HF Yagi beam good cond: £130. R26 ARC5 command Rx: £30. WS38 Mk24: £25. Split Stator VAR 2x100pF: £6. Seagull 5HP Longshaft outboard, immac: £60. (Brightlingsea) 0206 302382.

LOWE HF125 Rx, bxd, little used: £250. Trio 9R-59DS amateur radio Rx: £60. Eddystone comm Rx 840/A, gd cond: £70. Heathkit QRP rig H-W9, one year old, fully built and wkng 4 bands: £200. (Nottingham) 0623 792782.

LOWE HF225 communications Rx 30kHz/30MHz continuous (AM/USB/LSB/CW), boxed as new: £325. PRO 2006 scanner (AM/FM/WFM) 25-520MHz 760-1300MHz, 400 memories + "Hyperscan", boxed as new: £250. Stuart G0LOE QTHR (Dukinfield) 061-330 8149.

MARCONI TF995 signal generator 1.5-220MHz C/W probes leads etc.: £65ono. Big but good! Burndept BE470 UHF handle 433.50MHz; £50ono. 10M6 5.25 hard disk C/W XT controller, as new: £55ono. Deliver 75miles radius Merseyside. (Liverpool) 051-256 9814.

MICROWAVE modules MML/432/100: £180. Weather station ALT6: £90. Butternut TBR160S coil for HF6V: £25. WPO universal morse memory (faulty): £10. 10in b/w monitor: £25. SO239 sockets for Bird43: £5. John, G4ZTR QTHR 0206 860238 early evenings.

MICROWAVE modules, 144/100, 100LS, 1W/3W, Input, pre-amp, vgc, bxd: £!00 plus post. G7FHV QTHR (Sussex) 0444 417509.

MULTIBAND antenna V-dipole with traps for 7MHz 14MHz 21MHz 28MHz. All metal construction, ideal for small gardens: £100. Mike G0JHK (Battle) 0424 64847.

MULTIMODE CB master 3600, converted to 10M 100W (max) RF Amplifier. (DTI authy pending 12/90): £130 both. Mark (Gillingham, Kent) 0634 30822.

MUTEK TVVF144a transverter. Complete with separate Mutek interface unit to enable up to 10W drive. Output 1-10W by means of rear panel pot (Mutek fitted). Recently purchased for £365, will accept £265. G8WNP not QTHR (Reading) 0734 414106.

MUTEK TVVF50C 144/6m (original), box, manual: £120. BNOS LP50-10-50 linear, box, 12 mths old: £100. Pair: £200, post free. Separate - p&p £3 ea. G6LEU (Truro) 0872 501566.

NATIONAL NCX5-II HF Tx/Rx, 200w-PEP: £150. New HRO dial assy: £10. New AR88 gear assy: £15. Two Sommerkamp h/helds 28.5MHz: £20. CBM64 with 1541 d/d: £150. CBM+4 with cassette deck: £50. Sae lists of valves and xtals etc. G3TGF QTHR (E Sussex) 0435 830484.

NEW unused Icom 725 HF rig auto tuner Icom 150, was £1128, offers £925. GW1XUK (Penmaenmawr) 0492 623672.

NIKON photographic equipment F801 50mmF1.8 lens 35-70mm 70-3210mm FMII 50mm F1.8 FMII 28mm lenses Tokina 28-70mm lens. Two Metz flashguns (Nicad) Tripod Monopod Bags Filters. All as new, bxd, cost new over £2000, accept £1500. No offers. (Nottingham) 0602.

PAST number of years RadComs PopComs Short Wave magazines. Ask for best prices. Kenwood RZ1 scanner cost £449, will take £250 + p/p. Kenwood R1000, vgc: £175+p/p. Kenwood R5000, all optional items fitted, h/bk & service sheets: £900 (would cost £1400+ new). Grundig Sat400 Rx: £75+p/p. Reason for sale need space and cash, if what you need is not above ask - you never know. (Bristol) 0272 828586.

PK88 TNC, ex: £85. 4m rigs (2) Pye-FM Europa 3ch c/w mic, instructions: £32 ea. Morse keyboard MFJ 496. Loads of features - call for details: £70. Also large bx linear bits - coils, bxfmrs, switches, chassis, valves etc: £50. Carr extra. G0AYN not QTHR (Stoke) 0782 333852.

PYE marine PM125 Tx/Rx, DF ant, 24V, covers top band + 80M: £65. HRO Rx, rack cabinet with PSU + 5 GC coils: £65. BLACKSTAR Orion TV pattern generator: £95. EMI 2001 camera card extenders : £10 ea. MUIRHEAD valve voltmeter, working, large, hence £15. SWAP/BUY 19/22 set bits ie headsets, vehicle mounting tray, connectors, cases. Chris G4RBR (Twickenham) 081 891 1263.

PYE MM1 modulation meter: £70. Also Pye T414/R414 base station with mic and spkr, ready crystalled 433-725: £80. Plus Trio TR3200 UHF ptable fully crystalled and complete with accessories: £90. Pat Smith G4ZWQ QTHR (Doncaster) 0302 857526.

QRT sale FT102 tcvr + FC102 ATU: £575. Homebrew HF Linear 400W: £75. FT290R: £230. Kenwood TH215E h/held: £160. MM144 100LS Linear: £90. MD1 base mic: £40. MC80 Kenwood base mic: £40. RTTY Radprint TU + Creed 444 printer, both £30. Other items, all immac cond. G4YIJ QTHR 021 747 3303.

QUAD 2 ele Gem Quad Spider and Spreaders: £120. G3RVM QTHR (Newbury) 0635 74006.

RACAL RA17 HF Rx, excellent wking order, reluctant sale, with manual: £175. Dumb terminal: £35. PC keyboard, brand new: £20. Ferrograph: £150. (Harrow) 081-863 6718.

RACAL RA17 in case, lovely cond, plus h/book: £140. G4ILR QTHR (Aylsham, Norfolk) 0263 761612.

RACAL RA17L good cond: £150ono. 4-ele 2M quad, 12-ele ditto, 3-ele 50MHz beam: Offers. Buyers collect. (Soham, Cambs) 0353 720583.

RACAL RA17L Rx, gwo, and MA79G Tx Osc 0-30MHz: £300 (incl manuals). Filip G0KYQ (Sidcup) 081-304-6148.

REALISTIC PRO-2004 300 channel scanner, as new, bxd, with Hembro s/s discone: £260. JAYBEAM MBM48/70 70cm antenna, bxd: £30. G1GQL QTHR (Hants) 0425 654946.

REVOX A77 3.75 7.5 IPS recently overhauled, incl remote control, NAB, 10.5in spool: £250. Manual: £20. Tapes: £8. Simpson (York) 0904 432398.

ROTATOR Daiwa 7500HDR with mast clamp and box round controller, complete: £120. G4PYQ QTHR (Manchester) 061-360 0927.

RS232 terminals suitable for packet radio use. Working: £20 ea. Storno VHF radios CQM5114 no mic, spkr, sub audio, CTCSS, convertable to amateur band, gd overall cond: £70ovno. G6MNI QTHR (Bushey) 0923 229222 (daytime) 081 950 0647 (evenings).

SAISHO SW5000 Rx, LW/MW/SW AM/FM, eleven commercial SW bands, BFO, RF gain controls, little used, bxd manuals, 10 months old: £60. (Linlithgow) 0506 844001.

SHACK clearance: Cambridge antenna noise bridge: £15. Technical software rtty for BBC: £20. Power supply 7Amp: £20. IBM software supercalc 3.1 Amstrad accounts masterDD Sage retrieve all, unused, with manuals: £20. Each ono. G3YPP QTHR 0462 815533.

SHARP 4501 IBM compatible laptop 640K twin 720K diskdrives complete with soft case: £425ono. G6JNS QTHR (Worcester) 0905 620041.

SHARP camera, Sharp VC22ON VHS-C VCR Ferguson camera nicad AC/DC charger DC leads VHS adaptor in good order: £300 the lot, no split. Also Marconi TF1064 signal generator, needs attn: £15. G4DDI QTHR (Boston) 0205 352664 8am-5pm.

SILENT Key sale G4HTA. Thunderbird TH5 MkII: £250. HAM IV rotator: £175. BP30MN1 versatower: £275. FT1 tcvr: £1000. Linear FL7000: £1100. FT480R: £300. SP980: £50. Yaesu CB41: £50. Collins KW N380: £1995. Collins linear 30LI: £1150. Dummyy load 1KW: £50. Decca SWR/PWR 1KW: £30. FT480R: £300. Icom IC28E: £210. H/held IC2E: £70. Pye PSU 12V 10A: £30. All pristine cond. G3MJK QTHR (Basingstoke) 025687 439.

SILENT KEY sale G4USU. Trio 440S with auto ATU, FC902 ATU. Datong filter FL3, AR2002 communication receiver, YAESU FT408R tcvr, MML 144/50S linear, Tiny 2 Packet TNC. Dragon 64 with disk interface, double 40/80 disk drive, Dragon 32 computer, Kantronics mini reader, G4BMK Packet modem, Broad Band antenna 25-1300MHz, U/V light box for etching printed circuit boards, plus many interesting items. G0AMA QTHR (Amesbury) 0980 623062.

SOMMERKAMP FT150DX HF tcvr in wking order: £100ono. Ideal first rig. GJ0KYZ QTHR 0534 71233.

STANDARD C58, CMB8 mobile mount, CPB58 mobile linear, boxed. All manuals, rubber duck antenna, charger: £300. Yaesu FT726R 2M: £490. (Wilmslow) 0625 524600.

SX200N scanning monitor Rx AM/FM 26-88, 108-180, 380-514MHz, 16 memories, incorporates Garex mod. for S-meter: £130. G0APZ QTHR (Brighton) 07918 4951.

TEN-TEC model 263 remote VFO: £180. CAPCO SPC300D ATU: £130. Butternut HF6V: £75. Top-Band Coil TBR-160-S: £30. Radial kit STR-11 (new): £18. SEM QRM Eliminator: £40. SEM HF wavemeter: £18. Starmaster keyer: £38. Welz SP220 SWR/PWR meter: £30. (Edinburgh) 031-665-7287.

TOWER steel lattice, triangular section, 35ft high with 8ft mast: £150 or exchange HF tcvr. G0BFM QTHR (Devizes) 0380 812450.

TRIO 700S 2M m/mode tcvr, boxed, manual, lovely cond: £320. TRIO TW4000A dual band tcvr VS1, fitted duplexer, mobile safety mic, bxd, manual: £350ono G0LRH (Suffolk) 098681 582.

TRIO 9130 All Mode 2m mobile 25/5W Comp with boom mic whip ant + mount, gwo but some marks on case, hence bargain price: £250. Buyer collects or pays carriage (N/Yorks). G3GFU (Darlington) 0325 718745.

TRIO TR2600E 2m-FM h/h tcvr with PB26 nicad. ST2 base stand/PSU/charger, spkr/mic, soft cases x 2, extra wall charger, dual band linepass power meter. Complete 2m h/h setup. All mint cond, plus boxes: £235. Paul G0KPH QTHR (Leamington Spa) 0926 429719.

TRIO TR751 2m m/mode (SSB) tcvr, 25W incl two mobile mounting brackets and 10-ele Jaybeam (if you help take it down). Ex cond, prefer buyer to inspect/collect: £425 firm. G0MLU (Bracknell) 0344 488847.

TRIO TR9000 2M m/mode twin VFO 10W/1W output. Complete with mic, mobile bracket, manual & remote mic, PTT, up/down controls: £285. G4YPK QTHR (Basingstoke) 0256 27922.

TRIO TR9000 m/mode 2m Tx/Rx, SP120 spkr, PS20 PSU, BO9 base unit, 7/8 whip, mobile mic, mobile mount, 60w, PA: £200.ono. Welz SP300 SWR and power meter 1.8-50MHz, 20w 200w 1kw, 3 sensors, unused: £50. G3TRY QTHR (High Wycombe) 0494 881377.

TRIO TS440S, mint cond: £750. Yaesu FC757AT auto ATU: £125. AEA PK232MBX m/mode controller: £175. Kenpro KR400RC rotator: £60. Weltz CT150 150/400W 250MHz dummy load: £25. Marchwood 12v 30A PSU, well made: £45. Carriage at cost. G4UEN QTHR (Southampton) 0703 433837.

TRIO TS530SP CW SSB filters installed. AT230, SP230 spkr. MC60A MC3SS mics, TB7 Dipole, still as new, used indoors only. Drewsbury Marster keyer, Mk704 squeeze key, LF-30A filter, HS5 hdphones, all with service manuals, mint cond, very little use. No offers, no split: £800. Buyer collects or arranges carriage. Eddie, G0LEI (Stanley) 0207 282644.

TRIO TS940S plus SP40: £1350. FDK Palm 4: £75. 0604 864476.

TS520 mic, gwo: £270. FDK700EX FM 2m mobile: £120. Marconi Elettra/Mercury pair rcvrs + PSUs. TV5 Tx/Rx Pye Dolphins Tx/Rx: offers. (Brightlingsea) 0206 305851.

TS530SP MC50 mic, little used, mint cond: £550ono. Nevada TM1000 ATU: £50ono. G0BWW QTHR (Seascale) 09467 28726.

USA/PRG15 solid state HF SSB/CW spyset: £125. Would p/ex for military manpacks, B2, MkIII etc. Terry (St.Albans) 0727 48424

VERSA Tower P60, all gear winches etc: £200. 5-ele TET Tribander: £140. HF linear 40W input 400 out, homebrew: £100. Swaps possible; looking for VHF m/mode. (Warminster) 09856 274.

WIRELESS World 565 issues. No split. July 1943 to December 1986 complete. January 1940 to December 1943 two missing. 13 issues 1937 to 1939 incl TV design series. Advts removed on many: £120. Buyer collects. G3CMT QTHR (Torbay) 0803 842638.

XT CLONE upgraded. Turbo board 286 287 processors. 7 pack board with additional I/O ports. Hercules mono graphics. 20MB, 5.25in drives. Not working. For repair or spares: £125ono or swop for working TNC. Buyer collects or arrange carriage. G4KBX QTHR (Morpeth) 0670 512913.

YAESU FC757AT Auto ATU: £150. Tiger dual band colinear antenna model 145/434: £25. G0MHC (Hartlepool) 0429 264735.

YAESU FL2100Z linear amplifier, 1200W PEP input, ex con: £500ono. Matsui CD player and Midi system: £100. FRB757: £8. Steve, G0LRI (Cheltenham) 0242 680248.

YAESU FRG7700 Rx, good cond, with homebrew ATU: £200ono or swap for FC757AT automatic ATU. Also Hallicrafters SR2000 5 band SSB/CW HF tcvr with PSU: £95ono (Tx needs attn). Tony G0MQG not QTHR (Norwich) 0603 611764.

YAESU FT-707 tcvr FP-707 power supply FC-707 antenna tuner, all gd cond, manuals, original packing: £500. Dave G4MER (Leicester) 0533 750292.

YAESU FT-727R dual band tcvr with FNB-4A battery, charger, soft case, MH-12 spkr mic, little use, mint: £300ono. G0CTV (Birmingham) 021 360 3972.

YAESU FT102 HF tcvr, good cond, AM/FM board and narrow SSB F/tr MH1B8 mic, manual, bxd: £425. G3LBW QTHR (Middlesborough) 0642 317547.

YAESU FT180 8-chan xtal cont Rx/Tx solid state 100W pep ideal HF packet inc FT757HD PSU: £300. Codan Tx/Rx + PSU similar spec: £250. Help need wkshop manual for Eddystone EC10 Rx to photocopy and return. G3TWE QTHR (Gt Yarmouth) 0493 664497.

YAESU FT203R 2m FM portable, spkr mic, nicad, separate mains, 12v adaptors, mobile bracket. Little used: £125ono. Trio 7200G with VFO30G, reasonable cond: £100ono. UK101 computer, complete working: £25. 2114 memory ICS: 50p. G8NGM not QTHR (Witham) 0376 513884.

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CLUB NEWS

DEADLINE - Items for inclusion in the May 1991 issue must be sent to HQ marked "Club News - DIARY", to be received by 15 March 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 - 7, club night; 14, cw activity evening; 21, top band on air activity; 28, TBA; Apr 4, club station on air; 11, computer activity evening.

GORDANO ARG - 27, Annual General Meeting. Would all members please make a special effort to attend; Apr 24, talk "Phase Lock Loops". Details 0272 853849 (evenings) 0272 857102 (office hours).

SOUTH BRISTOL ARC - 6, Severnside TV Repeater Group Presentation; 13, HF activity evening; 20, Exhibition model radio controlled boats; 27, computer activity evening; Apr 3, Bristol RSGB/Organising Longleat; 10, 70cm activity evening. Details Whitchurch 832222 on a Wednesday evening.

THORNBURY & DARC - 6, TBA; 20, HF activity; Apr 3, Annual General Meeting.

BERKSHIRE

BRACKNELL ARC - ***NEW SECRETARY*** Ian Pawson, G0FCT, 3 Orion, Roman Hill, Bracknell, RG12 4YX. 13, talk "Producing Digital Audio Discs (provisional); Apr 10, talk "Amateur TV"

BURNHAM BEECHES RC - 4, Annual General Meeting; 18, TBA; Apr 1, surplus equipment/junk sale. Details 0628 25720.

NEWBURY & DARS - 27, talk "Build Your Own Sideband Rig". Details 0635 63310.

READING & DARC - 28, Spring junk sale; Apr 11, RSGB evening. Details 0734 476873.

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 6, talk "Oscillators"; 20, Annual General Meeting. Members please attend; Apr 3, talk "Packet Radio". Details 0280 817496 or 0908 560026.

CHESHAM & DARS - 6, General meeting; 13, RSGB video & discussion; 20, CW practice session; 27, open forum on "Novice Licence" - Hilary Claytonsmith, G4JKS. Details 0923 283911.

MILTON KEYNES & DARS - 11, talk "What Happens to your Letters?" (audio/visual); Apr 8, equipment and junk sale. Open to all. Details 0908 316435.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 1, constructors evening; 8, demonstration station to 1st Cambridge Scouts in the club shack; 15, video evening; 22, Annual General Meeting; Apr 27, Samuel Morse demonstration, Parkers Piece, Cambridge. Details Cambridge 880835.

CHESHIRE

WOODFORD (RATEC) - 4, talk "Cheshire Association Emergency Services"; 18, talk "Mechanism of Colour Photography". Details 061 485 3912.

CLWYD

DELYN RC - 12, Annual General Meeting. Please try to attend; 27, talk "Constructing Power Supplies"; Apr 10, talk "Transverters". Details 0244 819618.

RHYL & DARC - 4, talk and demonstration "Fitting Coaxial Connections"; 18, talk "Planning Permission" (provisional); Apr 1, SSTV Fax demonstration. Specy to PC. Details 0745 336939.

WREXHAM ARS - 6, talk "Aerials"; 19, Annual General Meeting. Details 0978 261482.

CUMBRIA

EDEN VALLEY RS - 28, BBC Club. Annual General Meeting. Please attend. Details G0MDV.

DERBYSHIRE

DERBY & DARS - 6, junk sale; 13, talk "The History of Computers"; 20, Annual General Meeting; 27, illustrated talk "Using Oscilloscopes"; Apr 3, junk sale. Details 0773 852475.

DEVON

EXETER ARS - 11, talk "Simple Test Equipment"; Apr 8, inter club quiz. Details 0392 78710.

PLYMOUTH RC - 12, talk by DTI representative; 19, CW evening - QSO procedures; 26, demonstration and analysis of weather charts by G3YJO. Details 0752 363607.

TAUNTON & DARC - 1, talk "My Early Recollections of Radio in Pre-War China"; 15, talk "Home Construction". Details 0823 680778.

TORBAY ARS - 1,8, club nights; 9, Annual Dinner & Dance - Sefton Hotel, Babbacombe, Torquay; 15, club night; 22, talk "Packet Radio"; 29, club night; Apr 5,12, club nights. Details 0803 526762.

DORSET

PLESSEY CHRISTCHURCH ARS - 14, beginners' evening. Details 0425 621982.

SOUTH DORSET RS - 5, bring & buy; 17, Tiverton SWARC Rally; Apr 2, Annual General Meeting and Constructors Cup. Details Geoff, G4FJO, QTHR.

ESSEX

BARDSWELL ARS (formerly BRENTWOOD ARS) - *NEW VENUE* Bardswell Social Club, Bardswell Close, Brentwood, Essex. Meetings Thursdays. New members welcome. Details Joe Wentworth, G0FED.

BRAINTREE & DARS - 4, junk sale; 18, social evening with Braintree React; Apr 15, club construction contest. Details 0376 27431.

CHELMSFORD ARS - 5, talk "Emergency Planning" by Chelmsford Council. Details 0245 260831.

COLCHESTER RA - ***NEW VENUE*** Colchester Institute, Sheepen Road, Colchester. 14, talk "The Marconi Story". Details 0206 851189.

LOUGHTON & DARS - 9, Novice Licence; 23, talk "Solid State Amps"; Apr 6, annual General Meeting. ALL members please attend. Details 081-504 4581.

GLOUCESTERSHIRE

GLOUCESTER ARS - 6, construction group; 13, talk by Tony Bennett; 20, vintage radio evening; 27, Morse sending practice.

GRAMPIAN

ABERDEEN ARS - 1, junk sale. Details GM0CSZ.

GREATER LONDON

ACTON BRENTFORD & CHISWICK ARC - 19, discussion "Keys and Keyers".

CRYSTAL PALACE & DARC - 16, talk "Workshop Practice"; Apr 16, talk "Basic Electricity". Details G3FZL.

SILVERTHORN RC - 1, meeting on the club project; 8, night on the air/informal; 15, HF activity night; 22, night on the air/informal. Details G0LXA QTHR.

SOUTHGATE ARC - 9/10, London ARS Show.At least three lectures have been arranged by the Southgate Club to take place during the London Amateur Radio Show at Picketts Lock. "Sporadic-E Across the Amateur Spectrum" by Dr. Geoff Grayer, G3NAQ; "Simple Sideband" by Ian Keyser, G3ROO and "QRP - Build It" by Rev George Dobbs, G3RJV; 14, talk "Phase Lock Loops" by Steve Reynolds of Icom UK; 28, club meeting; Apr 11, annual surplus equipment sale. Details 081 361 2048.

SUTTON & CHEAM RS - 21, constructional contest; Apr 13, Annual Dinner at the Stoneleigh Inn, Stoneleigh. Details 081 644 9945 (general), 0737 355271 (membership).

WHITTON ARG - 5, talk "What its Like to Operate as 4S7/G0LUH/P (audio/visual). Details 081 572 0465

WIMBLEDON & DARS - 8, general activity evening; 22 talk "Local Radio (Jazz FM)"; Apr 12, general activity evening. Details 081-397 0427.

GREATER MANCHESTER

ECCLES & DARS - 5, demonstration "Making and Marking Boxes for Projects"; Apr 2, talk "Intercoms in High Rise Flats". Details 061-773 7899.

SOUTH MANCHESTER RC - 1, CARES visit to Frodsham; 8, talk by winner Home Brew Contest; 15, NARSA preparation evening; 22, surplus equipment sale. Details 061 969 1964.

STOCKPORT RS - 13, TBA; 27, surplus equipment sale. Details 061-439 3831.

GWYNEDD

DRAGON ARC - 4, Problem Night; 18, Extraordinary General Meeting; Apr 15, talk by Eric Lynn, GW3REY. Details 0248 600963.

HAMPSHIRE

FAREHAM & DARC - 13, talk "2 Metres - The First Ten Years"; 27, The Chris Parry Nite; Apr 10, junk sale. Details G0KCG.

HORNDEAN & DARC - 7, talk "Police Communications -Control". Details 0705 472846.

ITCHEN VALLEY ARC - 8, Annual General Meeting; 22, junk sale. Details 0703 736784.

THREE COUNTIES ARC - 13, talk "Earth Imaging from Space"; 27, talk "Army Radio Equipment and Operation"; Apr 10, talk "losLoop HF Antenna". Details 0420 489847.

HEREFORD & WORCESTER

BROMSGROVE ARS - 12, night on the air; 26, construction night; Apr 9, night on the air. Details 0527 503024

BROMSGROVE & DARC - 8, Annual General Meeting; Apr 12, constructors competition. Details 0527 33173.

HEREFORD ARS - 1, talk "Mountain Rescue"; 15, informal + Thoughts on NFD; Apr 5, RSGB Liaison Officer's visit. Details Hereford 354064.

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

STEVENAGE & DARS - 4, RAE course (propagation and Antennas); 5, talk "Worked All Britain"; 11, RAE course (propagation and antennas); 12, practical; 18, RAE course (Transmitter Interference); 19, Annual General Meeting; 25, RAE course (Transmitter Interference); 26, practical; 28, committee meeting. Details G0GTE.

HUMBERSIDE

GOOLE R&ES - 8, talk "Raynet"; 15, visit from Hull DARS; 22, ATV night; 29, talk "VHF Propagation". Details Steve, G8VHL, Goole 769130.

KENT

MAIDSTONE YMCA ARS - 1, talk "Satellite Communication"; 8, RAE class & CW; 15, junk sale; 22, RAE Class & CW. Details 0622 676776.

LANCASHIRE

PRESTON ARS -7, illustrated talk "From Rio to Manaus"; 21, illustrated talk "Preston Kaleidoscope"; Apr 4, talk "The Ribble Valley".

WIGAN & DARC - 7, general discussion - update on Novice Licence; 21, talk and demonstration "RTTY", Apr 4, general discussion "Aerials". Details 0942 47416.

LEICESTERSHIRE

LEICESTER RS - 4, quarterly progress, open meeting; 11, committee meeting, HF/VHF activity night; 18, talk "Repeater Systems" by Geoff Dover, G4AFJ; 25, HF/VHF night on the air. Details G3TQF.

MERSEYSIDE

WIRRAL ARS - 5, open night; 6, DTI Radio Investigation Service; 12, open night; 13, committee meeting; 20, talk "Mersey Ferries"; 26, open night. Details 051 644 6094.

NORFOLK

ARC OF FAKENHAM - 5, Annual General Meeting; 19, talk "The Complete Mobile Operation and the Great DXHibition; Apr 2, talk "Scouting Today". Details East Rudham 633.

KINGS LYNN ARC - *CHANGE OF ADDRESS* Secretary's address is now: Laurel Farm, 7 Holly Close, West Winch, Kings Lynn, Norfolk, PE33 0PW.

NORFOLK ARC - 6, talk "Early Computers and Other Reminiscences"; 13, surplus equipment auction/bring & buy; 20, informal and committee evening; 27, inter-club quiz with Leiston and Felixstowe; Apr 3, Annual General Meeting; 10, talk "Designing a QRP 80m/40m Transceiver". Details 0632 850591.

YARMOUTH RC - 7, informal; 14, talk "Dynamics of Coastal Flooding""; 21, informal; 28,using GDOs follow-up session b-y-o GDO, Apr 4, informal; 11, talk "Practical Food Technology. Details Yh 721173.

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM - 7, forum followed by activity; 14, exhibition of members' home-constructed equipment; 21, talk "Making Measurements to Satisfy Licence Conditions"; 28, report on RSGB VHF Convention; Apr 4, Annual General meeting. Details 0602 733740.

MANSFIELD ARS - 7, talk "Dowsing (A Different Kind of Twig). Details 0623 755288.

ORKNEY

ORKNEY AR GROUP - 6, video "Secret Listeners".

OXFORDSHIRE

OXFORD & DARS - 14, talk "Electronics in Brain Imaging"; 28, junk sale, b-y-o & money!. Details Oxford 242720.

SHROPSHIRE

TELFORD & DARS - 6, 70cm on air; 13, construction competition; 20, junk sale: British Legion Club, Dawley; 27, pre-AGM meeting; Apr 3, Annual General Meeting. Details Bridgnorth 761203.

SOMERSET

YEOVIL ARC - 7, entries for club construction contest and discussion evening; 14, talk "My Work(?) with the RSGB"; 21, club construction contest; Apr 4, talk "Kirchhoff's Law. Details 0935 28341.

SOUTH GLAMORGAN

CARDIFF RSGB GROUP - 11, display of members' prizwed AR possessions; Apr 8, talk "Amateur TV".

SUFFOLK

BURY ST EDMUNDS ARS - ***CHANGE OF VENUE*** Now meet at West Suffolk College, Out Risbygate, Bury St Edmunds on third Tuesday each month at 7.30pm, Room EO-40. Details 0359 70527.

LOWESTOFT RC - 14, St John Ambulance First Aid; 28, talk "ATV Scene"; Apr 12, J. Bacon, G3YLA. Details 0502 566289.

SURREY

SURREY RCC - 4, surplus equipment sale; Apr 8, Annual General Meeting. Details 081 647 9301.

TAYSIDE

DUNDEE ARC - 5, construction; 12, talk "144MHz EME (Moon Bounce); 19, construction; 26, talk "Talking Books" by Miss Ella Stothart, plus Talking Book demonstration by GM3LCP. Details GM4FSB, QTHR.

WARWICKSHIRE

MID WARWICKSHIRE ARS - 12, talk "VHF QRP with an Emphasis on Homebrew"; 26, video night The RSGB and & Mick, G0JMW provide the entertainment; Apr 9, junk sale. Details 0926 513073.

RUGBY ATS - 12, Ben Nevis DXpedition video; 26, an invited guest will judge the construction race entries; Apr 9, Annual General Meeting.

STRATFORD-UPON-AVON RS - 11, talk "USA Licensing"; 25, discussion evening; Apr 8, Annual General Meeting and surplus sale. Details 060 882 495.

WEST GLAMORGAN

PORT TALBOT ARS - 1, 'St David's Day' = 'GB2DD'. Details 0639 630880.

SWANSEA ARS - 9, SARS will run a 53-seat coach to the Picketts Lock Radio Rally, London. Still a few seats left. Details GW4HSH, tel: 0792 404422 or GW0BBO, tel: 0792 818100.

WEST MIDLANDS

COVENTRY ARS - 1, night on the air and Morse tuition; 8, trip TBA; 15, night on the air and Morse tuition; 22, mini-lectures - short(!) talks on members' interests; 29, night on the air and Morse tuition. Details 0203 523629.

MIDLAND ARS - ***NEW CONTACT*** Norman Gutteridge, tel: 021 422 9787.

STOURBRIDGE & DARS - 4, on the air; 18, Annual General Meeting. Details G0HTJ.

WOLVERHAMPTON ARS - 5, committee meeting; 12, lecture and demonstration "War Games"; 19, night on the air; Apr 2, committee meeting; 9, talk "Prisoner of War Experiences".

WEST SUSSEX

CHICHESTER & DARC - 5,19, club meetings; Apr 2, annual General Meeting.

WEST YORKSHIRE

DENBY DALE & DARS - *NEW SECRETARY* Eric Stewart, G0DBU, 24, Ingleton Road, Newsome, Huddersfield, W. Yorks, HD4 6QX; tel;0484 532371. 6, talk "Old Military Radios"; 20, discussion "Contests and Organisation".

HALIFAX & DARS - 19, talk "Radio Old and New"; Apr 16, talk "Satellite TV". Details Halifax 202306.

KEIGHLEY ARS - 21, Horse Racing at the Cricket Club; 28, talk "Using Simple Test Equipment"; Apr 11, selection of personal films - Edwyn Hodgson. Details from Kathy, tel: 0274 496222.

NORTHERN HEIGHTS AR&ES - 6, talk and demonstration "Amateur TV"; 20, bring and demonstrate your computer; Apr 3, Annual General Meeting - club rooms. Details 0274 673116.

TODMORDEN & DARS - 4, trip to brewery (paid up members only); 18, Test equipment; Apr 15, quiz night.

WILTSHIRE

TROWBRIDGE & DARC - 6, talk "The USA Experience"; 13, rig testing night by SMC Northern; 20, Crime Prevention Officer gives a talk on security. 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'.

1 - 9 MARCH

St Dunstan's ARS Hamfest - St Dunstan's, Ian Fraser House, Ovingdean, Brighton. Special Event Station using callsign GB4STD.

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 Dave Hughes, 45 Conybeare Road, Sully, Penarth, S. Glamorgan, tel: 0446 738087.

9 MARCH

LAGAN Valley ARS Radio Rally - venue TBA. Details from Colin, GI7CML, QTHR.

9/10 MARCH

LONDON AR Show - Picketts Lock Centre, Picketts Lock, Edmonton, London N9. Details 081 361 2048.

EVENTS DIARY

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.

TIVERTON South West RC Mid Devon Rally - Pannier Market Tiverton. Doors open at 10am. Easy access, only minutes from junction 27 on M5. Two halls of trade stands, bring & buy, mobile snack bar. Further displays and full refreshment facilities in the club room bar. Talk-in on S22. Details G4TSW, Mid Devon Rally, PO Box 3, Tiverton, Devon.

WYTHALL RC 6th Annual Radio Rally - Wythall Park, Silver Street, Wythall, Worcestershire (on the A435 near junction 3 on M42, SW of Birmingham). Doors open 11.00am. 3 halls plus marquee, usual trade stands, flea market, bring & buy, bar and snacks, talk-in on S22. Admission still only 50p. 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 Magnum Rally - Magnum Leisure Centre, Irvine, Ayrshire. Usual stall, raffles, bring & buy. Details from Peter Reid, GM0FCI, tel: 0294 72253.

PONTEFRACT & DARS Components Fair, Carleton Community Centre, Carleton, Pontefract. Doors open 11am, trade stalls, bookstall, bring & buy, licensed bar & refreshments. Talk-in on S22. Car boot and van spaces. Admission by prize programme (3 prizes). Details 0977 615549 or 0977 704067.

31 MARCH

CENTRE OF ENGLAND Easter Amateur Radio Rally - Motorcycle Museum, Bickenhill, nr NEC Birmingham. Doors open 10.30am, admission £1. Concessionary rates for all who wish to visit the museum and for RAIBC members and senior citizens. Over 60 trade stands, bring & buy, talk-in from GB0COE from 7.30am on S22. Details from Frank Martin, G4UMF, tel: 0952 598173.

7 APRIL

CAMBRIDGESHIRE Repeater Group AR Rally - Philips Radio Communications - Catering Centre, St. andrews Road, Chesterton, Cambridge. Doors open 10.30am, admission 50p, junk sale, bring & buy. Details from G0HEM, tel: 0799 23689.

LAUNCESTON Launceston 5th AR Rally - Launceston College.Doors open 10.30am. Bar, hot snacks, bring & buy, traders, official Morse tests (applications through RSGB usual channels), talk-in on S22. Breakfasts for traders from 6am. Details from Maggie, tel: 040921-219 or Rodney & Joy, tel: 0566-775167.

LOUGH ERNE ARC 10th Annual Mobile Rally - Killyhevlin Hotel, Enniskillen. Doors open 12 noon. Talk-in on S21. Special guest Louis Varney, G5RV. Details from Alwyn Magee, GI0BFD QTHR tel: 0365 323802.

WHITE ROSE Rally - Leeds University. Doors open 11am.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

BURY RS Annual Rally - **(Changed from 28 April)** Castle Leisure Centre, Bolton Street, Bury. Doors open 11am, (earlier for disabled visitors) traders, bring & buy, catering facilities. Details from Lawrence Jones, G4KLT, tel: 061 762 9308

MARSKE-BY-THE-SEA Rally - Marske Community Centre. Usual traders. Details from G7CBR, QTHR, tel: 0642 480055.

SWANSEA ARS Rally - Swansea Leisure Centre (on the Swansea-Mumbles coast road, A4067). Doors open 10.30am, trade stands, bring & buy, bookstall, HF/VHF demo stations, full catering, licensed bar, talk-in on S22 from GB2SWR. Details from Roger Williams, GW4HSH, tel: 0792-404422.

5 MAY

BATC Rally - Harlaxton Manor, Nr Grantham, just off the A1 (signposted). Usual traders, bring & buy, refreshments and bar, lecture programme, talk-in, demonstrations, flea market and craft corner. Details from Paul, G8MJW; tel: 0522 703348.

KELSO ARS 8th Anglo-Scottish Rally - Tait Hall, Kelso. doors open 11am, usual attractions. Details from GM4UIB, tel: 0573 24654.

6 MAY

DARTMOOR RC Rally - St. Annes Church Hall, Yelverton, Devon (A386). Doors open 10.30am, trade stands, bring & buy, refreshments and parking. Talk-in on S22. Details from Dave, G1YPD, tel: 0752 703101

MID CHESHIRE ARS Rally - Civic Hall, Winsford. Doors open 11am (10.30 for disabled visitors). Full catering and ample car parking. 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 7th QRP Convention" - Preston Centre, Monks Dale, Yeovil. Doors open 9am, admission £1.50 to include programme. Usual traders, plenty of refreshments available, lectures. Details from Mr. David Bailey, G0NMM, QTHR as G1MNM.

18 MAY

SWINDON Radio Rally - The Oasis Leisure Centre, North Star Avenue, Swindon. (Leave M4 at jnct 16). Doors open 10.30. Trade stands, grand bring & buy, Repeater Group etc, ample free parking, talk-in by Raynet on S22 from 5am. Details from Jim, G7GEA, tel: 0793 611859 or John, tel: 0793 619014.

19 MAY

MID-ULSTER ARC "Parkanaur" Rally - Silverwood Hotel, Lurgan, Co. Armagh. Doors open 12 noon. Usual trade stands, bring & buy, bookstall, QSL Bureau etc. Talk-in on S22 145.550. The proceeds of this Rally go to the Stanley Eakins Memorial Fund at Parkanaur near Dungannon. This is a very worthy charity, and we hope to see a really good turn-out of everyone interested in all aspects of radio and electronics. Details from Jim Lappin, GI1YGS, tel: 0762 851179.

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. Doors open 11am. Usual traders, Morse tests, bring & buy, refreshments, licensed bar, bookstall, Raffle. Talk-in on S22.Details from Jan Fisher, G0IVZ, tel: 0752 340946 evenings/weekends, 0752 262826 (daytime).

27 MAY

BIRCOTES Radio Rally - Bircotes Sports Centre. 10m south Doncaster off A1. Doors open 11am (10.30 for disabled visitors). Details and booking forms Raynet c/o 23 Florence Ave, Balby, Doncaster, tel: 0302 857526.

2 JUNE

SPALDING & DARS Mobile Rally - Springfields Arena Spalding. Details from T. Kettlewell, G4TWR, tel: 0775 722940.

9 JUNE

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)

MID LANARK ARS Annual Open Day - Mid Lanark ARS club premises, Newarthill C.E. Centre, High Street, Newarthill, ML1 5GU. Details 0698 732403.

NORFOLK Raynet Rally & Car Boot Sale - Barford (B1108) Norfolk, OS map 144, Ref TG113078. Details from Pat Bates, G0IYD, QTHR, tel: 0692 404593 (evenings only)

ROYAL NAVAL ARS 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 Mr. E.F. Stewart, tel: 0484 532371.

30 JUNE

LONGLEAT Amateur Radio Rally. Longleat House, near Warminster, Wiltshire. More details from Shaun, G8VPG, tel: 0225 873098.

7 JULY

KINGS LYNN ARC Radio Raloly - The Corn Exchange, Tuesday Market Place, Kings Lynn. Details from G4PYB, 0553 761995.

YORK Radio Rally - Tattersall Building at York Racecourse. Details from Dave Moreland, G7FGA, tel: 0904 790079.

13 JULY

CORNISH RAC. Rally - Penair School, St Clement, Truro. Details from Rolf Little, G0NDC, St. George's Hotel, St. George's Road, Truro, Cornwall, TR1 3JE, tel: 0872 72554.

14 JULY

SUSSEX AR and Computer Fair - Brighton Racecourse. Details from Ron Bray, G8VEH, QTHR, tel: 0903 763978 or 0273 415654 (office hours).

21 JULY

COLCHESTER RA Mobile Rally - Highwoods Sports & Leisure Centre, Brinkley Lane, Colchester. Details from Frank Howe, G3FIJ, QTHR, tel: 0206 851189.

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.

11 AUGUST

DERBY Mobile Rally - Littleover Community School, Rykneld Road, Littleover, Derby. Details from Martin Shardlow, G3SZJ, QTHR, tel: 0332 556875.

18 AUGUST

WEST MACNHESTER RC Red Rose Rally - Bolton Sports & Exhibition Centre, Silverwell St, Bolton. Details from G1IOO, tel: 0204 24104.

23 - 26 AUGUST

OSCAR VICTOR Activity Group (WAB) Family Fun Weekend - Bent Rigg Farm, Ravenscar, North Yorks. (Midway between Scarborough and Whitby). Details from Peter Austin, G7BXA, QTHR, tel: 0532 563462 or Steve G. Bryan, G1SGB, QTHR, tel: 0709 543747.

25 AUGUST

TORBAY ARS 27th Annual Mobile Rally - STC Social Club, Brixham Road, Paignton, Devon. Details from G3LHJ, tel: 0626 54437.

1 SEPTEMBER

PRESTON ARS 24th Annual Rally - University of Lancaster. Details from Godfrey Lancefield, G3DWQ, QTHR, tel: 0772 53810.

8 SEPTEMBER

MILTON KEYNES & DARS 5th Annual Car Boot Sale - Cranfield Airfield. Details from Tony, G6WXM, tel: 0908 316435, Mike, G0FMC, tel: 0908 566796 or Ray, G1LRU, tel: 0908 660798.

VANGE ARS Annual Rally - The Laindon Community Centre, Laindon High Road/Aston Road, Laindon, Basildon, Essex. Details from Doris Thompson, tel: 0268 552606.

14 SEPTEMBER

WIGHT Wireless Rally - Wireless Museum, Arreton Manor, Nr Newport, IOW. Details from Douglas, G3KPO, tel: 0983 67665.

15 SEPTEMBER

BARTG Rally - Surrey Hall, Sandown Park Racecourse. Details from Ian Brothwell, G4EAN, tel: 0602 595261. **(This is a provisional date)**.

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.

7TH NORTH WAKEFIELD RC Rally - Outwood Grange School, Potovens Lane, Outwood, Nr Wakefield. Details from Dick, G4GCX, tel: 0532 622139 or John, G4RCG, tel: 0924 362144.

6 OCTOBER

GREAT LUMLEY Radio Rally - The Community Centre, Great Lumley, Nr Chester-Le-Street, Co Durham. Details from Barry, G1JDP, tel: 091 388 5936.

13 OCTOBER

HORNSEA Rally (ELHOEX Electronic Hobbies Exhibition) - The Floral Hall, Hornsea, East Yorkshire. Details from Jeff, G4IGY, tel: 0964 533331.

2/3 NOVEMBER

NORTH WALES 5th Radio & Electronics Show - Aberconwy Conference Centre, Llandudno. Details from N.B. Mee, GW7EXH, tel: 0745 591704.

10 NOVEMBER

BARNSLEY & DARC Rally - Willowgarth Senior High School, Brierley Road, Grimethorpe, Barnsley. Details from Ernie, G4LUE, QTHR, tel: 0226 716339.

OTHER EVENTS

24 MARCH

VHF Convention - Sandown Park. Details, G3FZL, QTHR.

27/28 APRIL

RSGB 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, Daventry. Details from Bob Whelan, G3PJT, 36 Green End, Comberton, Cambridge CB3 7DY

19 OCTOBER

G-QRP CLUB Mini-Convention. Details from G3RJV.

25/26 OCTOBER

LEICESTER ARS Show - Bramley Halls, Leicester. All usual facilities. Details from Frank Elliott, G4PDZ, tel: 0533 871086.

SILENT KEYS

G0BKG	Mr B Whelan	
G0FPJ	Mr T Edwards	
G1KPA	Mr P H Holden	12.1.91
G1SUY	Mrs M M Suarez	26.10.90
G1XCM	Mr H J Hall	6.90
G2IG	Mr R Hammans	8.2.90
G3ANN	Mr W E Williams	11.90
G3BX	Mr C J Sanders	
G3KKH	Mr R Pearson	4.90
G3NAH	Mr H Taylor	8.90
G3SGH	Mr J R M Hewitt	30.9.90
G3WMU	Mr G Brownlow	
G4CTX	Mr E J Bandy	16.12.90
G4DYF	Mr B Castle	26.12.90'
G4FCU	Mr R Restall	24.11.90
G4FUW	Mr W Davies	12.1.91
G4LVU	Mr T Woollerton	
G4PKS	Mr M C Lord	18.7.90
G4UBU	Mr J Turley	26.10.90
G5YH	Mr C H Chorley	22.12.90
G6XDJ	Mr R T Percival	13.1.91
G6ZTQ	Mr H Drinkwater	18.10.90
G8AK	Mr J Kippax	14.12.90
G8CPM	Dr E Sherrah-Davies	6.1.91
G8DDI	Mr J S Young	
G8IL	Mr H J R Letts	19.10.90
G8KB	Mr R M Strickland	4.12.90
G8LRT	Mrs J F Rhodes	
G8ML	Mr L W Lewis	
G8RVJ	Mr A J Plaskett	15.11.90
GD3KHE	Mr G E Hayes	1 1 91
GW0DNR	Mr H S Bale	1.1.91
GW2BUF	Mr J Price	18.12.90
GW7EQA	Mr N D Twiddy	1.1.91
HB9UD	Mr G Jorashkewitz	5.12.90
ON6CI	Mr J Schoon	2.9.90
RS25273	Mr J D Bruce	21.11.90
RS35773	Mr Archer	12.90
RS38766	Mr H W Rhoads	3.1.91
RS47954	Mr J D Righton	9.11.90
RS52448	Mr N G W Walker	15.8.90
RS92871	Mr R Matthews	19.12.90
VE3GBB	Mr R Bellis	8.8.90

GB CALLS

The list below shows all special event stations licensed for operation during this month and up to 8 August. It was taken from the HQ computer on 6 June. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

1 MARCH

GB2RCC	Radio Caravan Camping
GB2SDD	Saint David's Day
GB4SHS	Saint Helens Scouts
GB4STD	St. Dunstan's

2 MARCH

GB2TAR	Tyneside Amateur Radio

6 MARCH

GB50ATC	Air Training Corps

7 MARCH

GB4XXX	'X' Nett DX-pedition

8 MARCH

GB0LRS	London Royal Signals

9 MARCH

GB0JMS	John Mason School

10 MARCH

GB50ATC	Air Training Corps

13 MARCH

GB50ATC	Air Trainiung Corps

18 MARCH

GB2RCC	Radio Caravan Camping

22 MARCH

GB4MGB	Marlbrook Guides & Brownies

27 MARCH

GB50ATC	Air Training Corps

28 MARCH

GB2RCC	Radio Caravan Camping

31 MARCH

GB0COE	Centre of England

CLARK SCAM HEAVY DUTY 40ft TELESCOPIC PNEUMATIC MASTS retracted 7ft 8in head load 40lbs with or without supporting legs + erection kit in bag + handbook — £200-£500.
CLARK SCAM HEAVY DUTY 70ft TELESCOPIC PNEUMATIC MASTS retracted 13ft 5in head load 90lbs with or without legs + erecting kit + handbook £500-£800.
TEXSCAN CATV SET TOP CONVERTER tuner FX range 54MC/S-450MC/S output on channel 48 UHF-PAL-synthesiser controlled-keypad or IR remote controller. **BRAND NEW AND BOXED** with circuits and information — £20 or two for £30. Not tested.
RACAL MA4204 ENCRYPTION UNIT (speech or data security scrambling) for use with HF-VHF or field telephone equipment. Solid State. Alloy air sealed case. 12V DC supply. Each unit can send or receive but two must be used, one to receive, the other for sending. Both switched to the same number selectable from rotary switches on the front panel. 512 operating codes available **BRAND NEW WITH BOOK.** £150 Two for £275 or four for £500.
RACAL MA4230 — MA4231 AUTOMATIC MORSE RECEIVING AND SENDING SYSTEM.
MA4230 AUTOMATIC MORSE SENDER. Small solid state unit incorporates a full alphanumeric keyboard for entering messages which can be sent immediately or stored for 30 days. Output is in morse code 10 to 20 wpm or 8 to 16 times this speed. Internal storage of up to 1,000 characters etc, etc, contained in small alloy airtight case with book. **BRAND NEW.**
MA4231 AUTOMATIC MORSE READER. Self contained — receives morse code from above unit or radio audio output at up to 160 words per minute, by hand or automatic — stores up to 912 characters — readout on unit — letter by letter-LED display or printer VDU etc, many adjustable speeds ASC11 or baudot. Power 11-30V DC or AC mains by MA4232 power unit with book — MA4230 + MA4231 + battery charger + line adaptor and book. Not tested. Internal battery (Nicad) may want replacing due to storage. **BRAND NEW. £100. AS ABOVE BUT ARABIC NOT ENGLISH.** But supplied with kit to convert to English — new keyboard cover + proms + book. Line adaptor — **BRAND NEW. £50.**
MARCONI TF2008 SIGNAL GENERATORS 10KC/S to 510MC/S AF-FM or sweep output. Complete with book. Not tested — as they come from the pile — will have small faults — as received from MoD hence clearance price. £250 each. Front panel protected with metal cover therefore fair condition. Wooden kit box of leads etc. £25.
ARMY TYPE MORSE KEYS £5 each — large quantity available.
ARMY WHIP AERIALS AND BASE 12ft or 16ft — new — £20-£25.
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RSGB

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PA3 series 20MHz-1GHz; min. 13dB gain fitted with HPF to reduce breakthrough problems.
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PA3I/S (SO239): £35.50. PA3I/N (N conns): £38.95
Mains adaptors for "back-of-set" models: £8.50

MOBILE ANTENNAS

REVCO super Mag-mount + 5/8 for 2m: £34.95
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Body-mount 1/2" or 3/8" hole (state which) + 5/8 for 2m £19.95
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Mag-mount with 3dB 900MHz whip: improve the performance of your cell-phone or 900MHz scanner; in the car or on the office filing cabinet: £34.95. All with 4m feeder. Plugs on request.
REVCO unbeatable glassmounts, with tuned matching units for peak efficiency: 2m or 70cm: standard model £39.95; deluxe model: £50.95.

METEOSAT WEATHER SYSTEM

The complete basic METEOSAT system, no computer, just a plug-in and go package that can be up and running in 10 minutes. Antenna, receiver, frame store, all cables through to 12" mono monitor: £795.95 (or less monitor: £599.00).

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Miniature (only 34x9x15mm), any frequency in the range 40-200MHz, up to 25dB gain.
Stock versions: 6m, 4m, 2m, 137MHz (W-Sat): £11.95
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Other frequencies in the range 40-200MHz to order £14.25

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Miniature (38x18x10mm) xtal controlled 1750Hz £17.95

GAREX DC/DC INVERTERS

A popular line for many years. Economy package: chassis section cut from commercial R/T gear, re-wired & tidied up to make free-standing unit, no expensive cabinet, just basic value for money.
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4 METRE Rx CONVERTER

High quality PMR front end by famous manufacturer, modified to make a 4m converter: 10-11MHz output. Full data. Requires xtal, approx 15MHz. £16.95

4 METRE 0.5 WATT Tx

Tx Low Power driver unit matching above Rx, with modulator, fully aligned, with data: £15.95 (or + xtal for 70.45MHz £19.95)
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12v operation, handles 50 watts up to 200MHz: £1.95; 5 or more £1.50 each

WESTMINSTER FM BANDWIDTH CONVERSION KITS

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VISA

The Last Word

COMPULSORY MEMBERSHIP?

December 1989 brought to me, via my youngest son, a present that I looked forward to and enjoyed over the following twelve months. The present was membership of the RSGB and the monthly delivery of *Radio Communication.*

However, this year I did not get the same present because, (a) he could not afford the £30 required, and (b) I disagree with the subscription increase. When you are on a low income every penny counts.

I agree that there should be a national body to represent the radio amateur, and the RSGB, with all its experience, should be the one to do it. However, what I do not agree with is the few supporting the many. It is about time that all those holding a licence, paid in some way to support their national society.

All licensed amateurs should be affiliated to the RSGB by payment of their licence fee. This would involve an increase in the fee payable to the DTI who would in turn pass on to the RSGB a percentage of the fee (say 25%). I can hear the screams of horror now but think about it.

I feel sure that, with negotiation between the RSGB and the DTI, an arrangement could be made. Or is this just another case of 'What a good idea, but take no notice'.

C F Boland, G7EBH.

You seem to be advocating compulsory membership - a closed shop - which is unlikely to appeal to the present Government. What do other members think? — Ed.

HELP OFFERED . . . .

I would like to say a few words about my favourite mode which does not get mentioned too often.

There are many people with equipment to transmit/receive slow scan television (SSTV) and the ones I have spoken to are all interested, but complain of the lack of activity on VHF.

Anyone who actually sits down and sends some 'CQ SSTV' pictures out may be surprised how many monitor the frequencies. From my home in Northants, using a small set-up, I work friends in Herts who will help and be glad to advise anyone interested. I have also worked into Liverpool and Wales with scratch-free pictures so it goes to show its not just a chat, but DXing with your own personal pictures.

If you would like any advice, contact me and I will try to help or at least put in you in the right direction.

Paul Leybourne, G7ESK.

. . . . AND GIVEN

May I, through your column, thank Mr. Charles Matthews, G8NXU, RSGB Planning Committee member, for his recent invaluable help. I received planning permission to erect a box section tower in my garden, but in fact bought and erected a second-hand and cheaper lattice one. While I was not trying to put one over the Council, one neighbour objected and the Council instructed me to take it down, and appeal if I wished. Mr. Matthews advised me very thoroughly and successfully. The D of E inspector visited the site and found in my favour.

D J Twyman, G6LJR

SNOW THANKS

Having spent seven hours stuck in snow on the M5 at Junction 1 on Saturday 8 December, I would like to thank Roy, G3TRG, who booked me overnight accommodation in Birmingham, and Richard, G8ALO, who telephoned my wife in Manchester to say I was OK. Well done lads and well done amateur radio!

Keith Griffiths, G0EVP

NIMROD VARIATION

On the market at the moment are a fair number of microwave amplifiers, used in the Nimrod aircraft, covering a frequency approx 2.4 - 11.1GHz using F4024/F4025/F4026 travelling wave tubes. Several people have been asking for data in RadCom.

After some difficulty, I have managed to get data on the F4026B TWT which is similar except it has an internal resistor chain which the earlier TWT's do not have.

J.K. Eley, G3LMR.

Members requiring information on the above please send SAE to Mr. J.K. Eley, 112 Groby Road, Glenfield, Leicester LE3 8GL.

RAE FIRST?

My daughter (11) is currently studying for the Radio Amateur Examination, which she will be sitting in May. Assuming that she successfully passes the examination, she will be able to transmit using my callsign, whilst I supervise.

As I understand it, in order for her to transmit unsupervised, she will *also* need to pass the Novice Licence Examination (after the appropriate course of study). If the intention is genuinely to encourage youngsters into the hobby as part of Project YEAR, this makes it a remarkably cumbersome process for a youngster to contend with.

For most professional and similar exams, a pass in the 'Professional' level would normally grant an exemption in the 'Technician' level.

Is it not possible to grant a Novice Licence callsign to anyone under the age of 14 who is successful in the RAE? This would allow those sufficiently interested to take the RAE to continue in the hobby, without coping with the perverse mechanism referred to above, at a time in their lives when there are many distractions to divert their attentions. In addition, it might also have the added bonus of showing their friends that the hobby may be of interest to them - encouraging even more into the hobby - as is the avowed intention.

G M Phillips, G0KRB

The Editor replies . . . .

You have fallen into the trap of thinking the Novice Examination is a watered down version of the RAE. This is emphatically not the case. The two licensing routes are quite different in concept.

Passing the RAE involves only theoretical knowledge (albeit substantial) and will allow operation on any part of any amateur band using high power but only if directy supervised.

By contrast, a candidate for the Novice RAE must have taken a course involving much practical work and operating instruction. It is this which makes it possible for Novice Licensees to operate without supervision on small parts of some amateur bands using very low power.

As for discouraging the young, we do not envisage many youngsters taking the RAE before taking their Novice Exam.

ENTERPRISE PRAISED

I recently returned faulty a rather elderly Microreader to the manufacturers Enterprise Radio Applications Ltd, of Warrington.

They not only repaired the fault but also updated the software to the latest Mk.1 Microreader and also refunded my postage returning the unit to them.

What can one say about such service except a very big 'Thank you' and a strong recommendation for support for this British firm who have confidence in their products, and who demonstrate their consideration for the users of their appliances

George Metcalfe G6VS/VK2EZA.

BEST OF *RADCOM*

ZL2DA wants more technical articles (*Last Word* January), but on what? The micro-processor controlled SMD miniature marvel is beyond the resource of the Amateur; the back-numbers of *RadCom*, *Sprat* etc carry many variations of Rx, Tx, antennas, PSU, testgear, to match one's junk box, ability and pocket. The world has moved on, and we old G3s can indulge in nostalgic natters on valves, germanium transistors, while the young-'uns tinker with packet, computers, and spend money to keep industry and advertising alive.

The pioneers of HF DX, 6L6's, SSB, mobile comms, and the rest, have all retired, but their spirits live on in the pages of the past, with examples and the theory to help do-ers to do their own versions and readers to relive the achievements of amateurs.

Perhaps RSGB could publish a book, "Best of RadCom 1950-1990" (or whatever)? The material is in the archives, readers could be asked to send in their choices for inclusion, advertisers invited to take space, but how many would buy it?

John I Brown G3EUR

APATHETIC

What an apathetic lot we are! When we have the opportunity to influence the affairs of the Society by electing a new Ordinary Member of Council, only 9.3% of members can be bothered to return the voting papers - and 220 of those were invalid, either inadvertently or deliberately.

Given the chance to say what we wanted to see in *Radcom*, just over 1500 members submitted their views; only 4.3% of the 35000 who could have done so. This, in spite of a free draw with some very fine prizes!

GW0NPL, who wrote "I think that all hams complaining about the RSGB should, instead of bickering, do something about it", must now be feeling pretty despondent - it is very apparent that a large proportion of the members do not care what appears in *RadCom*, or how the Society is run.

C Wells, G4ZZG

CELL BY DATE

Further to my letter regarding the very old Eveready 'C' cell still showing voltage after 47 years, I have received a letter from Eveready Batteries (Kenya) Ltd in Nairobi. They have given me the address of their American Battery Museum in Westlake, Ohio, USA who, they say, would be very interested to obtain this battery. I will be contacting them.

By the way, the Managing Director of the Kenya company who wrote was DS Radley, 5Z4FN/G4ABI - it is surprising where *RadCom* gets to!

J.K. Eley, G3LMR

50 YEARS ON

"It is doubtful whether the devotees of any scientific hobby have been so dependent upon foreign-made gear, as have been the radio amateurs of Great Britain. This unfortunate state of affairs has been due entirely to the lack of appreciation, by certain manufacturers, of the amateur market".

That quote was made in the editorial of the *T and R Bulletin* of April 1939. How surprising that, over 50 years later, there's still the same situation.

Harvey Collett, G3KI.

STAY IN

I am sure Mr Gascoyne's membership sharing wheeze (*Last Word*, September '90) was meant as a joke but I do ask all radio amateurs NOT to drop out of the RSGB.

Yes, I know all the old moans and groans but the RSGB will hardly make the change you want if you drop out. Better to stay in, and continue to try and influence the Society.

It can be no secret to anyone who reads the letters page that I do not agree with the RSGB's attitude to cheap SSB CB sets. However, I paid my subs this year and am therefore still in a position to try to influence the Society.

I hope you will do likewise?

Stephen Dyke G3ROZ

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.

CONTINUED FROM PAGE 89

YAESU FT208R, 2 nicads, manual, case, YM24A spkr-mic, NC-8 chrgr PSU, FNA-2 battery pack adaptor. All very gd cond. No split: £170. G6AQC QTHR (Oxford) 0865 243634 after 7pm. No offers.

YAESU FT290R MkII with 2.2AH nicads rubber duck & case, MML144/30 linear Amp, 13.8v 6Amp PSU :£340. All above in gwo. Terry G4OXD (Hitchin) 0462 435248.

YAESU FT707 HF 80-10M: £350. Yaesu FP700 20Amp PSU integral extension spkr: £90. Jaybeam 144MH 6-ele quad: £15. QM70 144MHz Amp 10W in 50W out: £30. 1296MHz 23-ele Tonna used 3 months: £17. VIC20 computer + power supply, faulty (separate) TV modulator, cartridge games: £30. Ultra 12in B/W portable TV, gwo: £25. Shack tidy out! G4XEN QTHR (Wellingborough) 0933 677573.

YAESU FT727R/2 5W dual band handie with base PSU/chgr spkr/mic Vox headset 2 FNB4 batts soft case: £285. Also mobile 50W FT7B: £280. Wanted HF gen coverage Tx/Rx. G3JQL QTHR (Durham) 091 3861116.

YAESU FT757GX, hand mic, FP757GX PSU, Shure 444D desk mic. All vgc: £700ono. Will split. Mick G0GKL QTHR (Hastings) 0424 444376.

YAESU FT757GX: £550, FC757AT: £200, FP757HD: £125. Little used. All in orig packing with manuals. Any sensible offer considered. G0EET (Swindon) 0793 611048.

YAESU FT757GXII FP757HD all in mint cond with manuals and boxed: £800. Can despatch datapost £15.70. G1DDH QTHR or collect. (Richmond Yorks) 0748 850231.

YAESU FT77 tcvr - FP700 PWR supply - FC700 ATU - c/w mic - phones - key, bxd, vgc, h/books: £600 the lot. Room 5, Crescent Grange Hotel, Crescent Road, Bournemouth, Dorset BH2 5SS. Letters only please.

YAESU FTdx560 tcvr, ex cond, new Tx valves and balanced mixer: £180. G0GWP QTHR (Keyworth, Notts) 0602 434457 daytime only.

YAESU FTV901R trsvtr matches FT101ZD FT901 etc CW 2M 6M modules: £295. KR400 rotator: £75. Both items gwo. (Halifax) 0422 320094.

YAESU NC15 quick charger base unit: £55. PA3 car adaptor :£14. NC11C charger: £10. MH12A2B spkr mic: £20. G6XSJ QTHR (Watford) 0923 222284.

YAESUFT77 HF tcvr FM crystal marker 100W, good cond: £330. G0DOE QTHR 081-391 0514 evenings.

YAESU FT690 Mk.II 6M Trx and matching FL6020 linear, immac cond, bxd as new: £300 for both. Nacia 400W 2M linear, good cond: £150, G1EXG not QTHR (Worthing) 0903 43018.

WANTED

123 SET in good wkng cond (eg recent anchor surplus release). Also any accessories for same. Plinth spkr for Eddystone 730/4. Any 10X or FT-243 crystals for 80M, 40M or 30M bands (CW section only). Kemp G4TMO (Kingston-u-Thames) 081-549 1427 after 8pm.

400 non-inductive wirewound resistors, 80W power for T2FD aerial. Kenwood receive converter boards for JR-599 Rx. 50MHz type CC-69 part UC-2302J. 144MHz type CC-29 part UC2301J. Kenwood HS4 hd/phones. Eddystone 750 HF general coverage Rx. Richard Perzyna G8ITB (Bromley) 0689 852177.

ARGOSY I analogue tuning ten-tec tcvr with manual. Please write to E. Jackson, Thule Farmhouse, Gidleigh, Chagford, Devon TQ13 8HT.

ATU FC902 or similar, capable of tuning balanced or unbalanced antenna system, top band included. Lionel Leek 16 Riverside Drive Solihull West Midlands B91 3HH. 021 704 9689.

BUG key. Telescopic mast. Any QRP gear incl homebrew. G2CYN QTHR (London) 071-935 7119.

CIRCUIT information for UK/PRC350 tcvr. Complete Redifon GR479 HF tcvr. Terry (St Albans) 0727 48424.

CW FILTER XF30C for FT101 Mark IIA circa 1972. GW3SUH QTHR (Ferndale, Mid Glam (0443 757368).

DRAKE T4XC and AC4 PSU. Must be mint cond with no mods. Poss consider with R4C. G8HNI QTHR (Maidenhead) 0628 664132.

EIGHT inch HT energized loudspkr, for restoration project. Also early Rx valves B4, B5, B7, UX bases. Any magic eyes, especially CT8, UX6, IO based ones. Any quantity from one off. TV4, 6G5 particularly needed. Dick G0HPM (nr Reading) 0734 713332. Evenings.

FILTERS (IF) XF8.9KCN, XF8.9KC, XF10.7KC for Yaesu FT-ONE tcvr. Also keyer unit for same. G3LCZ QTHR (Stockton-on-Tees) 0642 582738.

FV101 to match old FT101B. Bob GU4YOX (Guernsey) 0481-44834.

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HRO complete or parts, tatty one acceptable. Condition and price. GM0KMG QTHR (Glasgow) 041 649 4345.

IMPROVING FRG7, need TA7130, an MFL455 IL filter or sources for these items. Also 10Henry 250mA HT choke. Also need a Datong D70 morse tutor in gd cond. Peter Ebsworth, Forland 5395, Steinsland, Norway. (West Norway) 010 475 338204.

MANUAL or circuit diagram for Pye Solent MkII yacht receiver - purchase or loan to copy. (Peterhead) 0779 73748.

PAN Display Unit BS5 for Kenwood station monitor operating the Kenwood TS520SE. Also external spkr SP520 and display DG-5. (Locks Heath) 0489 82423.

PROM Programmer Cifer model 26030, any info at all circuits connections, will pay good price. Brian G4SDL not QTHR (Manchester) 061-748 4010.

PYE EX PMR or similar manuals and equipment working or not. Robbie G8ZXL (Chertsey) 0860 781351 or 0932 560364.

RACAL RA217 Rx, any condx considered, any spares for RA217. Can collect. G4AJE (March, Cambs) 0354 741168. 5 to 7 p.m.

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