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October 1995

RadCom

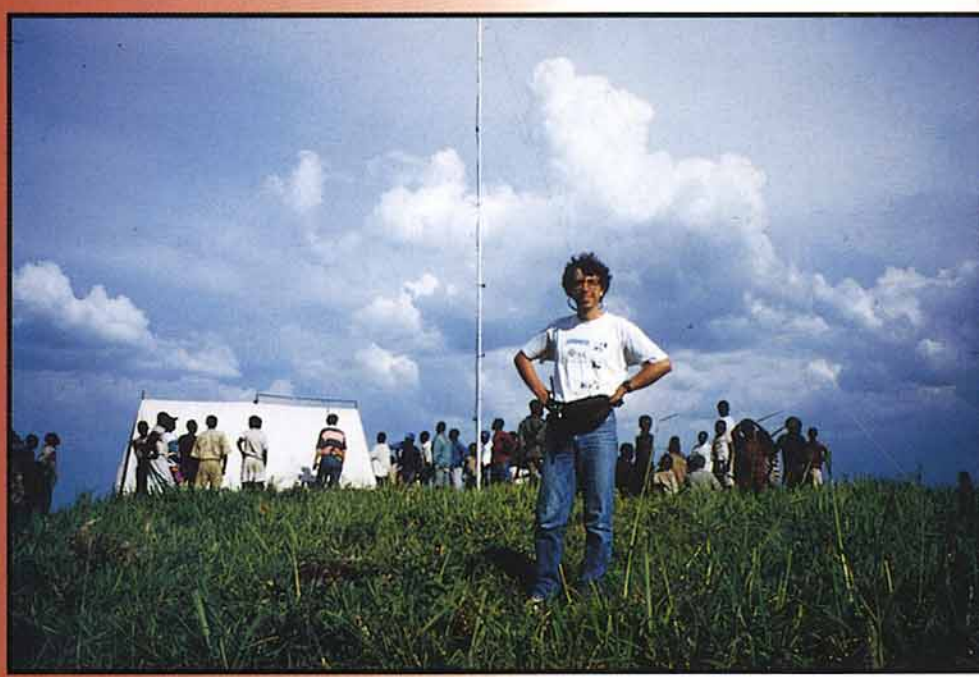
Radio Communication

The Journal of the Radio Society of Great Britain

THE VOICE OF AMATEUR RADIO FOR 82 YEARS

PHASE 3D SATELLITE

INSIDE: THE LEICESTER SHOW GUIDE



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RadCom

COVER PICTURE:
Peter Casier, ON6TT, on the trail in Africa. Read his first-hand account of working for relief agencies - page 34. In colour.

NEWS AND REPORTS

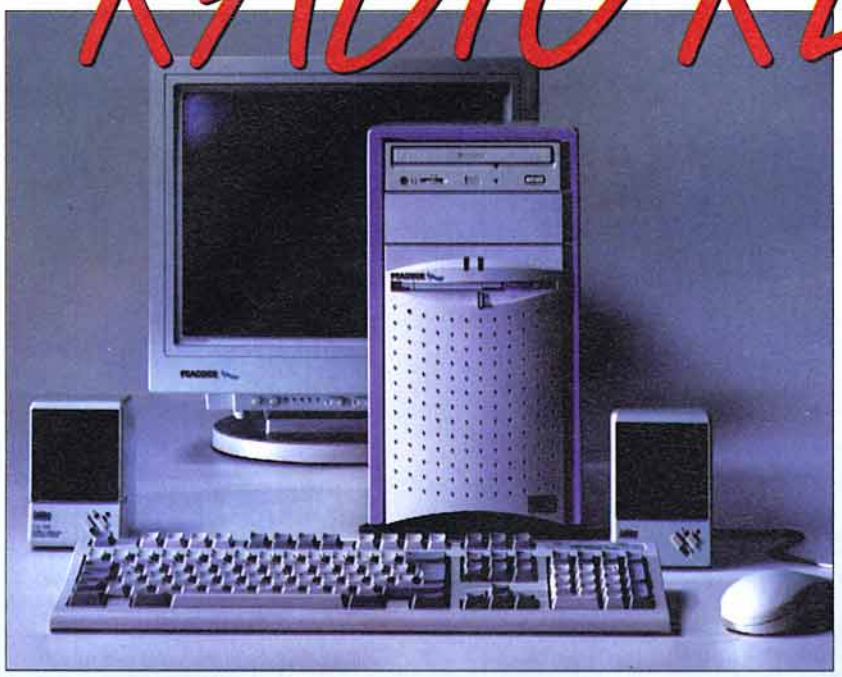
TECHNICAL FEATURES

REGULARS

PRODUCTS

LEICESTER SHOW GUIDE

"RADIO READY"



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The RadCom Leader

RA GOES IT ALONE ON MORSE

NEW CALLSIGN SERIES ON THE HORIZON

IN THIS EDITION of *Radio Communication* we find something rare - an *insert*.

If you are like me and are fed up with newspapers and magazines being full of such inserts, so much so that you just throw them away, ***stop.*** Please take time to read this document, because it is significant to the future of the Amateur Radio Service.

The exchange of letters between the Society and the RA missed our normal deadline and this was the only way that we were able to inform you of the Radiocommunications Agency's change of position regarding the mandatory Morse code test.

'M' CALLSIGN SERIES

The current 'G' callsign prefix is rapidly approaching the end of the series. The RA have just announced that from 1 April 1996, new amateur callsigns will be issued using the 'M' prefix instead of the 'G' one currently used, starting with M0 and M1 for the Class A and B licences. The change will take place on this date even if some of the 'G' calls remain unused. The 'M' series will use the same regional indicators as the 'G' series; the 'E' will only be used for England in the Novice '2' series.

Existing holders of 'G' callsigns will not be affected by this change, and will continue to use their existing callsigns. Even if their callsign lapses, they can still apply for its re-issue at any time. Existing holders of 'G' callsigns will not be able to change their existing callsign to an 'M' callsign. The 'G' prefix will continue to be used for repeaters, beacons and packet nodes.

Holders of Novice callsigns in the '2' callsign series will not be affected by these changes.

Reservations for the 'M' series will be accepted from 2 October on a first come, first served, basis, when the callsign is likely to be issued within the next six months. Applicants are advised to telephone SSL (0117 952 8333) to check that this is the case, before submitting a written application. Reservations for 'G' series callsigns will continue to be accepted up to 31 March 1996.

Peter Kirby, G0TWW
General Manager

RadCom NEWS

● THE CENTRE FOR the History of Defence Electronics (CHIDE) has been opened at Bournemouth University. They are seeking to interview people with radio or radar experience from WWII up to the 1960s. If you can help, contact John Burtenshaw, G1HOK, at the university, tel: 01202 595089.

● THE LATEST CALL-SIGNS issued by SSL as of 30 August were in the G*0WK*, G*7VR*, 2*0AM* and 2*1EJ* series.

Land's End to John O'Groats - on 2m/70cm

DR TONY WHITAKER, G3RKL, completed a solo trip to John O'Groats on 9 August, 43 days after starting out from Land's End. He walked about 650 of the 874 miles, with the remainder being by bus and train. While walking, he wore a Raynet reflective jacket at all times, as a safety aid. Using a Standard C528 handheld transceiver, QSOs were made through about 16 2m repeaters, with a further 20 repeaters being heard. On 70cm he worked through an additional five repeaters. The aerial was a dual-band collinear, supported from his 35lb backpack, and provided a great improvement over the 'rubber duck' aerial on the rig. Best DX included two Norwegian repeaters, LA8DR and LA8SR, when north of Dingwall, and on simplex GM/EI5EVB/M (on top on Ben Nevis) from near Golspie.

Tony Whitaker, G3RKL, seen here as GM3RKL/M, after completing the marathon trek to John O'Groats. Note the Raynet high visibility vest and high gain collinear aerial.

Radiocommunications Agency / RSGB award encourages talented teenagers

Young Amateur of the Year Award 1995

THE 1995 YOUNG Amateur of the Year is 16-year old Leroy Kirby, GW0ULC, from Cardigan, Dyfed. Leroy learnt of his success whilst away in Spain, and got back just in time to attend the presentation ceremony at the RSGB International HF Convention in Windsor on Sunday 10 September. His achievement has earnt him some very attractive prizes, including the first prize £300 cheque from the Radiocommunications Agency, together with a conducted tour round the Agency's Radio Monitoring Centre at Baldock, and a Sony general coverage receiver from the RSGB.

Leroy has worked hard to promote amateur radio, firstly through the Scouts and more recently through the Air Training Corps. He actively helps his local amateur radio emergency service, and has managed to re-activate his local YMCA amateur radio club which he helps to run as vice-chairman. He is also a keen contester, and is busily collecting 'parchment'. However, his main interest is packet radio and he has helped to set up a new local BBS system.

The Young Amateur of the Year 1995, Leroy Kirby, GW0ULC.

Runner-up Charles Banner, G7UBA / 2E1CHY.

The runner up is 15-year old Charles Banner, G7UBA / 2E1CHY, from Birmingham. Charles is a GB2RS newsreader, and promotes amateur radio through special event stations, and teaching newcomers on a Novice Licence Training Course. He is a QRP enthusiast, and is also assistant secretary of his school's amateur radio society. Charles has won a £50 cheque from the RA, and will also get a tour round the Agency's Monitoring Station at Baldock.

RSGB VHF / UHF Awards News

ERIC ASHDOWN, G1SDO, has been awarded 432MHz Senior transmitting certificate number 144. Eric already holds 144 and 50MHz Senior awards and qualifies for RSGB Supreme Award number 83.

Robert Tweddell, G1RST, was recently awarded a Standard Transmitting Certificate on 144MHz, 40 countries confirmed (two-way) on 50MHz, 175 squares confirmed on 50MHz, DX 25 country award on 50MHz, 100 squares / 20 countries on 144MHz, and 40 squares / 10 countries on 432MHz.

Another bumper package brought certificates for Colin Redwood, G6MXL, covering 20 countries two-way on 50MHz, 10 squares on 1.3GHz, and a DX 25 countries award on 50MHz.

The achievement of Derek Thoms, G3NKS, in becoming the third person to be awarded the 70MHz 45 squares / 8 countries certificate, illustrates what can be worked on the 4m band. Derek just needs to have a confirmed contact with Cyprus to have worked all 10 possible countries with a 4m allocation.

Congratulations to all award recipients who include:

50MHz. 10 countries G8FDJ, G7ORH, G1EFL. 20c G1HLT. 30c G7GYS, G7KAO, G8CDW. 70c G1SDO, G4FVP, G4SEU. 80c G0LCS. 110c G6HKM.

25 squares G7RUY. 50s G8CDW, G7GGM. 100s G7GYS, G7KAO, G4DCJ. 225s G1SDO, G4SEU. 250s G7BXS. 275s GW6VZW. 325s G8BQX.

DX Award 25 countries G0SOO, G7GYS. 75c G4SEU.

144MHz. Standard Transmitting Award G0GRI.

40 squares / 10 countries G3RHH, G7ORH. 60s / 15c G3FIJ.

432MHz. Standard Transmitting Award G3YHF.

70 squares / 15 countries. G4MKF, G8NEY.

1.3GHz. 50 squares G6HKM. 85s G3XDY.

24GHz. Advanced Award (150km) G6XM/P.

Details of the RSGB VHF / UHF awards are contained in the 1995 RSGB *Call Book* or may be obtained from the awards manager, Ian L Cornes, G4OUT, 6 Haywood Heights, Little Haywood, Stafford ST18 0UR, or tel: 01 889 882262.

On 8 July, Sharp UK held an open day at their factory in Wrexham, Clwyd, to celebrate their 10th anniversary. As part of the celebrations Taizo Arakawa, GW0RTA, Sharp UK Quality Control Centre Divisional General Manager, put on special event station GB4SUK and a display of amateur radio magazines and posters. He is seen here with the Mayor and Mayoress of Wrexham, Mr and Mrs Michael Morris, and on the mic Ian, GW0VML.

Sitting the RAE at College?

THE RSGB MEMBERSHIP Liaison Committee wishes to hear from all those applying for RAE courses or RAE examination places. Please send details of the college applied to, the college's reply, the course fee proposed, and the examination fees charged. Input from non-RSGB members will be welcome. The Committee would also like to hear from individual clubs (whether Affiliated Societies or not) which run their own RAE courses, as to the arrangements made for taking the examination, and what fees (if any) are charged for their course, and for the exam.

This is in order for the Committee to be able to counter cases of potential RAE candidates being discouraged from taking the courses or examination by some colleges. There have been some cases of colleges not returning fees should they decide to terminate the course, or courses being given by members of college staff who know little about amateur radio themselves. In many areas local colleges refuse to provide facilities for external candidates to take the exam. It is hoped that the information provided to the Membership Liaison Committee will provide evidence that there *is* a problem and then give the Committee the weapon with which to fight the case.

All input will be confidential, but the data collected will be presented as a report, initially to RSGB Council. Letters should be addressed to P Essery, GW3KFE, 287 Heol-y-Coleg, Vaynor, Newtown, Powys SY16 1RA.

Amateurs Prosecuted

AT CROYDON Magistrates Court on 14 March, a licensed radio amateur pleaded guilty to the charge of possessing and intending to use an illegal CB set. He was fined £100 and ordered to pay costs of £635. The equipment was forfeited.

And at Barnard Castle Magistrates Court on 5 April, a licensed radio amateur pleaded guilty to using radio apparatus other than in accordance with the appropriate licence. He was fined a total of £150 and ordered to pay costs of £25. A large amount of private mobile radio equipment was forfeited.

These are just two examples of successful action taken against individuals who abuse amateur radio.

Senior Novice Instructors

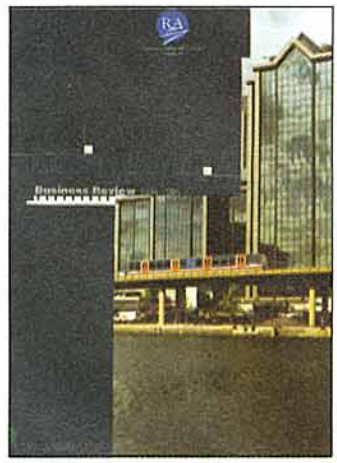
THERE ARE VACANCIES for Senior Novice Instructors in Gloucestershire, Oxfordshire, Somerset and Wiltshire. Anyone interested in taking on these posts should contact the Project YEAR Co-ordinator, Phil Mayer, G0KKL, 16 Haig Ave, Poole BH13 7AJ, or tel: 01202 700903, for more information about the work entailed.

Two new SIs have recently been appointed. They are: for Humberside, Bill Jackson, G0DLL, 22 Cliff Gdns, Oswald Rd, Scunthorpe, South Humberside HU7 0EP, tel: 01724 846441; and for North Yorkshire, Tony Easom, G4OPI, 1 Station Cl, West Ayton, Scarborough, North Yorks YO13 9JQ, tel: 01723 862169.

● IN THE SEPTEMBER *Radio Communication* we congratulated Mr J E Hodgkins, G3EJF, for having attained 50 years of RSGB membership. In fact, Mr Hodgkins resigned in 1993 and we would like to apologise to him for this error.

News from the RA

THE RADIOCOMMUNICATIONS AGENCY is moving from its familiar address of Waterloo Bridge House to the Docklands this month. The move will be completed over the weekend of 14 / 15 October and the new address is: Radiocommunications Agency, South Quay Three, 189 Marsh Wall, London E14 9SX. The new telephone number (General Enquiry Point and Switchboard) is 0171 211 0211.



The RA launched its 1994 / 95 *Business Review* and *Annual Reports and Accounts* on 17 August. Following feedback from customer surveys, the annual report has been split into two separate documents for the first time. Launching the reports, the RA's Chief Executive, Jim Norton, said "we care what our customers think of our service and have introduced a rolling programme of customer surveys by MORI and initiated a series of seminars around the country given by senior Agency management and local staff".

The *Business Review* makes interesting reading: it shows that there were a total of 61,457 Amateur licences as of 31 March 1995, a slight decrease from the year before, although Amateurs still represent the largest single category of licence-holders in the UK. The second-highest group is Maritime licences, which had over 58,000 licences.

The report says that "progress was made on a wide range of issues in relation to amateur radio in our regular discussions with the Radio Society of Great Britain (RSGB). Good progress was made in reviewing the arrangements for packet radio - which is the key initiative currently under discussion".

Copies of the *Business Review* and *Report and Accounts* are available from the RA Information and Library Service - but please note the new address / 'phone number from 15 October.

Left: Barry Maxwell, Director RA Local Customer Services, RIS, Monitoring and Quality Assurance; and right: Jim Norton, RA Chief Executive, at the launch of the RA's 1994 / 95 *Annual Report* and *Business Review* on 17 August.

RSGB Regional Meeting in GM

A FINAL REMINDER that an RSGB Regional Meeting will be held in Inverness on 28 October at 2.00pm. The meeting will be open to all members of the Society and all with an interest in amateur radio.

The RSGB President Clive Trotman, GW4YKL, will be attending, along with other members of RSGB Council, and light refreshments will be available.

The meeting will be held at the Highland Regional Council Local Authority Emergency Operations Centre, off MacIntosh Road in Inverness, and directions or further information may be obtained from the RSGB Liaison Officer, Mrs Elaine Shread, GM7TZT, 15 Hardie Court, Aberchirder, Huntly, Aberdeenshire AB54 5TG, tel: 01466 780739.

● THE RADIO AMATEUR Association of Thailand (RAST) now has the King of Thailand as Patron.

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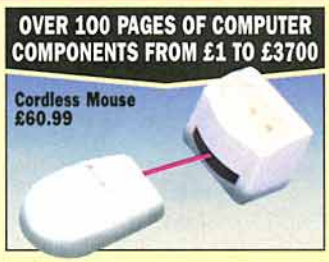

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Congratulations to Richard (Dick) Leeves, G2LV, of South Molton, Devon, who - on 27 September - celebrates the remarkable achievement of 75 years as a radio amateur! At 91 years of age, Dick is still active on the air and has regular QSOs on 80m with a number of operators, including Melly Rawlins, G0BIS, with whom he is pictured here.

International Friendship

WE RECEIVED a long letter for *The Last Word* from Keith Castley, G0FDJ. It was too long for *The Last Word*, but we felt that it illustrated the concept of 'international friendship through amateur radio' so well that it should be published somewhere. Here, in slightly edited form, is what Keith wrote:

I remember the days of 'rubber stamp' QSOs with Russian stations. How times have changed. Now that I am a G0 I have made friends with many people throughout the world. One friend is Vlad Lambrianov, UA6JD, who I have known for around four years. After my first QSO I QSLd direct to him and put a note with my card saying I would like a road map of Russia [Keith is a truck driver by profession - *Ed*]. He sent a map by registered post with a letter telling me how sorry he was that it was not in English and that he was sorry it had taken him some time to locate one. In fact he had to make several phone calls to Moscow from his home in Vladikavkaz, 2000km south, as he could not buy a map there. And the cost? - "nothing: a gift, from your Russian friend".

In the early 1980s Vlad made a start on the RSGB 5BWITUZ award and after around eight years had all the contacts and QSLs required, so in 1989 he sent £17 to the RSGB to get the plaque. £17 is a lot of money for him, as he only earns the equivalent of £3.35 per week, even now in 1995. He received a certificate, but never received the plaque. During those long years of waiting he became very unhappy with the RSGB and tried on several occasions to get G-stations to help him find out what had been the problem. He never received any response and over the years that made him see us in a very different light: he no longer saw us G-stations or the RSGB as 'gentlemen'. When I heard all this from him, I was not going to let the problem carry on any longer and I am happy to say that the situation has now changed for the better.

In September 1994 David, G0PWA, and Jeff, G0AMY, went to Vladikavkaz to visit Vlad. I was later given a 'video letter' which showed Vlad in his shack. The walls are covered in diplomas and plaques and the video showed a space for the missing plaque. That space is now full. I had confirmation from Vlad that he finally received his plaque in the middle of June. We would like to thank Fred Handscombe, G4BWP, the RSGB HF Awards Manager - a very fine man - for all his help, and also Peter Kirby, G0TWW, RSGB General Manager, who finally brought the plaque saga to a close 15 years on - thank you both.

David and Jeff took out a Yaesu FT-757 rig worth £800 for Vlad 'as a gift', and also a Bencher Morse key. Vlad was CW speed champion of the Caucasus at the age of 15, he is now 42 and still loves high-speed CW. Vlad needed a particular plug to fit in the rear of the FT-757, which was impossible for him to obtain in Russia. For me, it just involved one telephone call to my local radio store, Waters & Stanton in Hockley, Essex: did they have the plug Vlad required? I got a phone call straight back and was told no plugs could be sold without the complete lead, which they had ordered for me. I had my credit card ready to settle the bill but there was no charge. When I explained it was going to Russia, Waters & Stanton said "it's free, with our compliments". May I just say even in these tough times 'what a company'! Thank you to all the staff at Hockley.

Vlad now has a very large Union Jack flag hanging in his shack. His faith has been restored in us G-stations and the RSGB. Thank you all gentlemen, from myself and my friend Mr Vlad Lambrianov, UA6JD.

JOTA '95

AS IN PREVIOUS years, the RSGB will be producing an information pack for UK groups participating in Jamboree on the Air, which this year takes place on 21 / 22 October.

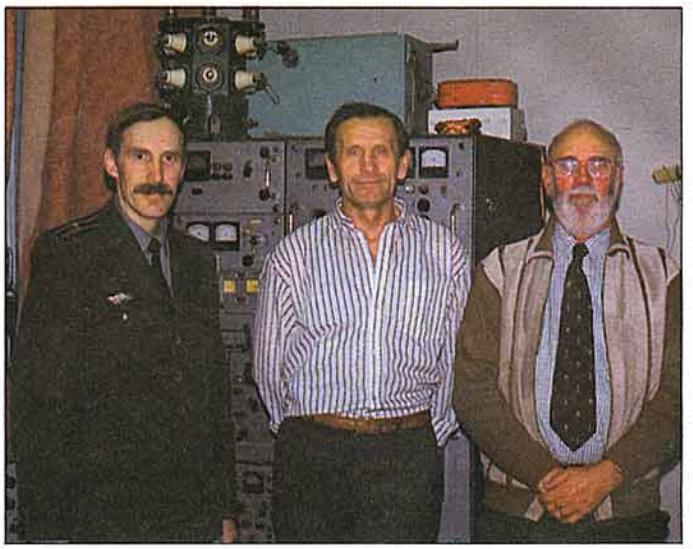
The pack will include a list of known participating stations and details of the countries which permit third-party Greetings Messages during the event. To ensure your club is on the list please send your GB call application to arrive at HQ **no later than 29 September**. Groups using a GX or similar club callsign should notify HQ as well.

If you would like to receive an information pack, please send an SASE (A4 size with 38p in stamps) *as soon as possible* to Fiorina Sinapi at RSGB HQ.

● THE RADIO Amateur Invalid and Blind Club - Northern Ireland wishes to thank members of the Mid-Ulster Amateur Radio Club for their efforts in arranging a street collection on behalf of RAIBC-NI on 5 August. The proceeds of £382.92 will be used to purchase radio equipment in Northern Ireland.

● A REMINDER THAT the GB2RS national news can be heard on the 'phone by dialling 0336 407394. The news is updated on the Wednesday afternoon *before* the Sunday of the GB2RS broadcast and remains available until the Wednesday after the broadcast.

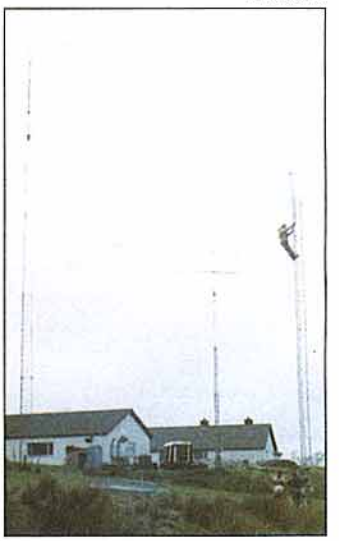
● KEN ROSIER, G3DJK, sends 73 to his old colleagues who remember him as XZ2AF from Burma, fifty years ago: 'QSL to G3DJK or write QTHR'.



Mike Pavely, G3GWD, recently visited Yakutia and met Nick Zinin, RA0UZ, and George Penya, UA0QAS, at the UK0QWA / RK0Q Yakutsk Radio Club station. The club sports full-size 40m 3-element and 20m 6-element beams at 100ft as well as quads and wire antennas. Mike reports he was the first G to visit the club and quite possibly the first G to visit that remote part of Siberia. Above: left to right RA0UZ, UA0QAS and G3GWD.

GI Super Station

IAN KYLE, GI8AYZ



UK CONTESTERS take note! *RadCom* has got wind of a Californian-style 'super station' being built in Northern Ireland. These are the first pictures of the antenna towers going up at the location of Ivor Greenwood, GI0AIJ, in Dundrod, Co Antrim. The unit under construction is a 200ft rotatable tower which will eventually sport stacked HF monoband Yagi arrays. Already completed is a 120ft tower which will also take monoband HF beams. The 'small' tower with antennas already fitted is, in fact, a 60ft tower with a TH7DXX tribander and 2m beam. We hope to bring more pictures of the completed installation in all its glory. Watch this space!

The Role of the EMC Committee

THE EMC COMMITTEE has had discussions with Council and has agreed on a policy to enable us not only to survive into the new century, but also play a part in re-establishing the positive image of amateur radio, which has declined with the coming of push-button global communications.

A major part of the Committee's work has always been to give advice to members so that they can solve their own EMC problems. It is essential that all amateurs realise that EMC is part of the art and science of amateur radio. Minimising all types of interference is a self-training activity just as much as home construction, learning Morse, or writing software.

The Effect of the EMC Regulations

By now everyone must be aware that the new European EMC Directive comes into force in Britain on 1 January 1996. The regulations cover practically all types of electrical and radio equipment sold after that date. The effect of these regulations will not be noticeable for some time but already there is a change in attitude by industry, the service providers and government agencies, to EMC problems.

The two aspects of EMC which interest amateurs are breakthrough (interference caused by the fundamental amateur signal breaking through into a susceptible piece of equipment), and interference to amateur reception.

1. Breakthrough.

Under the new regulations, all domestic equipment will have to have a reasonable degree of immunity to unwanted signals, which is adequate for a typical domestic environment.

2. Interference to Amateur Reception.

The new regulations limit the permissible emissions from all types of electrical and electronic equipment, but since the regulations are framed round large signal services such as broadcasting, the levels are much higher than amateurs would like to see.

3. How This Affects EMC Committee Policy.

In the long run, interference to reception will probably be the most serious threat to amateur radio, and the Committee is putting a great deal of effort into 'behind the scenes work' in this area.

Breakthrough and its social consequences is the most serious problem at the present time, and it is here that the change of attitude is most significant. Since the regulations do not cover the operation of equipment in abnormal EMC environments such as the relatively high field strengths which may exist close to a transmitter, it is reasonable to expected that the immunity of susceptible equipment should be increased by the fitting of 'mitigating measures'(mitigating measures is the official term for devices such as ferrite chokes and filters which are fitted in the external leads of susceptible equipment.)

In cases of breakthrough to neighbour's equipment, the Committee's advice is that the amateur should first look to the layout and operation of their station (good radio housekeeping). Secondly, they should co-operate with the neighbour in determining whether the problem lies in the neighbour's installation, or whether the equipment is functioning normally and mitigating measures are required. The Committee cannot advise on how a member should deal with a neighbour. Many amateurs find that, in simple cases, the easiest way is to lend suitable filters or chokes on the understanding that they will be returned when no longer needed. It is our policy to publicise low-cost chokes and filters, to minimise financial considerations.

Some installations, such as complex alarm or telecommunications systems can only be dealt with by the installer. In a number of cases the Committee has been successful in persuading installers that RF immunity is not only an obligation, but also makes good commercial sense.

Members are reminded that it is most unwise to modify any equipment which is not their own property.

Where a neighbour refuses to co-operate and persists in harassing the amateur, or where neighbour's equipment clearly has much poorer immunity than the levels defined in the regulations, and the neighbour refuses to acknowledge this, then the Society may be able to help. However, each case will have be considered on its merit, and it will be essential to be able to show that the amateur has made a genuine effort to resolve the problem.

The Function of Committee Members

The Co-ordinators.

The co-ordinators give EMC advice to members on the telephone, or by personal contact at clubs and rallies. The co-ordinators role does not include visiting the homes of members.

Most routine EMC problems are dealt with by co-ordinators, whose phone numbers can be found in the *Call Book* and are also published from time to time in *Radio Communication*.

Cases which, for one reason or another, cannot be solved at co-ordinator level, are passed to a Committee member specialising in that type of problem. In practice this usually means cases which involve contact with manufacturers, or service providers or the RA.

The Corresponding Members.

The Corresponding Members provide specialist back-up to the Committee. EMC has become such a complex issue that a wide range of expertise is essential.

Full Committee Members.

Apart from everyday organisational tasks, the full members have two major roles. The first is to deal with the cases passed up to them by co-ordinators. The second, and in the long term the most important, is to ensure that amateurs get the best possible deal in any regulations or codes of practice involving EMC. For this reason the Committee maintains contacts with manufacturers and service providers and has working relations with the RA and other bodies who form policy in the EMC field. Internationally the Committee exerts considerable influence via the IARU.

What the Committee Does for Members.

1. Gives technical advice to members on how to solve their EMC problems.

2. Maintains contact with the EMC groups and committees in other countries, both directly and via the IARU.

3. Carries out investigations to identify products which are potential sources of EMC problems and to bring defects to the notice of manufacturers, and if appropriate, the enforcement agencies.

4. Keeps a watching brief on new technology so that members are forewarned of future problems.

5. Where appropriate, assistance can be given in the preparation of letters or similar documents.

6. Where appropriate, the Committee can request the involvement of the Society's solicitors in the legal aspect of a case.

What the Committee Cannot do for Members.

1. The committee cannot visit members to solve their problems. Visits to members homes are only made in exceptional circumstances.

2. The Committee cannot become directly involved in the social aspects of neighbour disputes.

Radio Pioneers Commemoration

AUTUMN 1995 IS the start of the 75th anniversary what is probably amateur radio's greatest achievement: the discovery, development, and explanation of long distance, shortwave radio communication. The period began in the autumn of 1920, when radio amateurs tried to get signals heard across the Atlantic, and ended in 1925 with the explanation by American radio amateur John Reinartz of how shortwave propagation works.

Amateur radio signals were heard across the Atlantic for the first time in 1921, the first trans-Atlantic QSO took place in 1923 and the first QSO with the Antipodes was in 1924. These were heady pioneering days, for radio amateurs were way ahead of the professionals.

Over the next five years, Rob Micklewright, G3MYM, is planning to commemorate the 75th anniversaries of some of the amateur radio achievements of 1921 to 1925. The first such event is scheduled for the beginning of February next year, and will commemorate the 75th anniversary of the first attempt to get amateur radio signals heard across the Atlantic. These attempts are described in *World at their Fingertips* (p62) and *The Bright Sparks of Wireless* (p26).

● THERE ARE vacancies for RSGB Liaison Officers in Oxfordshire and Gloucestershire. Anyone interested should contact the Zonal Council Member, G3YGF, QTHR. The RLO for Avon, Dave Collins, G4ZYF, has offered to deal with queries from Gloucestershire in the meantime.

● THE INTERNATIONAL Short Wave League (ISWL) has informed us that the new address of their awards manager is: Mr Herbert Yeldham, Belle Fleurs, Wade Reach, Walton on the Naze, Essex CO14 8RG.

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TS-520 - good condition	£325.00	AR-2002 Scanner	£260.00
FT-77 + FC-700/FP-700	£575.00	ERA Microreader II	£110.00
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RADCOM TECHNICAL FEATURE

The Phase 3D Amateur Satellite

Reprinted courtesy of *The Amsat Journal*

A TRULY INTERNATIONAL PROJECT

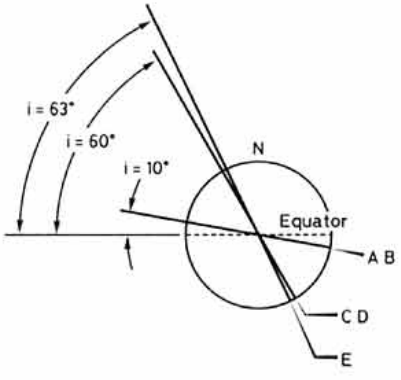
SUCCESSFUL USE OF AMATEUR satellites, OSCARs 10 and 13 require a single multi-mode VHF/UHF rig delivering 50 to 100 Watts (or at least a 2 meter receiver and a 70cm transmitter) and two directional antennas (one for 2 meters and one for 70cm) that can be aimed in both azimuth and elevation. Phase 3D, currently under construction, is aimed at significantly simplifying these requirements plus adding many other modes of operation, ie frequency choices.

A number of specific design features are being incorporated into Phase 3D to make it much more accessible to amateurs throughout the world, as well as more flexible for the years to come. However, in addition to substantially reducing the ground station requirements, Phase 3D is being specifically designed to assist the continued march of amateur radio toward ever higher frequencies - begun in the early 1920s at 200 meters. This is important if amateurs are to retain the use of these bands; which, in the next century, may turn out to be some of the most valuable assignments we have.

As commercial and government communicators have already discovered, satellites can make these upper reaches of the spectrum very useful for communication between widely scattered points on the Earth. In addition, the time may not be too far off when we are using the GHz bands to talk to radio amateurs on space stations, the moon and planets. Phase 3D will give us the incentive we need to begin making more use of these valuable assignments.

Phase 3D is truly international in scope. Not only is it being aimed at bringing satellite operation to within the reach of virtually every licensed amateur in the world, but it is being designed and built by an international team comprising people from some dozen countries. Much of the early conceptual work was done in Germany. Three of the transmitters, which will be aboard, are being built in that country. The 10 meter bulletin transmitter is a product of the South African AMSAT group. The 2 meter transmitter is being designed and built in the UK. A group in Finland is supplying the 10GHz transmitter and its associated antenna. The 24GHz transmitter, along with its antenna, is coming from Belgium. The IF matrix and LEILA (more about this later) is of German design. Receivers are being supplied by groups in Belgium, Germany, Slovenia and the Czech Republic. The propellant tanks came from Russia. What promises to be a very interesting camera experiment is the product of the Japanese JAMSAT group. All of the spacecraft's antennas, with the exception of those associated with the 10GHz and 24GHz transmitters, are being developed by a US team. A group in

	Motor burn	Orbit	Inclination	Distance from Earth (km) Perigee	Apogee
1		A	i = 10°	500	35000
2	I in Perigee				
3		B	i = 10°	500	47000
4	II in Apogee				
5		C	i = 60°	4000	47000
6	Drift without motor burn				
7		D	i = 60°	4000	47000
8	III in Apogee				
9		E	i = 63·4° Stable orbit	4000	47000



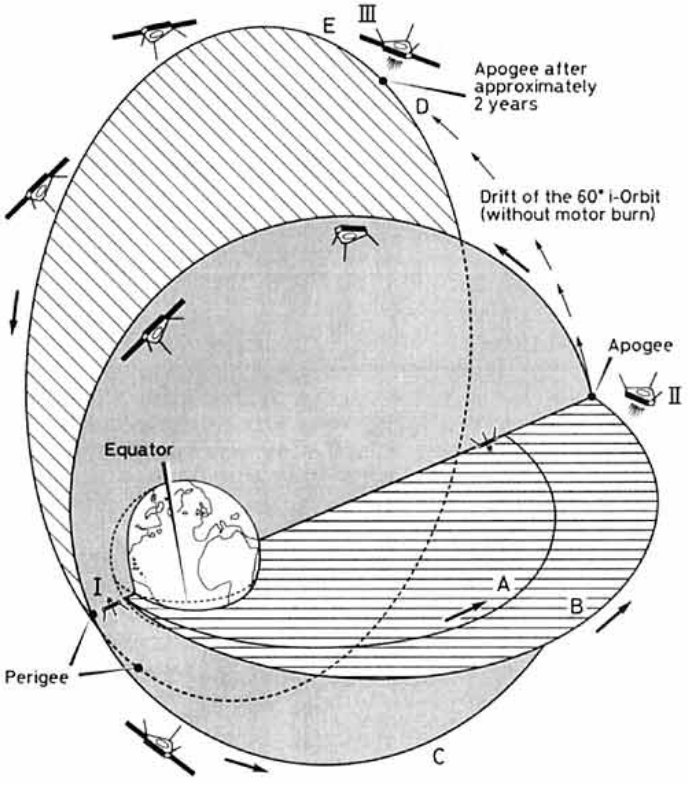
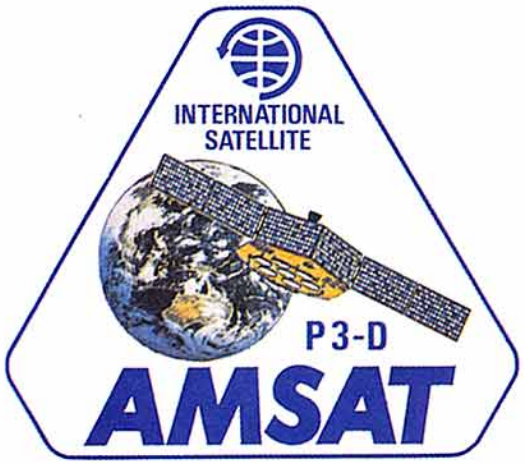


Fig 1: The progressive orbits of the Phase 3 spacecraft.



Hungary is supplying the Battery Charge Regulator and a communications experiment. Construction of the spaceframe and the launch vehicle adapter are taking place in the US where much of the mechanical and thermal design work took place.

Other contributions to the Phase 3D project, from this part of the world, include the design and construction of the GPS subsystem, the latter with some help from Canada. Much of the basic design for the main spacecraft computer, the IHU, came from Germany; but it is being built by a US team with German and British help. In addition, this same group, is also undertaking the design and construction of two other Phase 3D computers. One of these is called RUDAK and the other is a dedicated computer for the GPS experiment. The Arc-jet motor is currently under development by a group at the Institute for Space Systems at the University of Stuttgart in Germany. Radiation testing of various solid state components has been taking place in Canada.

Assembly and check-out of the spacecraft is taking place at a facility set up in Orlando, Florida. Launch, aboard the second test flight of the European Space Agency's new heavy lift Ariane 5 vehicle in April 1996, will be from ESA's launch complex at Kourou, French Guiana in South America.

The PHASE 3D spacecraft will be a secondary payload on the Ariane 5 launch vehicle and the low-inclination initial orbit provided by the launcher must be modified over the course of two years to give optimum world-wide amateur radio coverage as shown in **Fig 1** (see ORBITS in part two). This is done in stages using two propulsion systems; a high thrust liquid rocket motor and a lower thrust Arc-jet system mentioned earlier.

A NEW APPROACH

PREVIOUS AMATEUR SATELLITES have utilised transponders. A transponder can be characterised as a single box which receives signals on one band of frequencies and puts out an amplified replica of these same signals on another band of frequencies. Instead of dedicated transponders, which limit flexibility, Phase 3D will employ the approach shown in **Fig 2.** The satellites communication package will consist of a series of receiver front-ends and transmitter mixer/power amplifiers linked by a common IF. The outputs of any of the receiver front-ends can be connected to the IF Matrix, which in turn can be connected to any of the mixer/power amplifiers - all under computer control. This means that uplinks and downlinks can be set up on any of the bands for which hardware exists on the satellite. This is very important, because no one can say for sure what bands will be most visible for uplinks and downlinks in, for example, 2005 - the year that Phase 3D will be nine years old, and expected to be still going strong. By configuring the satellite in this manner, a variety of circumstances can be accommodated by software loaded from the ground. The expected arrangement of uplink and downlink frequencies is illustrated in **Fig 3** (see page 21). Because of this flexibility to interconnect various receivers with various transmitters; the old 'Mode' designations, which amateur satellites have used for years, has become obsolete. As a result, a new system of designations will be put into use with the launch of Phase 3D. This calls for separate letters designating the various uplink and downlink bands. Each uplink/downlink configuration will employ one or more letters depending on what uplink(s) and downlink(s) are activated. The uplink(s) will come first, followed by the downlink(s), separated by a '/'. The various bands, currently planned for Phase 3D, will be designated as shown in **Table 1**.

Band	Uplink	Downlink
15m (21MHz)	H	None
10m (29MHz)	None	T
2m (146MHz)	V	V
70cm(435MHz)	U	U
23cm (1260MHz)	L	None
13cm (2.4GHz)	S	S
5cm(5.6GHz)	C	None
3cm (10GHz)	None	X
1.25cm (24GHz)	None	K

*The 10 meter transmitter is for furnishing bulletins and similar information only and is not configured to support two-way communications.

Table 1: Phase 3D Band Designations.

Thus, what we currently call 'Mode B' will become 'Configuration U/V'. No doubt, in use this will be shortened to 'Config.U/V'. Because of the flexibility offered by the matrix, combinations such as 'Config.UL/VSX' are possible. (Satellite tracking software writers please take note). Naturally, combinations such as U/U or V/V are not possible because transmitters and receivers cannot be operated simultaneously on the same band.

OVERALL DESIGN CONSIDERATIONS

FOUR SPECIFIC DESIGN features are being incorporated into Phase 3D to provide this

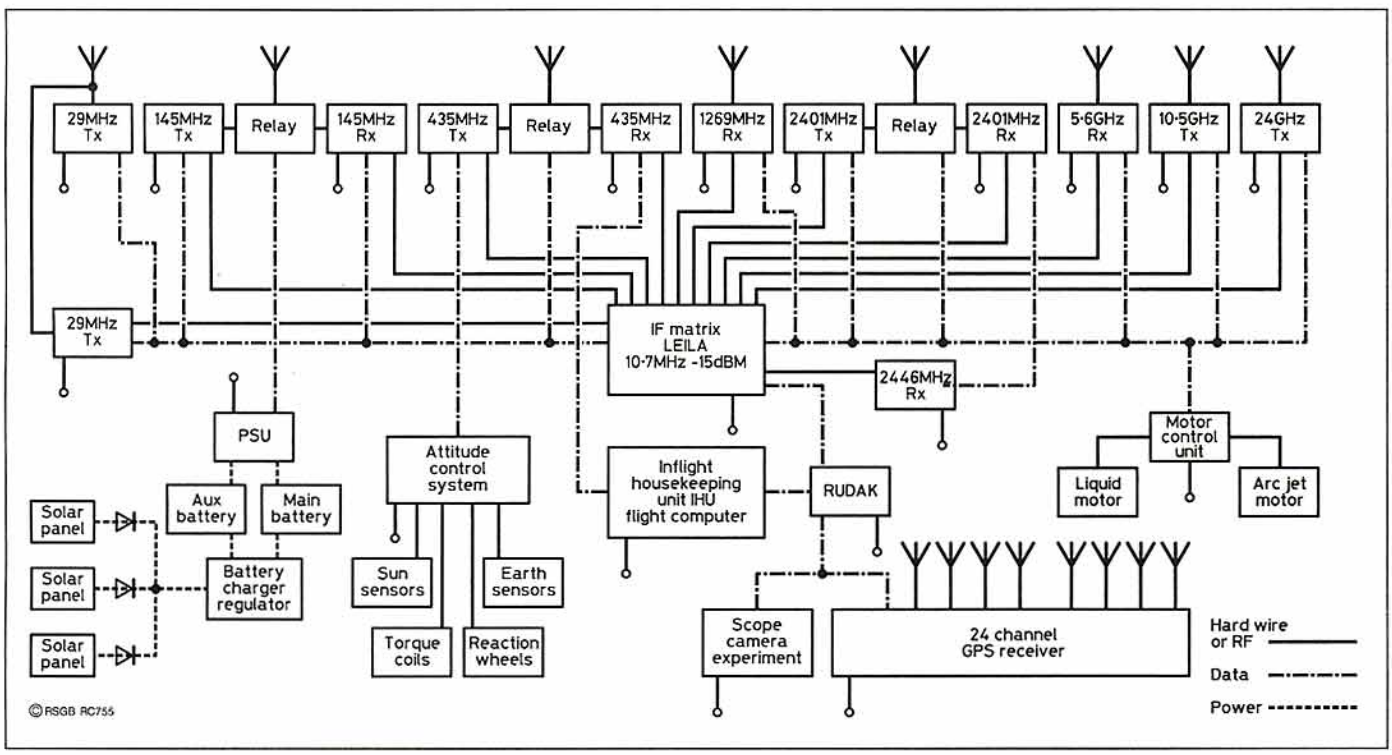


Fig 2: Block diagram of the radio equipment showing the flexibility afforded by this new approach.

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FT-790R2	list £749	our price £625

ICOM

IC-Z1E	list £529	our price £459
IC-2GXE	list £255	our price £225
IC-2GXET	list £279	our price £229
IC-T22E	list £259	our price £229
IC-T42E	list £269	our price £269
IC-W31E	list £469	our price £419

KENWOOD

TH-79E	list £479	our price £419
TH-22E	list £254	our price £219
TH-42E	list £289	our price £249
TH-28E	list £319	our price £279
TH-48E	list £369	our price £319

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HL166V	6M Linear, 3/10W in Auto select 80/160W out Rx Preamp	299	C
HL37VSX	2M Linear, 0.5-5W in 20-35W out variable gain preamp	109	B
HL62VSX	2M Linear, 5/10/25W in 50W out preamp	235	C
HL36U	70cm Linear, 6/10W in 25/30W GaAs FET Preamp	155	B
HL63U	70cms Linear, 10/25W in 50W out GaAs FET Preamp	259	C
HL180V	2M Linear, 3/10/25W i/p auto select 170W out Rx Preamp	389	C
HL130U	70cms Linear, 3/10/25W i/p auto select 120W out Rx Preamp	485	C

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USED EQUIPMENT*

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PX	FT1000	HF Transceiver with additional Sub RX	£2,595.00
PX	FT757GX11	HF TX/RX Gen Cov RX	£675.00
PX	TS130S	HF 100 Watts with Ext VFO	£395.00
PX	FTONE	HF Transceiver Gen Cov RX	£750.00
PX	FT980	HF 100W gen RX/TX ham s/h	£925.00
PX	HT180	HF 10W 80mtr mobile SSB/CW s/h	£289.00
BX	FT747GX	HF Transceiver	£449.00
BX	FT901DE	HF Transceiver	£449.00
LX	FT101B	HF Transceiver	£275.00
LX	FT101E	HF Transceiver 6 Band	£325.00
LX	FL7000	HF linear, boxed	£1,650.00
LX	FT890AT	HF Transceiver, boxed	£1,250.00
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RX	FT757GX	HF Transceiver with 6 mtrs fitted	£975.00
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FS 711U	Hansen SWR meter 430-440MHz 5/20W	£35.00	B
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FS20 DL	Hansen SWR meter 3-150MHz 1/10W	£35.00	B
FS 20D	Hansen SWR meter 3-150MHz 5/20W	£35.00	B
	FS 20D & DL have built in dummy leads		
FS 710V	Hansen PEP SWR 50-150MHz 15/150W	£75.00	B
HT 180	Tokyo 80m SSB/CW QR & transceiver 10W PEP	£279.00	C
HT 106	Tokyo 6m SSB/CW transceiver 10W PEP	£319.00	C
HP 100S	Tokyo matching PSU for HT transceivers	£69.95	C
432/17X	Met 34 ele crossed 70cm Yagi	£59.00	C
70/3	Met 3 ele 4m Yagi	£35.00	C
144-4	Met 2m 4 way power splitter	£29.00	B
UGP/2m	2m grand plane antenna	£15.00	B
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PX	IC900E	2mtr / 70cms / Head Display complete	£475.00
BX	FT203R	2m Hand Held	£119.00
BX	TS700	2m All Mode base TX/RX	£289.00
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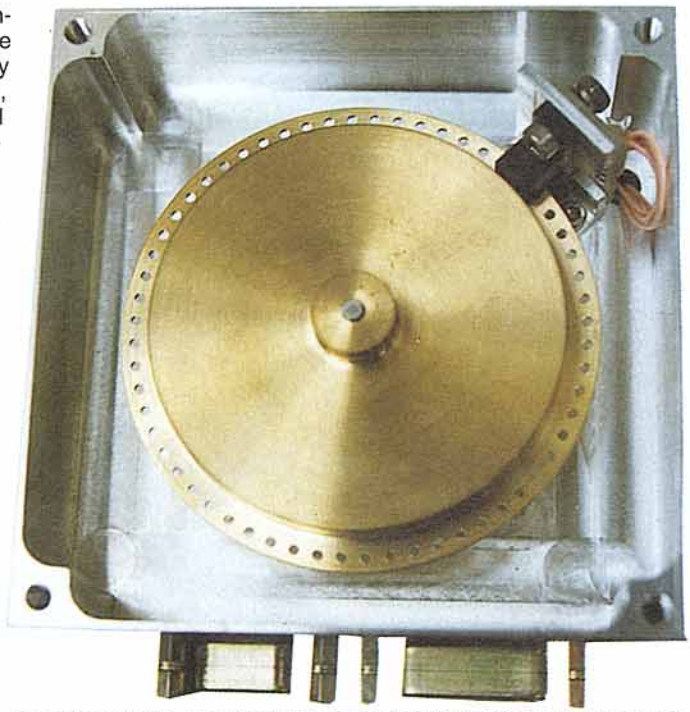
Carr A = £2.50 B = £5 (handies) C = £9.50 (mobiles) D = £13.50 (base stations) E = £16.50

greater ease of use and to increase its flexibility. First, the transmitters will have significantly higher output powers. Second, the antennas on Phase 3D will have higher gain than their cousins on AO-10 and AO-13. Third, the antennas on Phase 3D will always point toward Earth. Both OSCARs 10 and 13 were designed to be spin stabilised in inertial space. Therefore, for one part of the orbit, the 'high' gain antennas might be oriented toward Earth. However, for the rest of the orbit, they are pointed out into space. In order to provide some operation during this time, both satellites include low gain antennas.

Not surprisingly, the 'high' gain antennas are used near apogee and the low gain antennas near perigee. But there are lots of times when neither set of antennas is optimum. Of course, since the failure of OSCAR 10's flight computer, it has not been possible to orient it, so its low gain antennas are used at all times. **Table 2** shows how Phase 3D compares with OSCAR 13 when that satellite is using its 'high' gain antennas.



Example of an attitude control momentum wheel for the micro-satellite system developed by Natheneal Chabert, UoSAT.

Keeping Phase 3D always orientated toward Earth is a major undertaking in itself. Just meeting this one objective, adds considerable complication to the spacecraft's design. First, the satellite must 'know' its orientation with respect to space and then calculate its orientation with respect to earth - depending on its location in the orbit.

To determine its spatial orientation, two approaches are being taken. The primary one employs Sun, and Earth sensors.

A secondary, experimental system involves the use of signals from the GPS satellites. This makes use of the phase difference between GPS signals arriving at different points on the spacecraft.

However, merely determining the orientation of the satellite is only part of the problem. Once this is known, it is necessary to do something to correct for the continual misorientation caused by the satellite traversing its orbit as well as smaller drifts that build up over time. The way most of the big geostationary TV satellites do it is to use gas jets to keep the satellite in the right attitude as well as in the right orbit. When their stored gas is used up, their useful life is over. In fact, depletion of their stored gas is the principal cause of the demise of geostationary satellites. In addition, most big TV satellites spin. This is done primarily to keep one side from becoming too hot and the other too cold. Their antennas are mounted on platforms which are driven by motors which turn at the same speed as the satellite's spin, but in the opposite direction. In this way their antennas are always aimed toward Earth.

In order to obtain as long a life as possible for Phase 3D, it was decided early-on that some means, other than stored gas, had to be used to provide continuous orientation of the satellite. The method adopted employs a set of spinning wheels. The momentum, associated with the spin of these wheels, reacts to reorient the satellite. Proper operation of this system is essential if Phase 3D is to meet its main objective of bringing satellite operation to many more radio amateurs on the ground.

ATTITUDE CONTROL SUBSYSTEM

AS STATED ABOVE, Phase 3D differs from previous OSCARs in that it can maintain any desired pointing angle (attitude). This is accomplished through the use of a complex attitude control subsystem. During normal operation, the pointing angle will be adjusted continuously throughout the orbit to cause the antennas on the top of the spacecraft to point towards the centre of the Earth. The other degree of freedom (rotation of the spacecraft about the antenna boresight axes) will be used to maximise the amount of sunlight illuminating the solar panels.

All pointing operations are continuously operated by the main onboard computer, the IHU or Integrated Housekeeping Unit. During the times of motor firing, the computer will direct orientation of the spacecraft such that the motor thrust points into the correct direction. The mathematical calculations to compute the necessary angles are quite involved. Fortunately, because these same kind of computations were also needed for OSCARs 10 and 13, the necessary programming already exists. Thus, it is planned to draw heavily on this existing software.

The attitude Control Subsystem hardware consists of:

- A set of three magnetically suspended, orthogonally mounted reaction wheels.
- A complement of Earth and Sun sensors and associated electronics.
- Two rings of electromagnets, the field of which can be stepped through six directions.
- Six nutation dampers and the Inflight Housekeeping Unit (computer).

All of these components are necessary to achieve successful attitude control. Basically, the three reaction wheels store the momentum to provide the spacecraft with some intrinsic attitude stiffness, like any gyro system - or a spinning spacecraft. But because the momentum now is in the wheels, the spacecraft itself can remain at a fixed attitude.

Because there are three wheels, mounted 90° to each other, it is possible to redistribute momentum between the wheels by simply controlling the individual speed of each. Since the initial momentum of the spacecraft is conserved, and thus fixed in space, the only way a redistribution of momentum can take place is by the spacecraft itself changing its attitude. As previously stated, these wheels employ magnetic bearings, thus eliminating the problems inherent with lubricants in space, or the frictional wear which might occur with conventional bearings over the expected 10 to 15 year life of the spacecraft. The reaction wheels are a joint project of the University of Darmstadt, and the University of Marburg in Germany and are nearly complete and ready for test. Each wheel is expected to consume about 5W of power for a total 15W.

In order to effect the attitude control, the IHU computer requires data on the current actual attitude of the spacecraft with respect to inertial space. The aforementioned Sun and Earth sensors will be used as primary references to obtain this information. As stated earlier, it is also planned to be able to employ information from the GPS subsystem to determine spacecraft attitude.

It is unavoidable that solar radiation pressure exerts a small, but finite, force on any spacecraft. It would be very unusual, and fortuitous, if this force were to pass through the centre of gravity of the spacecraft. Thus, this misalignment of radiation pressure causes some small amount of torque to act on the satellite. This 'nuisance' torque must be compensated for in some way or the wheels would have to be driven at an ever increasing speed. This eventually would lead to disaster, unless some means is provided to get rid of this accumulated torque. In Phase 3D, this 'momentum dumping' will be achieved against the Earth's magnetic field with the two ring electromagnets.

Their operation is similar to the magnetic torquers in AO-10 and AO-13. Of course, the IHU computer needs a strategy to regularly dump momentum by this system. The algorithms are not very much different from those of the above mentioned satellites. Additionally, since Phase 3D will be spin stabilised during its early life in orbit, including its first motor burns, it, like AO-10 and AO-13, will have the need for nutation dampers. The units to be used on Phase 3D are residual hardware from these earlier projects.

This magnetic torquing system consists of two hexagonal rings of magnets with a total of 12 wound rods. The two magnet rods on each

side are in series, with a parallel connection to the two rods on the opposite side. This allows for a total of three magnet combinations, each one of which is switched to send current in either of two directions by the IHU. Thus, six possible polar conditions are available. As the rods are computer controlled, they can be quickly switched to take care of spinning conditions. Their total power dissipation is about 10.7W. The rods are operated at about 1.2 Tesla flux (12,000 Gauss).

These torque rods and their associated hardware are complete and awaiting installation into the spacecraft.

From this description, it should be clear that quite a sophisticated system is necessary to maintain optimum antenna pointing for the amateur radio payloads as well as to achieve a high level of power generation by the solar arrays.

THERMAL CONTROL SUBSYSTEM

THREE AXIS STABILISATION carries with it another consideration. As stated earlier, the TV-sats spin in order to keep any side from getting too hot and the opposite side too cold. As noted earlier, once in its desired orbit and orientation, Phase 3D will not spin, but will be orientated in three-dimensional space, with the antennas continually facing Earth. This continual attitude adjustment, with one side facing the Sun, causes some interesting thermal design problems. The Phase 3D solution to overcome most of these problems is through the use of the four heat pipes. A heat pipe is a thermal linkage of very high conductivity consisting of a closed, evacuated tubular chamber with walls lined with a wick and partially filled with a pure fluid. The fluid used in Phase 3D is anhydrous ammonia. The fluid is vaporised at the hot end. The vapours then move through the hollow core of the tube, and condense at the cold end; from which the resulting liquid is returned through the wick to the hot end by capillary action. By this process, heat is transported from the hot to the cold end. Heat pipes typically offer heat transport characteristics that are many times greater than the heat transfer capability of the best heat conducting materials, while maintaining an essentially uniform temperature. The process requires no power and operates satisfactorily in a zero-gravity environment.

In the case of the Phase 3D spacecraft, the internal ring-shaped heat pipes can be likened to a meat-cooking rotisserie, removing heat from one part of the spacecraft and redistributing the energy to other parts where it is ultimately transported through the sides of the spacecraft and thence radiated to space - the ultimate 'heat sink'. What is felt to be a unique feature of this heat pipe system, as employed on Phase 3D, is that none of the pipes come in direct contact with space-facing panels. Instead they depend upon indirect re-radiation of the heat from internal equipment mounting panels to side panels that are deliberately allowed to become cold. All along, however, the electronic equipment modules maintain their desired temperatures because of the thermal influence of the heat pipe system, regardless of whether those modules are mounted on the solar heated side, or on the space-cold backside of the spacecraft.

The earlier Phase 3A, B and C satellites employed several multilayer thermal insulation blankets to assist these spacecraft through the thermal rigours of spaceflight. Quite simply, such blankets are a first-class nuisance to fabricate, as the required assembly technology is very exacting. In the case of Phase 3D, the side panels of the spacecraft will be painted black to provide heat rejection. The top and bottom panels will be mostly solar energy absorbing metallic finishes of several different types, depending upon the location and desired temperatures of that section of the spacecraft. In general, the thermal design calls for the mean spacecraft temperatures to be between -5° and +20°C for the expected range of Sun angles (beta) from -80° to +80°.

Extensive computer thermal analyses of the Phase 3D spacecraft have given us a very comfortable confidence that this design will provide the desired results, without the use of the kind of thermal blankets used on most other satellites including AO-10 and 13. These thermal analytic computations were accomplished on a home computer of the 80486-DX2/66 class; a process that required crunching through numbers for 10 to 13 hours (3 hours once a Pentium 90 was on line) at a time to produce a series of temperature performance curves.

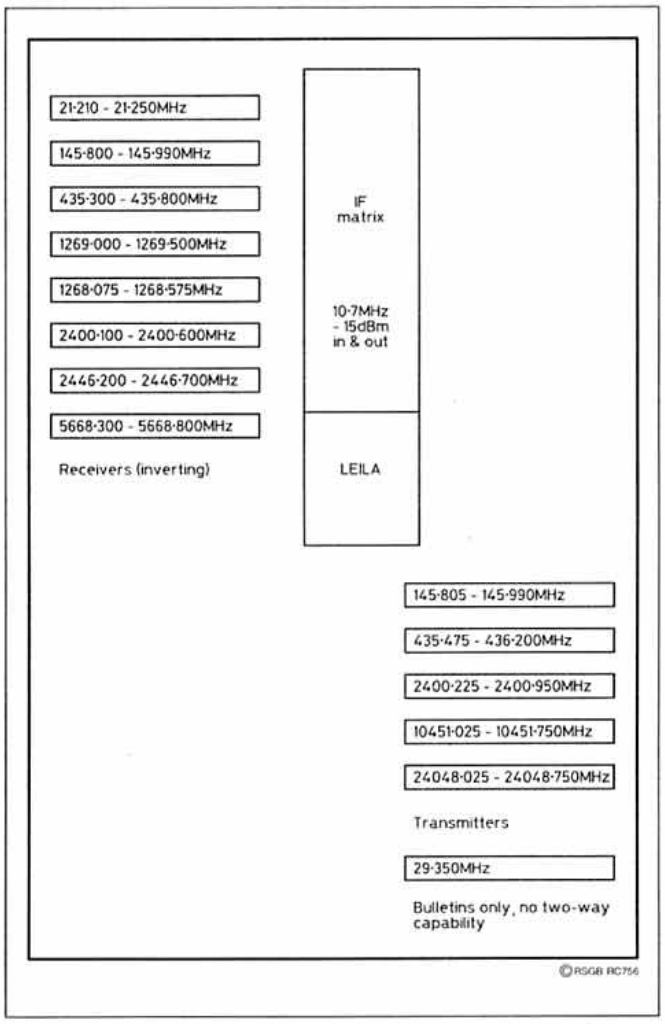


Fig 3: The expected arrangement of uplink and downlink frequencies.

MORE POWER NEEDED

AS STATED, one of the design features intended to make Phase 3D more accessible to smaller ground stations will be the use of higher power transmitters. This increased power carries with it another set of problems. First, the power must be generated. This means more solar array area. To achieve this, Phase 3D willemploy four deployable solar panels in addition to the two mounted on the spaceframe. This will be the first use of deployable panels on an amateur satellite. Of course, deployable panels means mechanisms to initiate the unfolding plus appropriate hinges and latches to achieve the desired final configuration. The answer to the right type of hinge was found at the entrance to German bistros, the same kind of device seen in old-style western saloons - the cabaret hinge. This type of hinge is able to swing both ways but always return to the desired centre position. One of the German members of the Phase 3D Design Team first suggested the use of this type of hinge, and actually obtained one at a German hardware store to demonstrate the utility of the principle on the model of the former Phase 3D 'Falcon' spacecraft design. As there is not the luxury of a lot of excess space around the current Phase 3D spacecraft when installed in the Ariane 5 launch vehicle, this hinge design had to go through several gestations in order to achieve the desired device in a compact manner. This effort included finding a spring wire able to withstand the metallurgical and thermal rigors of anticipated operation at temperatures as low as -100° C. ♦

Downlink	AO-13			P-3D			
	Xmtr pwr W	Ant gain dB	EIRP W	Xmtr pwr W	dB	Ant gain dB	EIRP W
2m	50	5.5	180	130	11	9.7	1,700
70cm	50*	9.5	300	250	15.3	14.5	8,471
13cm	1	9.0	8	50	19.5	27.4	4,456
3cm	—	—	—	50	20	—	5,000
1.25cm	—	—	—	1	20	—	100

*This transmitter is no longer functioning.

Table 2: Comparison of Transmitter PEP and Antenna Gain for Phase 3D and OSCAR-13.

... to be continued

HF NEWS

JOHN ALLAWAY, G3FKM
10 Knightlow Road, Birmingham B17 8QB

A REQUEST for help has arrived from Ray Parsons, G3MTL, who writes that Richard Kingston, 9N1RHM, (in **Nepal**), would like to arrange regular (weekly) schedules with G stations. Anyone interested should please contact G3MTL (QTHR), tel (office) 01706 229909 or (home) 01942 818940. Ray says there have been problems with 9N1RHM QSLs becoming 'lost' and he recommends that cards and IRCs etc are wrapped in a sheet of plain white paper in a sealed envelope. Please do not mention the callsign on the envelope!

BEACON NEWS

MARTIN HARRISON, G3USF, (who is IARU Region 1 IBP Co-ordinator) reports that ZS1J is now operating a 1.8MHz beacon from his site at Plettenburg Bay at the southern tip of Africa. The frequency it uses is 1.817MHz and it runs 1W into a half-wave antenna which runs east-to-west. His 28.2025MHz beacon now runs continuously with 5W into an end-fed vertical. The power will be increased to 50W soon. LA4TEN is a new beacon on 28.211MHz from JP20 which appears to be running 250W ERP and has been putting a very strong signal into the UK during Es openings this summer while testing prior to moving to a permanent location. Finally, DL0AGS was scheduled to begin a 24 hours service on 18.110MHz from Kassel in August.

John Troster, W6ISQ, who is IARU IBP Co-ordinator reports that as of 1 August, 1995, eight of the nine 14.1MHz NCDXF/IARU beacons in the International Beacon Project were reported to be in operation. The Hawaiian beacon, KH6O/B, was off the air temporarily awaiting a new callsign. Under the present operating plan, these nine beacons will be replaced with new five-band beacons. After that, an additional nine five-band beacons will be distributed to new locations making a total of 18 beacons in all. It is hoped that these will be located in **United Nations, NY (4U1UN/B)**; in Canada (VE8); **USA W6WX/B**; **Hawaii**; New Zealand; Australia (VK6); **Japan (JA2IGY)**; China; Russia; Sri Lanka; **S.Africa (ZS6DN/B)**; Kenya; **Israel (4X6TU)**; **Finland (OH2B)**; **Madeira (CT3B)**; **Argentina (LU4AA/B)**; Peru; and Venezuela. Those in bold type are already on the air.

EXPEDITIONS

IN LATE October/November members of the Whitton Amateur Radio Group will be departing for a DXpedition to the **British Sovereign Bases on Cyprus.** Their callsign will be ZC4DX and they will be active from 24 October until 6 November. They will take part in the multi-operator single transmitter category of the *CQ* WWDX SSB Contest over the weekend of 27/28 October. Their equipment will cover all bands from 1.8MHz to 2.4GHz. The HF group will have access to the Base's 3-ele triband beam at 70ft as well as a 2-ele Yagi for 7MHz. Antennas for 1.8, 3.5, 10, 18, and 24MHz will be taken from the UK together with a full legal power linear. A substantial effort will be made to use the more wanted bands/modes including 1.8MHz and RTTY. The VHF/UHF group will have a fully equipped satellite station and the visit will coincide with planned EME operation from VE3ONT. Further information is available from Internet at DX @ VASEK.DEMON.CO.UK or David Bowman G0MRF @ GB7DEO #37.GBR.EU. The same group visited the Gambia last year and operated as C56DX. A total of more than 8,000 QSOs was made and a lot of interest found particularly when operating on other than 14 and 21MHz - the same procedure will be followed this year.

DL4MFM, DJ5BA, DK7ZT, and DL8OBO will be visiting **Kirghizstan** between 25 October and 1 November, according to *RSGB DX News Sheet*. Mario, DL4MFM, has offered to take any cards for EX stations in view of the very poor mail service. His address is: Mario Fietz, PO Box 1206, D-49126 Wallenhorst, Germany (to arrive *before* 24 October).

BAND REPORTS

Many thanks to G2HKU, G3GVV, GJ4GG, GW4KGR, and the UK DX Packet Cluster (via G4PDQ) for input this month. The period covered was mid-July to mid-August. Callsigns in italics were of stations transmitting on CW:

1.8MHz

0000	*VE1ZZ, 4S7RPG, 9K2MU.*
2100	*SV8ZS, ZS1JK, 5A1A, 9J2JA, 9M8FC.*
2200	*OK1EE/OD5, V5/ZS6YG, VK6VZ, 9M2AX.*

14MHz

0600	ET3RF, FO5IW, TI9JJP, VK9NS, ZK3RW, 3D2AJ.
0700	AH8A, *FO5JR, FR5SH/G,* JY1, KA3HMS/KH3, NH6XM, KL7BP, TT8AB, *ZK1BN,* 5W1MH, 5Z4RS.
0800	KH3AF, FO5OK, *J28JA,* S92YL, 5A1A, 5W1MD.
0900	AA4VK/CY9, JT1FAS, R1/N9FNQ/FJL, WL7DU.
1500	ET3AA, HS0/G4UUAV, V85BG, VK9CJ, 9M6EL, 9M8DB.
1600	AP2AL, BY5RT, E21CJN, KL7XD, *R1FJZ/FJL,* S21YE, SU1AY, YE50RI, *3B8/NK6E,* 9M8DJ, 9N1RHM, *9V1WW.*
1700	HL0Y, HS7AS, JT1KAA, V51BO, VU2JPS (Andaman), 9M2/G3NG.
1800	H5ANX, TU2DP, ZD7CTO,ZD9BV, 3V8BB, 5H3MZ, 9Q5TR.
1900	A22RV, A71EA, D3T, PY0ZFB, TR8IG, VP8CRT, 5X1MA.
2000	A61AN, JA, JY1, JY74Z.
2200	KP2/VS6CT, S0RASD, *T31JE,* TI9JJP, TZ6AK, 4U/KC0PA.

18MHz

0800	OD5SE, *TT8NU, 3B8FG,* 5B4XF.
0900	HV4NAC, *VU2PAI,* YI1RS, *ZA1AJ, 5A1A, 7P8SR.*
1100	BV2KI, CN8MC, *H44XF,* PJ8AD, *9Q5MRC.*
1300	JA9AA, OX3LX, *V85FC,* YB2ARW, YS1ZV.
1400	D3T, JA5XAE, *JT1CO,* XX9GD, 5A1A.
1600	TL8LS, *TR8DF, TY1AJ,* 9Q2L, *9M8FC.*
1700	D2TT, *KH6CC, S92SS,* VU2BIX, Z21CS, 9G1BS, *9Q5MRC.*
1800	D44BC, FY5GF, KP2/VS6CT, PJ8AD, ZA1E.

DX IN FOCUS

A VERY SIGNIFICANT operation took place under the patronage of HM King Hussein, JY1, from **Jordan** at the end of July when 4X6TT, 4Z4DX, 4X4DK, 4X6ZK, and 4X6RE operated together with Jordanian amateurs as JY74Z and JY74X to celebrate the first anniversary of the Washington Declaration. The group made more than 17,000 QSOs and one of the operators was JY1 himself.

Radio amateurs in the tristate area around Cincinnati, Ohio, will be active during the 1995 'Tall Stacks' celebration between 11 and 15 October. The special stations will be using the /TS suffix. The sponsoring club calls will be K8SCH/TS and W8VND/TS. They will operate on all modes/bands and special QSLs will be issued showing historic steam paddle boats. QSL to North American *Call Book* 1995 addresses or via the bureau for any station.

The Frankford Radio Club members of Team Antigua will be active as V26B from **Antigua** this year. They will enter the *CQ* WW SSB Contest at the end of the month in the multi-operator multi-transmitter category. Individual members will be active before and after the contest. They are: V26A (N3BNA - QSL via WB3DNA); V26B (WT3Q - QSL via WT3Q); V26DX (N3ADL - QSL via N3ADL); V26E (AB2E - QSL via AB2E); V26R (KA2AEV - QSL via KA2AEV); V26T (K3MQH - QSL via K3MQH); V26U (WA2UDT - QSL via WA2UDT); and KF3P whose V2 call was not known at the time of writing. If you work V26B on all bands 3.5 to 28MHz you will qualify for a certificate of appreciation. If you work the station on all bands 1.8 to 28MHz you will receive an extra special certificate - just send your QSL requests to WT3Q for processing.

DL1FDF is operating a low power expedition across Canada which is due to finish on 16 October. His callsign is VY1QRP and he will use the customary QRP frequencies of 3.560, 3.690, 7.030, 7.090, 14.060, and 14.285MHz. According to *RSGB D X News Sheet,* TI9JJP will be on the air from **Cocos Is** between 4 and 20 October.

28MHZ COUNTRIES TABLE

G0AEV	123
G4OBK	104
G0DNV	90
G0MCT	55
G0NQC	41
GJ4GG	36
G3XBM	32
G3ING	30
G2FQR	20
GM4CHX	20

1995 WARC BANDS TABLE

	10MHz	18MHz	24MHz	Total
G4YVV	73	103	60	236 (CW)
G3ING	77	84	34	195
G0DEZ	75	55	36	166
GJ4GG	47	56	27	130
G4OBK	17	39	17	73
G4CMZ	21	18	29	68
G0SKW	33	26	7	66
G4FVK	16	34	10	60

The *RSGB DX News Sheet* also reports that 3W8FM was due to return to Russia from **Vietnam**. His home call is UA0FM. He will be returning to 3W during October and will be active until May 1996 mostly on CW on the LF bands. Another station, 3W1AS, has been reported on from Hanoi on 14MHz CW. It seems that the HZ1HZ logs between October 1994 and May 1995 have been mislaid and N7RO is unable to supply QSLs until they are found. DK9LM (ex-TA1ZE) is now in **Laos** - he will stay there for another 15 months and will try to get a licence. VU2JPS is now reported to keep a schedule with F5PYI between 14.195 and 14.210MHz between 1600 and 1800UTC.

The latest on **Scarborough Reef** is that an ARRL Bulletin dated 26 July said that the ARRL Membership Services Committee (MSC) had voted to remove from the Awards Committee Standard Operating Procedure the words "thus it requires a favourable recommendation by the DXAC to initiate a country status review by the Awards Committee". All Directors were present at the meeting and the overriding feeling was that the Awards Committee should review negative as well as positive country status recommendations of the DXAC. On 25 July the ARRL Awards Committee voted unanimously that Scarborough Reef *should* be added to the DXCC list under Point 2 (a) of the Countries List Criteria. Under procedures established by the ARRL Board and because the chairmen were not able to agree on a compromise there is an automatic appeal. The two committees will report the reasons for their votes to the MSC to the full ARRL Board who will ultimately decide the matter.

The *Long Island DX Bulletin* reports that VP8CGC who is located at Faraday Base in **Antarctica** is often found between 14.280 and 14.290MHz and that VP8CQS - who is in the **South Shetland Is** - frequents 7.004MHz around 2100 and 7.050MHz at 2145.

The recent operation by some Ukrainians from **Libya** took place from the Youth International Club in Tripoli and during their stay they trained two local operators. *RSGB DX News Sheet* reports that JF2EZA (who is QSL manager for 3V8BB) has told DL7HUR that the logs for the period 14 January to 29 April have been lost in the mail. F5IBZ is in **Kenya** for 18 months and is on the air as 5Z4BZ. According to *DXPRESS*, TZ6VV has a problem because 50MHz is not available to amateurs in **Mali**. However, there is a pirate 'TZ6VV' operating on 50MHz and all are asked to avoid working this illegal station. The genuine TZ6VV operates on 14, 21, and 28MHz using an R5 vertical antenna. However, he hopes to have a tower and Yagi up by autumn and be on all bands - including 1.8MHz. *DXPRESS* says that 9Q2L as put up an inverted-L antenna for 3.5MHz and has been heard in Europe. His favourite frequency seems to be 3.505MHz at 2030 and he listens up. It seems that Robert, 3B9FR, on **Rodriguez Is** is active once more and has been heard in the USA on 10MHz. N5TP was due to return to the **Chagos Is** last month and will be there for four months.

G3MTL reports that regular 'check-ins' into the 'Lazy Net' (which takes place on Saturdays and Sundays on 14.184MHz between 1330 and 1730) include BV, VK, 9M2, 9M8, YB5, 9N1, AP2, A4, A9, 9K2, OD5, 9G1, TU2, XT2, 4S7, TJ1, 5Z4, 5H3, 3B8, V51, ZS, ZD7, TF, JX, etc. UK stations should break-in by calling one of the strong European stations - OE3WAC, OH3GZ, or DL7FT.

Joe, W7LPF, has written to announce that he has all logs for his K7LRO, W7ZQV/7, W7ZQV/KG6, W7LPF/4 (Fauquier Co), W7LPF/DU2, CT1DKG/CR7DKG, W7LPF/4 (Orange Co, Va), and HB9IBA activities. QSLs can be requested from W7LPF via the W7 bureau for all activity prior to HB9IBA or to Joseph Lutz, US Mission - Geneva, Dept of State, Washington, DC 20521, USA.

Three ZD8 stalwarts (from left) Andy Chadwick, ZD8VJ (G4ZVJ); Jim Neiger, ZD8Z (N6TJ); and Mike Wadsworth, ZD8M (G3UOF), enjoy some refreshments between pile-ups in the Volcano Club, Ascension Island.

QTH CORNER

F5NOD/P	(EU-105) Gil Gautier, Le-Fontenau 38440, Moidieu-D, France.
TI9JJP	Jose Pastora, PO Box 330, 1000 San Jose, Costa Rica.
TY9G	LA8G, v/Morten Antonson, PO Box 5626 Moellenberg, 7027 Trondheim, Norway.
VK1	QSL Bureau GPO Box 600, Canberra ACT 2601, Australia.
VP8CQS	Andrej Frotha, ul Mikolaja Gomolki 5 m 1, 80-279 Gdansk, Poland.
ZC4DX	via G0MRF, D Bowman, 31 Benson Close, Hounslow, Middx TW3 3QX.
5A1A	(CW) via LZ2UA, Vlad Vladov, Box 100, 5600 Troyan, Bulgaria.
5A1A	(SSB) via OM3JW, Horecky Stefan, Mlynska 2, Stupava, IBV 900 31, Slovak Republic.
9M2/G3NUG	G3NUG, Further Felden, Longcroft Lane, Felden, Hemel Hempstead, Herts HP3 0BN.
9N1RHM	Mr R Kingston, PO Box 10810, Kathmandu, Nepal.

AWARDS

WORKED ALL YUGOSLAVIA

This award, the WAYUG, is issued to those who have contacted all call areas in the Federal Republic of Yugoslavia since 9 May 1992. The areas are YU1, YU6, YU7, and YU8. All other prefixes issued to Yugoslavia (YT, YZ, 4N, and 4O) are also valid. European applicants need five QSOs with YU1, five with YU7, and one with each of YU6 and YU8.

A contact with the SRJ HQ station YU0SRJ can be counted as a substitute if necessary. Send a certified list of stations contacted, plus 10 IRCs to: Savez radio-amatera Jugosavije, Award Manager, PO Box 48, YU-11000 Beograd, Yugoslavia.

HEARD ALL YUGOSLAVIA

Called the HAYUG, this is for short wave listeners - same conditions as for the WAYUG Award.

SILVER JUBILEE AWARD

To commemorate the Sultanate of Oman's 25th National Day ROARS has introduced this special award. From 1 November until 31 December 1995 all A4 stations (except the special event station A43SJ which will be on the air in the third week of December 1995) will use /25 after their suffix - ie A41XX/25, A45XX/25, A47RS/25.

The award will be issued to those who collect eight points by contacting A43SJ (three points), A47RS/25 or A47OS/25 (two points), or any other Omani station (one point). QSOs with the same station using a different band/mode double the points. Send certified copy of log, with 10 IRCs or US $5.00 to: The Awards Manager, ROARS, PO Box 981, Muscat, Postal Code 113, Sultanate of Oman.

WORKED ALL BELGIAN PROVINCES (WABP)

This is a new award being issued by the Union Belge des Amateurs-Emetteurs (UBA) and it is available to licensed amateurs and listeners. QSOs after 1.1.95 are valid and there are no band/mode restrictions. European applicants must make contact with all 10 Belgian provinces and the city of Brussels on at least two bands (= 22 contacts). DX stations need one QSO with each province and Brussels. The provinces are: Antwerpen (AN); Brussels (BR); Brabant Walon (BW); Hainaut (HT); Limburg (LB); Liege (LG); Luxembourg (LU), Namur (NM); Oost-Vlaanderen (OV); Vlaams-Brabant (VB) and West-Vlaanderen (WV).

Send list of QSLs certified by two other amateurs, plus US$7.00 or 10 IRCs, to: Danny Commeyne, ON4ON, UBA Award Manager, Rozenlaan 36, B-8890 Dadizele, Belgium.

Please note that the old WABP ceased to be awarded on 31.12.94 but that applications may still be sent until 31.12.95.

CONTESTS

VK-ZL-OCEANIA CONTEST

1000 7 October - 1000 8 October (Phone)

1000 14 October - 1000 15 October (CW)

Work VK/ZL/Oceania stations on 1.8 to 28MHz (no WARC bands). Single-operator single and all band, multi-operator all band and listener sections. Exchange RS(T) plus serial QSO number from 001. Multiplier is the number of prefixes worked on each band.

QSOs count 20 points on 1.8MHz; 10 on 3.5MHz; 5 on 7MHz; 1 on 14MHz; 2 on 21MHz; and 3 on 28MHz. Listener logs should show date/time, callsign of station heard and station being worked, RS(T) and serial number sent by the heard station, points claimed, and new multipliers. Send logs postmarked by 17 November for the Phone section, by 24 November for the CW section to: Peter Nesbit, VK3APN, Federal Contest Co-ordinator, Wireless Institute of Australia, PO Box 2175, Caulfield Junction, Victoria 3161, Australia. I can provide photocopies of the rules.

In the **1994** contest **G3NAS** was top G in the Phone section with 2331 points and **G3GLL** top in the CW section with 806 points. Also listed are **GM3ITN** with 897, G5MY with 423, and G0TDX - who scored five points on 7MHz.

EU SPRINT 1995

1500 - 1859 7 October (SSB)

1500 - 1859 14 October (CW)

Single operator only. Object is to work as many Europeans as possible on 3.5, 7, and 14MHz. Recommended frequencies are 3.530 -3.570, 7.010 - 7.040 and 14.030 - 14.070MHz (CW) and 3.680 - 3.780, 7.040 - 7.090 and 14.220 - 14.280MHz (SSB). Exchange callsigns, serial QSO number (RS/T is *not* required), and name.

If a station solicits a call by calling 'CQ' or 'QRZ' only one station may be worked on that frequency and a QSY of at least 2kHz must be made. Each QSO counts one point and there are no multipliers. No awards or prizes - this is a test of individual skills! Logs must be sent no later than 15 days after the contest to: (SSB) Paolo Cortese, I2UIY, PO Box 14, 27043 Broni (PV), Italy. (CW) Karel Karmasin, OK2FD, Gen.Svobody 636, 674 01 Trebic, Czech Republic.

CQ WW DX CONTEST

0000 28 October - 2400 29 October (SSB)

All bands 1.8 - 28MHz (excluding WARC). Categories are single operator single or multiband, multi-operator single or multi-transmitter and QRP (up to 5W *output*). Exchange RST and *CQ* zone (UK is in zone 14). QSOs with own continent count one point, with others three. Own country may only be contacted for multiplier credit. The multipliers are the total of DXCC and WAE countries and zones worked on each band and added together. Use separate logs for each band and if you make more than 200 QSOs on any band you must submit a 'dupe' sheet. Logs must show date, UTC, station worked, numbers sent and received, and points claimed. Clearly mark each new multiplier and check carefully for duplicate QSOs - if you have too many you may be disqualified. QRP entrants must mark this fact on their cover sheet and indicate the actual power used. Entries for the SSB Section must be postmarked no later than 1 December 1995.

Send entries to *CQ* magazine, 76 North Broadway, Hicksville, NY 11801, USA. Sample contest stationery is available from that address in exchange for a SAE and a few IRCs. Unfortunately, I do not have any of these available but I *hope* to be able to supply copies of the rules as published in *CQ* magazine in due course - SASE please. Please note that the *CQ* WW Committee has voted to clarify the position of IG and IH which will now be a new multiplier - African Italy.

XVIII CONCURSO IBEROAMERICANO

2000 7 October - 2000 8 October

Phone only on IARU recommended frequencies on 1.8 to 28MHz (no WARC bands). Single-operator Latin and non-Latin American, multi-operator ditto, and QRP (less than 5W output) and listener sections. Exchange RS plus serial QSO number. Three points for QSOs with Latin American stations and one with others. I can supply copies of the full rules (SASE please).

YL ANNIVERSARY PARTY

1400 11 October - 0200 13 October (CW)

1400 25 October - 0200 27 October (SSB)

Yes - these dates *are* correct! Only for licensed women operators. I can provide copies of the rules (SASE please).

THANK YOU

ONCE AGAIN to everyone who provided input for the column, and as usual special thanks go to the following for news items extracted from their publication: the *Long Island DX Bulletin* (VP2ML), the *RSGB DX News Sheet* (G4BUE), *DXPRESS* (PA0FQA), and the *Lynx Dx Bulletin* (EA2KL). Please send everything for the **December** column to reach me no later than **11 October.** ♦

VHF/UHF NEWS

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

WRITING THIS column well into August, the exceptional British heat wave continues with no end in sight. Temperature and drought records have been broken and it has been a good summer for VHF DX too.

The 50MHz band has produced some remarkable E-layer DX during this period of sunspot minimum, while tropospheric propagation on the higher bands has been very rewarding.

REPEATER NEWS

THE GB2RS NEWS broadcast on 6 August included the following item: "There is a proposal for a new 70cm speech repeater to be located in north-west Glasgow. For further details contact the Amateur Radio department at RSGB headquarters - telephone 01707-659015."

The Fenland Repeater Group operates two repeaters. The VHF one, GB3FR, located at Spilsby on the Lincolnshire Wolds, has been in operation on R7 since 1978 and has recently been overhauled and updated. The new installation comprises a TAIT 800 Base Unit incorporating the Sheffield University Mk1 logic design and has full battery back-up. The TX antenna is a stacked pair of folded dipoles and the RX one is a 3dB gain collinear. The UHF repeater is GB3SO serving the Boston area on RB0. For details of the FRG contact secretary Mr G Gwilliam, G4FJO, who is QTHR.

The Leicestershire Repeater Group's July Newsletter *LENS* contains some engineering information by Adam Moss, G0ORY. UHF repeater GB3LE on RB4 now has a VoiceBox which can record and play back an eight second message in RAM or EPROM. An add-on board enables eight such messages to be stored. The LRG thinks it is breaking new ground with this innovation. Adam plans to introduce DTMF (Dual Tone Multi Frequency) 'star services' too. The Philips speech synthesizer can hold 40s of speech in a single 8k EPROM. For details of the LRG send an SASE to PO Box 180, Leicester.

The Aylesbury Vale Repeater Group's June *Newsletter* carries reports on GB3VA (R4), GB3AV (RB2) and GB3BV (RB1). VA has a 'mute' mode which keeps the carrier on while inhibiting through audio. The callsign and locator are transmitted in Morse every 15 minutes. This mode is used when gross abuse occurs, such as swearing. The AVRG had 148 members in June and the address for correspondence is that of the secretary Mike Marsden, G8BQH (QTHR).

PUBLICATIONS

THE AUGUST issue of *Six News*, the journal of the UK Six Metre Group, includes a fully illustrated account of the June trip to the Cape Verde Islands by Geoff Brown, GJ4ICD, plus family and friends. The GB3MCB and ZB2VHF 6m beacons were heard consistently for long periods but no stations were worked in those areas. Beacons close to a sea path - such as CU3URA, ZB2VHF, GB3LER, GB3IOJ, CT0WW, YV4AB and SV1SIX - were often copied but GB3NHQ was never heard, even in UK openings. The edition, number 46, is packed with DX news and useful data. For details of the UKSMG contact secretary Chris Gare, G3WOS, at QTHR.

The August issue of *CQ-TV*, the journal of the British Amateur Television Club, is the 171st. As usual, it is an excellent 80-page publication of a high technical standard. The 'Circuit Notebook' section deals with DTMF. John Stockley, G8MNY, describes the Teletext service now available on the GB3HV 23cm TV repeater at High Wycombe. 'Repeater Updates and Developments' is a new feature edited by Graham Hankins, G8EMX.

In his 'TV on the Air' column Andy Emmerson, G8PTH, considers the future of 70cm ATV should we lose the top 2MHz of the band as proposed by the ERC. He suggests that digital compression technology might offer a solution whereby UHF ATV could be accommodated in a reduced allocation. He reports that Doug Ferrell, KD4MOJ, has an ATV Information Server on the Internet. To join this reflector send an E-mail to ATV-Request@exchange.tlh.fl.us and in the body of the message type 'add join subscribe.'

CQ-TV is edited by Chris Smith, G1FEF, whose QRA is 19 Ravendale Road, Gainsborough, Lincs DN21 1XD (*not* QTHR) and

membership inquiries go to Dave Lawton, G0ANO, who is QTHR.

BEACON NEWS

ANDY STEVEN, GM4IPK (SLD), took GB3LER on 144.965MHz out of service on 4 August until further notice. A mains induced problem by other equipment on site caused the failure of the amplifiers. As he is now working in London, Andy has returned them to the manufacturer for repair. The 6m and 70cm Lerwick beacons continue to radiate normally.

MOONBOUNCE

THE FIRST LEG of the ARRL International EME Competition is on the weekend 7/8 October. With full moon on the Sunday, Sun noise will not be a problem and the 2m sky temperature will vary from 275 to 323° K during the two days. In London, moonrise on the Friday is around 1630. Saturday moonset is 0430 rising again at 1700. Sunday moonset is 0545, rising at 1720 till Monday moonset at 0655, all times UTC. The signal degradation varies between -0.82 and -1.24dB The VE3ONT station will be QRV - see September's *VHF/UHF News*.

Patrick Magnin, F6HYE, writes that the Yota Sawe EME Group plans operation from near Rabat in Morocco in the second leg of the ARRL contest, 4/5 November. They requested the callsign CN2EME. The operators will be F5JBP, F6HYE and F6IRF and the suggested operating QRG is 432.023MHz, depending on local conditions.

The station will comprise a TS850S transceiver, 28/432MHz transverter, 4CX250R driver and TH327 coaxial cavity PA. The antenna array is eight 11.5 wavelength Yagis with open-wire feed. The receiver consists of a two-stage home-made preamp, low noise, high dynamic range converter (0.32dB system noise figure) feeding the TS850S with a digital signal processor. Through previous experience from 4U1ITU, T70A and CS1EME know they can work 2-Y/1kW and 4-Y/500W stations so operators without antenna elevation capability can call them at their moonrise/moonset.

METEOR SCATTER

PERSEIDS INQUEST

John Hoban, G0EVT (YSW), did not think the shower was as good as previous years. Completions included 9A1CCY, S51WX, 9A2PT, HA3UU and I8MPO, then others from 0000 to 0200 on the 13th. The peak seemed to be about 0000 on the 13th and at 0005 he noted a 2.5min burst from 9A2PT - "just like sporadic-E". Alec Trusler, G0FIG (SXW), echoes G0EVT's remarks. Before and during the shower he completed with LA/DL5DTA (JP21), EA/DJ3MY (IM96), ES0SM (KO17), SM0EJY (JO89), 9A4FW (JN95), SM7THS (JO76), CT1DYX (IN51), OZ/DL9GJW (JO47), IW4ARD and IW4DLA (JN64), SP9ZDN (KO00), YU1BT (KN03), 9A3JH (JN74), SM5MIX (JO78), SJ9WL (JO69) and SP2SGZ (JO82).

Conrad Farlow, G0RUZ (YSS), completed with OH2TI (KP20) in 72min (15p 8b 12s) on 70cm in a sked from 0100 on 13 August. The QRB is 1,745km and he wonders if this was a first? He runs a 3CX800 PA, six 11 wavelength DJ9BV OPT70 Yagis providing 27.5dBi gain and MGF1302 preamp.

OH2TI uses an 8938 PA and four 21-ele F9FT Yagis stacked vertically with a 1dB NF receive system. Conrad's best direction is 100-225° azimuth and he would like to try with partners on 70cm in the 1,500-2,000km range, probably in the Geminids and/or Quadrantids.

His E-mail address is conrad@g0ruz.demon.co.uk and the packet route is G0RUZ@GB7WRG.#19.GBR.UK.

Mike Jupp, G1HWY (SXW), is now QRV on 2m on CW MS using the OH5IY keying program and 'Wave for Windows' on receive. In the Perseids he completed with EA6FB (JM09), SK7AX (JO77) and SP2OFW (JO93) and with OK1FXX (JO80) on SSB.

Matthew Cabban, G1WPF (HFD), is QRV again from a new QTH. During the shower he completed on 2m with F/G0JIM/P (JN14), GM4DHF/P (IO68), IK2XRL, IK5JWQ (JN52), IT9BLB (JM68), I8MPO (JN70) and DL7VBW (JO62).

On the 12th Ela Martyr, G6HKM (ESX), spent almost the whole day listening on 2m. She worked GM4DHF/P and thinks she completed on 144.200MHz with S51WX. On 6m she completed with GM4ODA/P (IO68) and HB0/HB9QQ.

On 6m GJ4ICD listened for four hours on the 12th with very poor success. Next day from 0800 Geoff completed with many stations in an hour, most reports being RS37. They included HB0/HB9QQ, SP4MPB and S57MC. In his first attempt at MS, Jamie Ashford, GW7SMV (GWT), completed with HB0/HB9QQ.

Members of the Fenland Repeater Group have good reason to look pleased now that the GB3FR VHF repeater, located on the Lincolnshire Wolds, has been overhauled.

NEWS

David Hilton-Jones, G4YTL (BUX), reckons one of the most annoying problems of MS work is some operators' apparent inability to keep time. He mentions that Maplins now sell an MSF-controlled clock for £24.99 and suggests: "Please advertise it widely!"

The Orionids stream should peak on 22 October at solar longitude (LS) 208.4° according to the IMO's *1995 Meteor Shower Calendar* compiled by Alastair McBeath. Times when reflection efficiencies exceed 50% are: NE/SW 2330-0500; E/W 0130-0730; NW/SE 0400-0930; N/S 0600-1030 and 2300-0330. The radiant rises at 2100 and sets at 1200, all times UTC. In 1993 an unexpected outburst, equivalent to the usual maximum, was observed in the 17/18 October night, so listen on the 18th - just in case.

50MHZ

NICK GREGORY, G0HIK (CBA), worked some SPs in JO91, 92 and KO02 around 1630 on 23 July for three new squares. Between mid-June and mid-July Neil Carr, G0JHC (LNH), worked over 100 North American stations during nine openings. Most were in EM and EN fields. The KP4s were active but he wonders where were all the other Caribbean stations?

John Hill, G0WEH (HPH), is back on VHF after an 11-year absence. His previous calls were G8HUY, KS4WG and DA4BA. He uses an FT-736R, 160W solid-state PA and home-made 5-ele log periodic aerial. He lists lots of Balkan stations worked on 30 July plus SV9ANK (KM25), SV1OH and SV0BY (KM18). EW1AA (KO73) is in Belarus or Byelorussia, John - see the 'Countries Checklist' section in the RSGB *Call Book*.

Terry Chaplin's, G1UGH (SFK), QSOs included IK0OZD (JN61), IK5RLP (JN52), HB9s SLO and STY (JN36) at the end of July. On 7 August he worked ID9/I2AE (JM78) on Salina Island and IT9KSS (JM68). G6HKM found TF/G4AFJ/M (IP13) on 21 July; his wife was driving at the time. Ela also worked GM7AFE/P (SLD) that day. EW1AA (KO33) was copied on the 23rd as were 4X4IF and Z32BU on the 25th with SV9ANK worked.

Tony Jarvis, G6TTL (KNT), is back on the band after five years with QRP and a halo antenna. John Fitzgerald, G8XTJ (BUX), was QRV on 13 August and contacted YL3AG, some EHs and GM4ODA/P. On the 15th he worked HB9AOB (JN46) and HB9RNC (JN45) after 2100 and OH2TI was very loud on the morning of the 16th. GW7SMV lists his best DX as ES1CW (KO29), TF/G4AFJ/M, CS0RCL (IM56), 9H5AB (JM75), SP5CCC/1 (JO84), SV8CS (KM07), SM1LPU/P (JO96) and EH9IB (IM85).

70MHZ

DEREK THOM, G3NKS (GLR), reports a welcome increase of stations joining in on the Tuesday activity evening sessions. Some portables have been out including G3JRL and G0PGT in Dorset. Two 'new' stations from Dyfed are Bob Gibbons, GW0AIY and Jim, GW0NCN, both running 100W and also QRV on Sunday mornings, so please turn your beams to south Wales. The next issue of Derek's *Four Metres News* was due out in mid-September.

Peter Neale, G3UHN (HFD), runs an 'elderly' FT480R, RN Electronics transverter and 4-ele Yagi. His site is 124m ASL with a clear take-off to the north. Beacon GB3BUX is very loud under flat conditions. GB3ANG

LOCATOR SQUARES TABLE

STARTING DATE: 1-1-1979

Callsign	50MHz	70MHz	144MHz	430MHz	1.3GHz	Total
G3NKS	2	46	9	2	-	59
G4YTL	-	43	310	58	-	411
G1SWH	300	38	206	70	17	631
G0EHV	-	38	199	87	-	324
GW4LXO	499	37	261	109	48	954
G4TIF	363	28	217	112	-	720
G3FIJ	95	27	88	38	10	258
G8TOK	186	25	131	51	23	416
G4OUT	-	23	106	-	-	129
G8ESB	31	21	99	36	24	211
G6RAF	134	19	184	119	16	472
G3IMV	470	15	541	125	52	1203
G0UPU	8	15	25	6	2	56
G0EVT	286	14	285	75	9	669
G6ODT	-	3	62	73	-	138
GJ4ICD	647	1	264	121	75	1108
G0HIK	61	1	77	22	-	161
G6HKM	518	-	263	122	66	969
G4IGO	621	-	250	-	-	871
G4RGK	183	-	333	211	74	801
G0CUZ	221	-	398	80	-	699
G0JHC	576	-	48	-	-	624
G0FIG	200	-	253	76	33	562
GW6VZW	403	-	143	6	-	552
G3XDY	-	-	229	160	107	496
G0GMB	135	-	226	108	-	469
G0HVQ	339	-	71	-	-	410
G4RRA	-	-	317	80	-	397
G1UGH	251	-	126	-	-	377
G1HWY	-	-	202	90	48	340
G8XTJ	206	-	133	-	-	339
GW8JLY	-	-	288	36	-	324
G1AWF	69	-	190	20	-	279
GW7SMV	167	-	92	-	-	259
GW4FRX	-	-	249	-	-	249
G7HUD	135	-	87	25	-	247
G3FPK	-	-	246	-	-	246
G7CLY	108	-	133	2	-	243
G6TTL	49	-	108	80	-	237
GW0PZT	-	-	207	-	-	207
G7LIJ	25	-	181	-	-	206
GI1CET	100	-	79	12	-	191
GJ7LJJ	102	-	54	12	-	168
G0SOO	115	-	41	-	-	156
GM0WDD	138	-	-	-	-	138
GM0GLV	102	-	35	-	-	137
G0HDZ	35	-	70	-	-	105
G4ZHI	-	-	65	18	-	83
G3UOL	11	-	66	-	-	77
G3KIP	46	-	21	-	-	67
G6XRK	-	-	16	-	-	16

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Next deadline is 19 October. Band of the month 70MHz.

(IO86MN) was copied weakly during much of July and early August in the sustained high pressure period. As pressure declined on 4/5 August it came up to S9+10dB for 24 hours. However, it is inaudible all winter. He is carrying out long-term crossband tests with Malcolm Hamilton, GM3TAL (FFE), on 40m.

144MHZ

THE SUSTAINED high pressure has warded off Atlantic depressions and fronts as far as mainland Britain is concerned. This resulted in some good tropo openings on all bands although activity was sometimes a little disappointing. No Es were reported in August.

G0EVT writes that the Es openings seem to have favoured the south. John found it "very frustrating to see spots on the DX cluster for SV and comments about YOs being S9+20dB but inaudible in Wakefield". On 15 July, 1715-1914 he worked into LZ and IS0 but spent a lot of time listening to G4SWX (SFK) and G4PIQ (ESX) working IH9, LZ and YO.

On 19 July G0FIG worked HB0/DF0CB (JN47) and Alec reckons Liechtenstein must be one of the hardest countries to work on tropo. He also worked LX/PE1PRG/P (JN29). On the 22nd he contacted GM4ZAP/P (IO85), GM4CLN/P (IO84), GD4GDH (IO74) and GM4CXM (IO75) in the low power contest. The 24th brought QSOs with Swiss and German stations including DG0OG (JN68) at 1,042km. The 28th was a memorable day with EA3KU/5, EA5/DJ3MY and EA5/DL3MGL, all in IN90XP worked at 1,135km. More good tropo was worked on 29/30 July. On 5 August GB3ANG was S9+40dB, the strongest ever heard in IO90UU. On the 8th Alec contacted LA/DL7YS/P (JO37) and on the 10th DG6LM (JO54) and SM7WT (JO65). The 12th brought more Spaniards - EA2ARD (IN93), EA2AWD/MM (IN84), EA1EBW and EA1DDU (IN73) and ED4CXM (IN81).

G0HIK/P was QRV in the low power contest on 22 July using two DL6WU 10-ele Yagis making about 230 contacts in 67 counties. The weather in south Cumbria was a howling gale with 100 yard visibility at times. Nick picked up more new squares from home during various lifts to the Continent in the 29 July to 6 August period.

G1HWY worked SM5MIX (JO78) on 9 August and DL0DWD (JO34) next evening on tropo. On 5 August, G1UGH worked GM0GMD/P (IO74), GM1TDU (IO87), EI4CL (IO63) and GB0MAY (IO64). G6HKM took part in the low power contest but reckons activity gets less and less each year. On 9 August Ela contacted LAs in JO37, JO59 and JO16 and SMs in JO77 and 78. Next day brought contacts with LAs, OZs and SMs including 7S6AG operating from the athletics event in Gothenburg. On the 11th she had an 8min QSO with LA6CL/P (JO37) who was only running 2.5W from an FT-290.

G1WPF contacted GMs, LAs, OZs and SMs in the 1-5 August period. The opening on the 9th was superb with several SM5-7 stations and a couple of OZs worked. Matthew stayed up all night on the 11th and was rewarded with more Scandinavian DX plus SP1MHY (JO84) from 0355. He uses an IC-251E with Mutek board, Dressler PA and 9-ele Tonna Yagi.

G6TTL has been getting up quite early to take advantage of the coastal ducting across the North Sea. On 1/2 August the GMs were at good strength but by the 3rd, the propagation had swung around to the north-east, a nice QSO being with OZ/DJ7RJ (JO75) on Bornholm Island at 0535.

John Fitzgerald, G8XTJ, was QRV for the low power event and his best DX were GM4ZAP/P (BDR) and G0HIK/P (CBA). GW1WPF/P provided new WAB areas from Gwynedd. G1POK and G1PXM did the WAB addicts proud from north-east England in the 28-30 July period and also gave G8XTJ Durham, Cleveland and Tyne and Wear for the annual table.

GW7SMV worked F1IKO/P (IN87) on Noirmoutier Island on 28 July. On 3 August Jamie contacted DLs, ONs and PAs and on the 5th, in the morning, worked more than 30 stations to the east, best DX being DL4OL (JO52). Only SM6CMU (JO57) was worked on the 11th as the ducting from Scandinavia did not quite reach Newport.

430MHZ AND UP

G0EVT added LA1ZE (JO28), GW7LHI/P (IO72), SM6CEN (JO57) and DL0DWD (JO34) for four new squares on 70cm in the 31 July to 10 August period. John has been amazed at what he has worked on 23cm with just 300mW at the 23-ele Tonna Yagi, best DX being LA/DB1DI/P (JO37). He reckons the long-lasting tropo was often better on the UHFs than on 2m.

G0FIG lists 70cm QSOs with GD4GNH, GM6VIU/P (IO84), DK0OG (JN68), GD8EXI, DB8WK (JO33) and LA/DB1DI/P in the 23 July to 8 August period. G0HIK/P was QRV in the low power contest for a couple of hours on 23 July but gave up due to the bad weather. In August, Mike Jupp, G1HWY, worked GW8VHI/P (DFD) on the 2nd, LA/DB1DI/P on the 4th and SM6ESG (JO67) on the 9th on 70cm and Mike worked the LA on 23cm too.

G1WPF runs 3W to a 19-ele Tonna Yagi and Matthew contacted LA/DB1DI/P, OZ9IT (JO46) and DJ9EH (JO43) between 4 and 12 August. G6HKM worked the LA portable on both bands on 9 August plus SM6CEN on 70cm and SM6EAN (JO57) on 23cm. G6TTL was yet another who contacted LA/DB1DI/P on 70cm.

DEADLINES

THE **DECEMBER** deadline is **19 October** and the **January** date is **16 November**. The fax/telephone answering machine is on 0181 7639457 and my CompuServe ID is 70630,603. The Internet address is 70630.603@compuserve.com and the BT Gold mailbox is 87:CQQ083. ♦

QSL

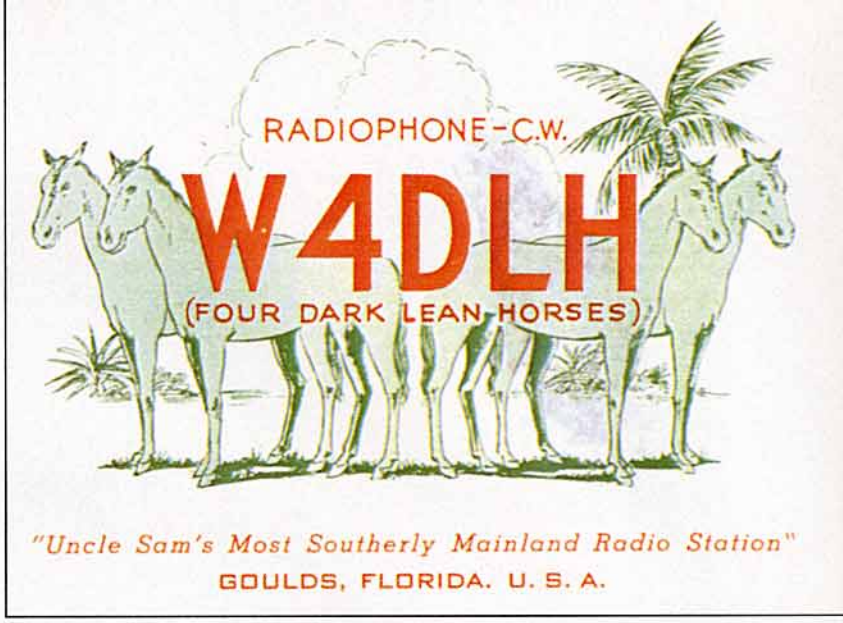
JOHN HALL, G3KVA
Corfe Lodge, Ipswich Road, Long Stratton, Norfolk NR15 2TA.

MY WAITING LIST for potential QSL Sub Managers is a bit old now and it is time I brought it up to date. Now before hopefuls rush to volunteer, let me stress that it is not a job for the faint-hearted. It is not unknown for newly-appointed Sub Managers to find they have bitten off more than they can chew and they resign with consequent delays being caused to their 'customers'. Let me list some of the qualities required in the aspiring 'Sub'.

- A sense of humour is helpful. Bear in mind that many of your 'customers' will be very demanding and a few will be the sort you would be reluctant to stand next to when there is a full moon!
- Patience and an ability to perform methodically. A fairly long fuse is required, particularly when taking a late night telephone call from a punter demanding to know where his cards are, or when trying to decipher the words of a punter who apparently never learnt to write! In addition, sorting QSL cards, whilst rewarding for the interested person, is hardly exciting work!
- A commitment to your 'customers' is a must. That's what they pay their membership fee for, and they are entitled to nothing less than a first class service.
- If you are allocated a busy prefix series then be prepared to receive a carton of about 2000 cards every six weeks. They will need to be sorted and sent out to your 'customers'.
- A yearly honorarium of £25 is paid to all QSL Sub Managers, but that is the only payment apart from the reimbursement of some necessary expenses.

Because of the difficulties some amateurs have found themselves in after appointment, I now take the opportunity of having a word with each new Sub Manager and we issue them with some comprehensive note of guidance. After that, they are on their own. However, all Sub Managers are encouraged to shout if they get into difficulty and I am on the end of a telephone and will always try and assist.

If, after all the above, you are still interested and want to put something back into the hobby then please drop me a line at my home address and I will set up a new list of volunteers. Don't hold your breath awaiting appointment, however. Whilst vacancies do occur they are pretty unpredictable and you might have a long wait.



Historic card from W4DLH, dating from 1937.

INTERESTING CARDS

STEVE READER, BRS 93463, sent me his card (bottom left produced using an inexpensive DTP package and a friend's printer. He says the total cost was a couple of pints! The design is printed out on paper (three to a sheet) then glued to thin card and cut.

Steve Gibbs, GU3MBS, who I recently worked on 10m CW, sent me this little QSL card he received from General 'Kab' Kabraji, VU2BK, which is pictured below. I have worked Kab a number of times myself but had forgotten the apposite Confucius saying all his cards bear. I am grateful to Steve for reminding me of it.

Tony Burley, G0MBM, sent me this interesting QSL card pictured above. Tony got it from Bill Burkhart, W4DLH, (ex spark 8DI and 4AAQ) when he (Tony) was a very young SWL in March 1937 for a contact on the 20m band. Tony used a home made O-V-I TRF receiver and he was naturally thrilled to receive the acknowledgement from a ham with an obvious sense of humour! Sadly, I guess that Bill Burkhart is no longer around because a quick peak at my American *Callbook* listings indicates the call W4DLH has been re-allocated. Another piece of amateur radio history, for which I am most grateful.

SOUTH SHETLANDS

RYS TYMKIEWICZ, SP5EWY, writes about HF0POL in the RSGB *DX News Magazine,* issue 1 [The *DX News Magazine* is sent free of charge every month to all subscribers to the RSGB's weekly *DX News Sheet* - subscription details are available from Marcia Brimson at RSGB HQ - *Ed*]. The QSL card I received (shown below) for a QSO in March 1992 tells me that HF0POL on the South Shetland Islands is operated by members of the 16th Polish Antarctic Expedition 1991 / 1993.

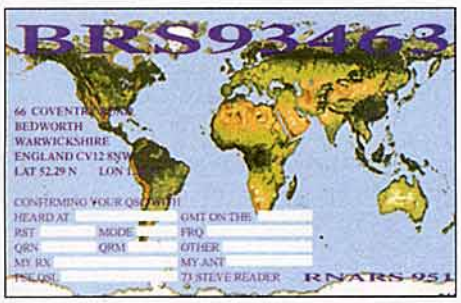
The Henryk Arctowski Station of the Polish Academy of Sciences was founded on 26 February 1977 on the South Shetland archipelago and has 19 permanent staff members including scientists and technicians.

HF0POL is a club station and for each period of activity it has a different operator and QSL Manager. The station has already made over 60,000 QSOs. If you are still short of a card from them apply as follows: if until 24 December 1990 the operator was SP5FLC, so QSL via him, from 24 December 1990 to 25 December 1991 via SP3FYM; and in 1992 via SP9DWT. Zbigniew Kulczak, SP9DWT, was the operator that provided my card so I know that route works perfectly well. If you still can't get a card Rys will try and assist if you get in touch with him.

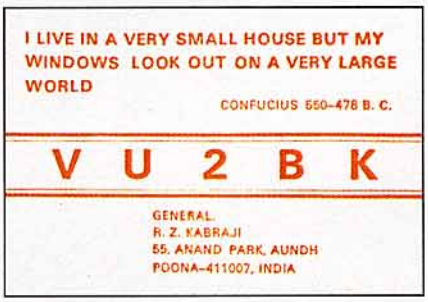
HELPFUL HINTS

D R MIRAMS, G4SFU, tells me that a company called Neat Ideas Ltd, Sandall Stones Road, Kirk Sandall, Doncaster have a very nice line in gummed manila envelopes at about £9.50 per 1000.

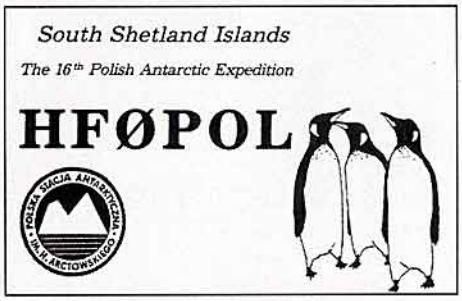
Graham Brooker, G4XVJ, says that just because one gets a card for a non-existent QSO it doesn't mean the call has been pirated. I agree. Most of the mistakes occur as a result of misreading the callsign at the time of the contact and you should see some of the writing we have to try and decipher! Graham says what causes him some grief are the people who misread his callsign for that of G4ZVJ (that well-known exotic location finder!) and send Graham the cards! ♦



Another 'D-i-Y' QSL produced very easily using a DTP program.



The QSL from Kab, VU2BK, bears a thought-provoking saying of Confucius.



QSL from the Polish club station at the scientific base on the South Shetland Islands.

HF F-LAYER PROPAGATION PREDICTIONS FOR OCTOBER 1995

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

Time / / GMT	28MHz 000001111122 024680246802	24MHz 000001111122 024680246802	21MHz 000001111122 024680246802	18MHz 000001111122 024680246802	14MHz 000001111122 024680246802	10MHz 000001111122 024680246802	7MHz 000001111122 024680246802	3.5MHZ 000001111122 024680246802
* * EUROPE								
MOSCOW	....	....111....	....34431...	....56663...	...4787873..	1..6665678 41	7644333 35788	++3.....25++
MALTA	....	....1111....	....3434 3...	....67666 2..	...48778871.	2317655 67972	8975332 35898	+++2....25++
GIBRALTAR	....	....	....13212...	....35544 2..	....7877871.	.2.476667971	6857533 35797	+++52...24++
ICELAND	....	....	.....11....	.....1432...	....1677 63..	....6767785.	4413544 45786	+++52...24++
** ASIA								
OSAKA	....	....	....11.....	....331.....	...1653 21...	...2433344 1.	....21.13661	.........34.
HONGKONG	....	....111....	....343.....	...1565.....	...2665311..	...1333356 2.	....11.13673	.........3+2
BANGKOK	....	....222.....	...1454.....	...26761....	...2465 3....	....1333223.	2....1.13584	.........3+4
SINGAPORE	....11.....	....2221....	...14554 1...	...36766 3...	...2466663..	1...1333674.	1....1.13684	.........3+3
NEW DELHI	....11.....	....2221....	...25553....	...36665....	...3456 63...	2.11123355 42	62.....13688	3.........3++
TEHERAN	....1111....	....3322....	...35555 1...	...566774...	...5445673..	4232113357 54	862....13688	+3........3++
COLOMBO	....1111....	....3322....	...25555 1...	...35677 3...	...2345662..	.1...1335754	31.....13688	2.........3++
BAHRAIN	....1111....	...13333....	...35556 2...	...56677 5...	...4335673..	5331.1235765	862....13688	+3........3++
CYPRUS	....2222....	...14444 2...	...37767 51..	...6888883..	11176667 88 21	7655334 56886	9852111 24789	++2.....4++
ADEN	....22221...	...14445 2...	...36567 5...	...4556872..	1..4224686 1.	6131..1358 75	952....13688	+3.....3++
** OCEANIA								
SUVA/S	....	....	.....1.....	.....122....	....2455.1..	...1433324 1.	...3211133..	....
SUVA/L	....	....	....1.....	...131....1.	...4642..34.	..1643 22.52.	...31...23..	....
WELLINGTON/S	....	....	....11.....	....1332....	....4555 1...	...3433344..	...2211133 1.	....
WELLINGTON/L	....	....	.....1.....	.....1.....	.1.22....13.	.1244 1...431	...22...131.	....
SYDNEY/S	....	....11.....	....4421....	...2664 3...	...4765541..	...3433561.	....11.13622	.........3..
SYDNEY/L	....	....	.....2....1.	....51....4.	..1.531..152	...121..142.	.........2..	....
PERTH	....11.....	....332.....	...26641....	...4776 31...	...3565542..	1..1233357 41	1.....13673	.........35.
HONOLULU	....	....	....	....	.....23.....	....2221531.	..132111 21..	...2.....
** AFRICA								
SEYCHELLES	....12221...	...13445 2...	...35567 5...	...4557772..	...2225687 1.	642...23587 5	84.....13688	+.........35+
MAURITIUS	....22231...	...14445 3...	...36678 61..	...4557883..	...3225677 2.	632...23587 5	83.....12688	5.........3++
NAIROBI	....33342...	....4556 5...	...26668 72..	...4556884..	...4223678 2.	6531...35885	872.....2688	+4........3++
HARARE	....23454...	....4567 61..	...26678 83..	...4556886..	.1.5223578 3.	5632...35885	873.....2688	+5........3++
CAPETOWN	.....2465...	....1368 72..	...14678 95..	...3556788 1..	...5433579 5.	4533 1..24895	8841....2588	++.....2++
LAGOS	....34566 1..	....5667 83..	.....7777 86..	....1755688 1.	.2.5522396 .	4825 2...3795	7972....1588	5+5.....2++
ASCENSION Is	....23336 2..	....4555 75..	....7666 87..	....7655782.	.2..6333477.	4863 31..1586	8985 1....278	+++2.....4+
DAKAR	....14435 3..	....2665 75..	....5776 881.	....7755783.	.2117433478.	3766 41..1586	8885 1....278	+++2.....4+
LAS PALMAS	.....2212 1..	....1543 43..	....4776 76..	....7887882.	.1.1876678 71	4766644 35797	8996 3211 2589	+++3....25+
** S. AMERICA								
Sth SHETLAND	.......121..	.......2243..	.....3556 61.	....2566773.	.1115555555.	2666 4322 2233	4665 2....12	2342.....
FALKLAND Is	.....1234 3..	.....3456 5..	.....6677 71.	....2776673.	.1115654345.	3765 4321 1134	7885 21....13	4++2.....
R DE JANEIRO	.....3112 2..	.....5334 5..	.....7556 71.	....1865573.	.11.4633356.	3764 431..255	8985 21....26	+++2.....3
BUENOS AIRES	.....1323 2..	.....3535 4..	.....6767 61.	....1776663.	.11.4653345 1	3764 432..134	7985 21.....4	+++2.....
LIMA	.......1.11..	.......3133..	.......6455 1.	.....7555 2.	1532231	254.122...13	6884 21.....2	4++2.....
BOGOTA	.......1.11..	.......2122..	.......5344 1.	.....1754 42.	3532241	243.333...13	7873 21.....2	5+52.....
** N. AMERICA								
BARBADOS	.......1.11..	.....1312 2..	.....3645 51.	.....5745 53.	6532351	354.332...35	8874 21....15	++52.....2
JAMAICA	....	.......2111..	.......4333 1.	.......6544 2.	1543341	232.1331..23	7872 21.....2	5+52.....
BERMUDA	....	.......1111..	.......4344..	.....1655 52.	4544551	231..3311235	8872 21....15	+++2.....2
NEW YORK	....	.........11..	.........2332..	.....4554 1.	.....1555 54.	22...3322234	7861 11....14	5++2.....
MEXICO	....	.........11...	.........332..	.........5431.	.....3632 2.	12..2.331..1	3761 21.....	.++2.....
MONTREAL	....	.........1....	.........2332..	.....4554 1.	.....1555 54.	22...3332344	7851 11....14	5++2.....
DENVER	....	....	.........11..	.........233..	.....4542.	11....1332 21	3641 1..1...1	.5+2.....
LOS ANGELES	....	....	.........1...	.........32..	.....2542.	11....3321 1	2541 2..11...	.3+2.....
VANCOUVER	....	....	....	.........11..	.....1442.	.....2432 1	2432 11.121.1	.2+2.....
FAIRBANKS	....	....	....	....	.....231..	....1222 5531	1213 2111 2211	..22.....

The provisional mean sunspot number for August 1995 issued by the Sunspot Data Centre, Brussels was 15.1. The maximum daily sunspot number was 41 on 26 August and the minimum was 0 on 14, 19, 21 August. The predicted smoothed sunspot numbers for October, November and December, are respectively: (classical method) 14, 13, 12 (±3); (SIDC adjusted values) 11, 10, 9 (±2). July 95 SESC: solar flux 73.8 Ap 8.0 Smoothed January solar flux 80.6 Ap 13.4.

Contest Exchange

ANDY COOK, G4PIQ
Fishers Farm, Colchester Road,
Tendring, Essex, CO16 9AA.
G4PIQ @ GB7MXM.#36.GBR.EU

From left: Chris Swallow, G3VHB; M A Peiperl, G0UHK; and Dave Sharred, G3NKC, operating at the multi-multi station G0KPW during the *CQ* WWDX SSB contest in October last year.

YOU WILL, by now, have seen the rules for the 1996 contests in the September *RadCom*. Having all the rules in one place will hopefully make it a lot easier for you to find the information which you need! All the rules have been revised and many re-written, but the VHF contest rules in particular received a lot of attention and have undergone a complete face-lift. There are a few changes to the substance of the rules. For example, crossband contacts now count half points on 2.3GHz and above; some more contests move to 1pt/km scoring, and the rule about exactly who qualifies as a single operator fixed station has been changed. The old single operator fixed station rule has been removed, and it is now permissible for someone to enter a VHF single operator fixed station section when operating from, for example, a club station, provided the operation takes place from the main station address on the licence and that the station is housed in permanent substantial buildings.

ENTRIES ON DISK

In spite of these changes, most of the effort was aimed at making the rules more usable. We've tried to clarify some rules which had caused some confusion in the past, such as making it clear that in VHF contests, packet cluster can be used in all sections, and a number of out-dated rules have been removed. The structure of the rules has also been changed with a core set of General Rules which apply to every contest, and then a set of special rules only, some of which will apply to a particular contest. Details of which of these special rules apply to a particular event along with the date, time, and sections are all contained in the master table of VHF contests. We are also very keen to encourage entries on disk and we've brought things into line with the HF events, so no paper copies of logs need to be supplied with the disk. However, please provide a contact telephone number on the paper cover sheet (which is needed!) so that we can get hold of you when our computer helpfully reveals: 'Disk error reading drive A'! I've just come back from a weekend adjudicating VHF Field Day, and having lots of logs on disk really is a great help. The only people who weren't popular were the two well placed groups who didn't supply soft copies which we had to type up!

There is one important rule for 1996 which applies to both HF and VHF contests which may need a little explanation. County boundaries are going to change substantially over the next year or so - some will just have their boundaries re-shaped, while others will disappear completely and some, which were scrapped several years ago, will make an official re-appearance. In Scotland the situation seems even more confusing to an outsider, with the likelihood of many new county-like units being formed or re-formed. Whatever your views on these changes, all of this frantic activity by the bureaucrats and politicians is going to make life a lot more complex on the multiplier front for next year's contests! To try and keep things manageable, we have decided that, for 1996, all multipliers will be based on the county boundaries of 1995. If someone gives you one of the new counties in the exchange you will need to make sure that you can figure out what old county they were actually in during 1995. It will be easy enough to ask people on SSB, but this is going to pose a little more of a challenge on CW, so it will help everyone if you send the right exchange in the first place! This ruling will be reviewed before we set the rules for 1997 when it is a little clearer how well understood the new counties will be.

There is no doubt that we won't have got everything right in these changes and, of course, your feedback will be very welcome. Many of the changes this time have been based on your contributions over the past nine months and more. We really do appreciate the time taken to help us get it right and we're thinking about 1997 already! If you have any comments on the HF rules, please send them to Chris Burbanks, G3SJJ, and comments about the VHF rules should go to David Johnson, G4DHF - both are QTHR.

WRTC ON FOR 96

EARLIER THIS YEAR plans to run a World Radiosport Team Championship in Washington DC during 1995 fell apart, but it seems arrangements are being made in good time for the 1996 event. It will run during the IARU HF World Championship on 13/14 July 1996 and will be hosted by the Northern California Contest Club in the San Francisco Bay area. The exact rules have yet to be published and I'll bring you more information when I have it. However, the organisers are planning to make some changes to the controversial selection criteria that was to be used to determine who was eligible to enter the 1995 event.

EURO SPRINTS

OCTOBER IS time for the second pair of European Sprint Contests. The SSB leg is 1500-1859UTC on 7 October, and the CW leg runs at the same times, but on 14 October. If you want to find out more about these contests look at the March 1995 *Contest Exchange*. Although N6TR's LOG program supports the sprint well, and it is also quite possible to use other software (I used LOG by G3WGV), DL2NBU has made available another logging package for the sprint which is very similar to K1EA's CT. If you have internet access you can get it at ftp://gonzo.rrze.uni-erlangen.de/PDS/FREEWARE/HAMRADIO/LOGBUCH/CONTEST/spr113.zip.

CQ WW

THIS MONTH ALSO marks the start of the serious HF contest season and there is nothing more serious than the SSB leg of *CQ* WW which runs during the last weekend of October. The level of activity in this event is huge with somewhere between 30,000 and 40,000 stations entering or just giving points away.

There is no doubt that at the top of all the tables and right the way through the some of the sections, competition is extremely fierce. However, there are actually quite a lot of opportunities to put a more modest entry together and stand a good chance of taking a certificate.

Firstly, there are six categories - single operator high power (full legal limit); single operator low power (100W output - interesting definition of low power this!); single operator QRP (5W output); single operator assisted (with packet cluster or other spotting input); multi-single (normal multi-operator with an additional multiplier station) and multi-multi (chaos). This means that, for example, even if you aren't into true QRP but just don't own an amplifier, you can overcome that disadvantage by choosing to enter the low power section. Then, for single operators there are the single band entries. Rather than having to put a big antenna system together for all six bands and having to juggle the band changes carefully, you can concentrate your efforts on a single band.

Those chasing awards should note that certificates go to the leading stations in each country in each category, including the single band variants. This means that, for example, one G station could be top G on 14MHz low power, and another could be top G on 14MHz QRP, and another on 14MHz assisted and all will receive certificates. This makes a total of potentially 210 certificates to the UK. I have the 1993 results in front of me and I can count 25 certificates awarded to the UK - let's try harder this year! There is one important criterion which needs to be satisfied to get a certificate; single operators must operate for a minimum of 12 hours and multi-operator stations for at least 24 hours.

The event really is great fun, with complete chaos at times, but there is something for everyone. If you don't fancy having a go on your own, the multi-single section is particularly well suited to club entries since having an additional multiplier station means that more people can be fully involved all the time. You'll find brief rules for the event in *HF News*, and full rules are in *CQ* magazine or on the Internet at http://mpoli.fi/~leif/oh2ki.html. ♦

TURN TO PAGE 88 FOR CONTEST CLASSIFIED

SWL NEWS

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

OCTOBER SEES perhaps the biggest event in the SWL calendar - my SWL Challenge, which coincides with the SSB leg of the *CQ* World Wide DX contest. I am hoping for an improvement on the 80 logs which were received in 1994. A great deal more publicity this year should lead to in excess of 100 entries. Last year, the UK effort was first class and I am looking for an even greater number of logs this year. Although the transmitting contest takes place over the whole 48 hours, listeners can choose the times they listen and are encouraged to submit a log. I intend to prepare a results booklet similar to last year and include not only the results and a contest summary, but also a page devoted to your comments, statistical information, and other useful data. As in 1994, I hope to be able to include photographs of listeners receiving stations. So why not send a photograph along with your log. If it does not find its way into the results booklet, you might see it featured in *SWL News* at a later date.

C56 QSLS

AS AT MID-AUGUST all cards received for the C56DX and C56/G0MRF DXpedition in October/November 1994 were answered. I have been surprised at the number of listeners who sent reports. To date, 66 have been answered - 26 for C56DX and 40 for C56/G0MRF. A breakdown by band and mode is included below:

C56DX (all SSB)

28:	14
21:	8
14:	4

C56/G0MRF

	SSB	CW
28:	3	0
24:	0	1
21:	14	1
18:	3	0
14:	10	2
10:	0	2
7:	0	1
3.5:	0	0
1.8:	0	2

From the figures it seems clear that a great many listeners monitor 28MHz during contests in the hope of catching good DX. On the LF bands, the Gambia was not blessed with favourable conditions to Europe, but the lack of reports on 7MHz shows that few listeners are prepared to look for the DX on 7MHz. Outside of the contest, reports suggest that most listeners prefer to do their DXing on the traditional DX bands. On the WARC bands - 24, 18 and 10MHz - six reports were received. Perhaps the best reports were those for 1.8MHz CW one of which was from Robert Small, BRS8841. Listening on 1.8MHz needs a good receiver, good antenna and lots of dedication - so, well done!

REPORTING

BEING A QSL Manager for a major expedition has given me an insight into reporting standards and QSLing techniques. Unfortunately, some negative aspects need highlighting. The report *must* be accurate otherwise it will more than likely be consigned to the bin. A major DXpedition will keep its log on computer using a program like 'CT'. To check whether an SWL report is accurate requires the call of the station worked to be inputted. Therefore, if the call of the station worked is incorrect, the report cannot be easily verified. Hence, accurate reporting is essential. I have long suggested that more than one station being worked is included in the 'station worked' box of your QSL. Now that so many keep their log on computer, it seems even more worthwhile to include more than one station worked when sending reports. By doing so, the DX station has more than one call to check against in trying to verify your report.

Regarding QSL techniques, *always* include the correct return postage when QSLing direct. In the latest batch of C56 cards, there were cards with no return postage (no stamp, IRC or $), cards with insufficient postage (only 1 IRC when 2 or 3 were required for a direct airmail reply) and even cards which included illegal tender. In these cases cards were returned via the QSL Bureau, but some amateurs would take more drastic measures and not reply at all.

In conclusion, a few simple rules to remember:

- Make the report accurate.
- Make sure your timepiece is accurate. Always use UTC.
- Make sure you get the 'station worked' correct.
- Include more than one 'station worked'.
- Make sure you write legibly.
- Include the correct return postage if QSLing direct.

CQ AWARDS

WELL KNOWN DXer Fred Handscombe, G4BWP, is the Society's HF Awards Manager and saw the *CQ* Awards item in *SWL News* in July's *Radcom*. The information given was only a small part of a much bigger picture. WB9RCY does write the Awards column in *CQ* Magazine but each of the *CQ* sponsored awards has a separate manager.

CQ sponsors four major operating awards - WAS (for working all 40 CQ Zones), CQ DX (a parallel to DXCC without 'deleted' countries), WPX and an SWL VPX for working/hearing prefixes, and USA-CA (the US Counties Award).

I can provide the addresses for each of the managers if anyone wants them. The rules for WPX and USA-CA specifically include SWLs, the other rules do not specifically exclude SWLs but do not directly include them.

In addition to these awards, *CQ* are sponsoring some awards for the 50th Anniversary of *CQ* Magazine being celebrated this year. Fred can supply copies of the rules and application forms (where they exist), for all those awards in exchange for a large SASE (A4 or A5 sized).

As a guide, one set of rules and forms runs to 6-8 pages of A4. There will be more from Fred about RSGB SWL Awards in the next *SWL* column.

NEWS & DX DATA

READERS WILL recall that Liam O'Hara, RS95272, was lucky enough to be given A92FZ's DR48 communications receiver last March. He uses the receiver almost daily and has heard many interesting stations. He keeps a log and sends reports. He expressed particular satisfaction with one QSL received from Radio Austria to celebrate International Marconi Day. He is to study for the RAE and 12 WPM Morse test in the coming months.

Meanwhile on the DX front, Graeme Caselton, RS44984, seems to be yet another SWL hooked on IOTA. His report lists many stations operating from islands, both outside the IOTA contest and during the contest itself. Interesting island loggings include IB0/IN3XUG/P (EU-045), ES0/DL9GJW/P (EU-034) and W5IJU/CY9 (NA-094). On the QSL front, Graeme had received a card from TR8JLD for a report sent in 1987! Graeme asked whether reports should be listed by callsign or by band? I find it more helpful if listings are in callsign order.

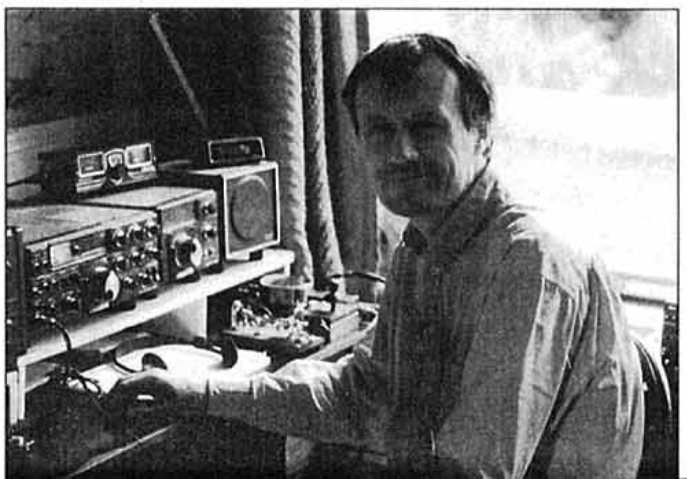
ZC4DX ALL SET

THE WHITTON ARG are due to embark on another DXpedition and I am, once again, handling the QSL cards for SWL reports.

The DXpedition will be active for the two weeks from 24 October to 6 November. There will be a serious effort during the SSB leg of the *CQ* WW contest. They will have equipment for frequencies from 1.8MHz to 2.4GHz. Outside the contest, the group will be making a substantial effort to give ZC4 to the needy on the more wanted frequencies and modes ie 1.8, 10, 18 and 24MHz and on RTTY. So, if any SWL hears the DXpedition and wants a card for ZC4, send them to me either direct (using the guidelines noted above) or via the RSGB bureau.

FINALE

THAT'S IT FOR another month. Please keep me in touch with your listening habits. The deadline for the **December** *SWL* is **11 October** ♦



Robert Small's, BRS 8841, well equipped station which he shares with his father G3ALI. Robert has entered the SWL Challenge in 1993 and 1994. He was 2nd in '93 and 3rd in '94. He hopes to maintain this impressive form in the 1995 event.

IARU

JOHN ALLAWAY, G3FKM
and
TIM HUGHES, G3GVV

MORE GOOD NEWS has arrived from Region 2 concerning the International Amateur Radio Permit (IARP). Resolution OEA/Ser.P AG/doc.3256/95 has now been approved unanimously. Uruguay and the USA signed the Convention on 8 June, making it effective 30 days later. The member societies in Region 2 are now working hard to persuade *all* members of the Organisation of American States to sign. This is going to be a gigantic task because legal procedures will be different in each country and much co-ordination between telecommunications, foreign affairs and, in some cases, legal departments will be necessary. Region 2 hopes that countries *outside* the Americas will join and New Zealand has apparently already expressed interest. New Zealand is, of course, already involved with T/R 61-01. Significantly, in the General Provisions of the original document under the heading Definitions, there is a mention of the IARU. This bodes well for amateur radio and it shows that the inexorable progress towards a real IARP is truly under way!

RISING STARS

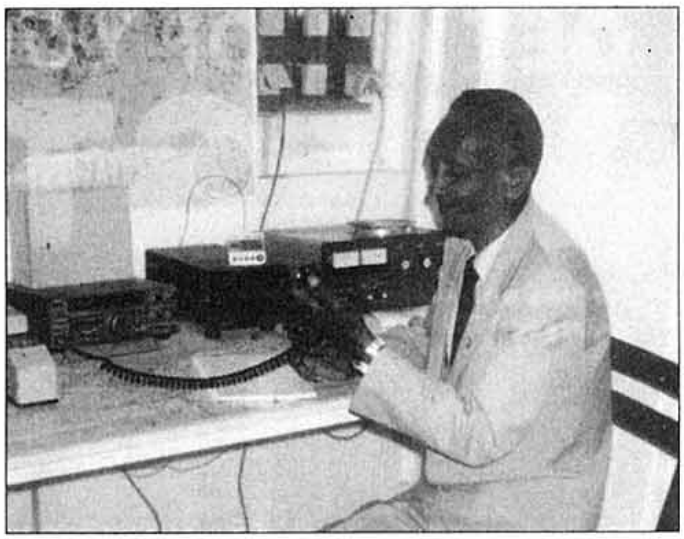
IN PREVIOUS items we have mentioned the Working Group for the Support of Amateur Radio in Region 1, or 'STARS' for short. Its co-ordinator is Hans Welens, ON6WQ, who made us all aware that of the 55 or so countries in Africa, less than half have an organised national radio society. The Working Group has representatives in northern Africa (7X4MD), western Africa (6W1KI and 9L1YL), eastern Africa (5Z4MR) and South Africa (ZS5AKV). This group should not be confused with another group in Africa called the AFRICOM sub-regional Working Group, the purpose of which is to monitor the work of African official organisations such as PATU (the Pan African Telecommunication Union). The AFRICOM group's co-ordinator is 5N0OBA.

News has arrived from Hans van de Groenendaal, ZS5AKV who reports that the Liga dos Radio Emissores de Mozambique (LREM) - the dormant IARU Member Society in Mozambique - has been reactivated. The vice-president is Jose Perez Santo, C91CE, and the new address of LREM is, PO Box 2731, Maputo, Mozambique.

EARS ON SHOW

AN UPDATE ON the Ethiopian Amateur Radio Society (EARS) was received recently from Sid May, ET3SID/G4CTQ. Sid reports that an African Regional Symposium on Telematics for Development was organised by the UN in Addis Ababa in April and that EARS was allowed to set up an exhibit which demonstrated SSB, AmTOR, packet, RTTY, fax etc much to the interest of the visiting delegates, some of whom were unaware of the existence of amateur radio. Sid sent a list of delegates who attended the symposium which included the names of representatives from many African countries where amateur radio is not developed.

From Left: Wojciech Nietyksza, SP5FM, vice-chairman of Region 1; Dick Baldwin, W1RU, IARU president; H E Ahmed Suwaidan Al-Balushi, A41FK, minister of telecomm-unications of Oman and chairman of ROARS; Lou van de Nadort, PA0LOU, chairman of Region 1; and Pedro Seidemann, YV5BPG, secretary of Region 2.



Admass Zeleke, president of the Ethiopian Amateur Radio Society.

BOOKS GO FAR

TO ASSIST overseas candidates studying for their radio amateurs' examination, the RSGB generously despatches some of its own publications, the *RAE Manual* being in particular demand.

We were delighted to hear from Cassandra Davies, 9L1YL, that RSGB books had reached Sierra Leone and were being put to good use. The Region 3 STARS programme functions in the same manner in Asia and Australasia and RSGB material for Bhutan is on its way.

Meanwhile, word has reached us from David Rankin, 9V1RH, that attempts to meet with the authorities in Myanmar (Burma) have not yet been successful.

REGION 2 TALKS IN NIAGARA FALLS

BY THE TIME you read this, G3GVV and G3ZNU will have been at the Region 2 Conference in Niagara Falls. Hosted by the Canadian society RAC (Radio Amateurs of Canada), representatives from North and South America including Central America and the Caribbean will be attending. They are due to present two papers from the RSGB, one dealing with the Monitoring System and the other with the VHF/UHF/Microwave bands in CEPT countries.

Once again, this will enable the Society to be made aware of proposals which could well affect its own members.

Following the Region 2 Conference, the 1995 Administrative Council meeting will take place. G3FKM will be attending as one of the two IARU Region 1 representatives. The other is Lou van de Nadort, PA0LOU, who is chairman of Region 1.

AZERBAIJAN

THE FEDERATION of Radiosport of Azerbaijan has requested details of how to apply for membership of the IARU. Natig Kasimov, 4J5T - the President of FRA - also expressed sincere thanks to the RSGB for helping to distribute QSLs on behalf of Azerbaijani amateurs.

GENEVA EVENTS

DURING OCTOBER two very important events will take place in Geneva. The first will be WRC-95 and the second TELECOM 95, which will open on 3 October and finish on 11 October. As usual, space has been allocated by the organisers of the event for an IARU exhibit which will be manned by a multi-lingual team of amateurs probably including Larry Price, W4RA; Paul Rinaldo, W4RI; Pedro Seidemann, YV5BPG; Vincent Magrou, F5JFT; and Hans Ehlers, DF5UG. They will be meeting officials from all over the world and presenting the case for amateur radio to very influential people. The value of this public relations exercise is incalculable. WRC-95 - which will take place between 23 October and 17 November - is *believed* to have nothing of amateur interest on its agenda but this can never be taken for granted and IARU representatives will be observing throughout.

IARU President Dick Baldwin, W1RU, and IARU Region 1 Vice-Chairman Wojciech Nietyksza, SP5FM, are scheduled to attend on our behalf. The IARU will be hosting a reception for delegates to WRC 95 on 31 October. This will provide an excellent opportunity to meet delegates and the IARU reception has now become a respected tradition. ♦

Wires . . . Cables . . . Connectors . . . Clips . . . Plugs and Sockets

GET ALL OF YOUR WIRES FROM WESTLAKE

SEE US AT LEICESTER!

Cables and wires for your wireless:

Westflex 103, low loss air spaced 50 ohm	95p/m
RG213U, (UR67), Mil spec, 50 ohm low loss	70p/m
UR43, 5mm dia, 50 ohm, single centre	30p/m
RG58CU, 5mm dia, 50 ohm, stranded centre	30p/m
RG174U, 2.3mm, 50 ohm, miniature coax	35p/m
UR95, 2.3mm, 50 ohm, mini nylon coax	30p/m
UR111, 2.3mm, 75 ohm PTFE mini coax	40p/m
UR57, 10.3mm, 75 ohm low loss coax	70p/m
UR70, 6mm dia, 75 ohm transmitting coax	30p/m
Double screened, 75 ohm coax, 8mm dia	40p/m
UHF low loss TV downlead, 75 ohm	25p/m
75 ohm twin balanced feeder, 400 w PEP	25p/m
300 ohm standard ribbon	25p/m
RG62AU, 6mm dia, 95 ohm coax	50p/m
Single core screened cable, 2.3mm dia	12p/m
Two core screened cable, 5mm	30p/m
3 core mains, 5 amp, cable	25p/m
6 core rotator cable, heavy duty	45p/m
8 core rotator cable, heavy duty	65p/m
14 SWG HD copper	25p/m
16 SWG HD copper	20p/m
PVC coated AE wire, light duty	8p/m
Red/black DC power cable, 8 amp	30p/m
Red/black DC power cable, 15 amp	45p/m
PVC coated AE wire, heavy duty	12p/m
NEW UR67 50 ohm HD with robust outer sheath	90p/m
NEW 75 ohm heavy duty twin balanced feeder	60p/m
NEW 300 ohm heavy duty slotted feeder	60p/m
NEW 16swg stranded copper aerial wire	30p/min
NEW 450 ohm ladder ribbon feeder	65p/m
Self amalgamating tape	£3.80
Dipole centre boxes	£2.50
Polyprop egg insulators	50p
4in dog bone insulators	70p
Half kilo multicore solder	£5.00

N CONNECTORS FOR ANDREWS 4/50 and 5/50. Cellflex ⅞th cable etc — SAE for special surplus lists.

Postage on cables up to 20M £3.00, over 20M £5.00

SPECIAL OFFER!

WESTFLEX 103 . . . the super low loss 50 ohm cable at the affordable price (we sell nearly 80% of our production to the commecial market . . . inc HM Govt, BBC, BT, Racal and other UK blue chip companies as well as several tons a year for export) . . . **100m drum to the amateur market for £80 plus £6 delivery.**

ADAPTORS . . . all 50 ohm

BNC plug one end . . . SO239 socket the other end	£1.60 ea
PL259 plug one end, BNC socket the other	£1.60 ea
N plug one end, SO239 socket on the other end	£3.00 ea
N plug one end . . . BNC socket on the other, MIL spec	£3.50 ea
BNC plug one end . . . N socket on the other, MIL spec	£3.50 ea
PL259 plug one end, Phono socket on the other	80p ea
Phono plug one end, SO239 socket the other	80p ea
BNC plug one end, Phono socket on the other	80p ea
3.5mm plug one end, SO239 socket on the other	80p ea
N plug one end, C socket on the other, MIL spec	£4.00 ea
N plug one end, with C plug on the other, MIL spec	£4.00 ea

SPECIAL HANDY OFFER!

BURNDEPT BE600 hand portables, UHF, 420-470MHz, 6 channel. Complete and good condition, no batteries (take 2x9v PF1 Rx type) **£25** each postage £3

20 way Automatic Battery Chargers/Processors for above 9v batteries . . . will also suit PFI Rx and BE470 Batteries etc **£25** each postage £5

MIL SPEC PROFESSIONAL CONNECTORS

Below we list our stock of MIL spec professional connectors . . . these are mainly by GREENPAR and are normally SILVER PLATED bodies, pressure sleeve clamps, PTFE insulators & silicon rubber gaskets . . we normally hold large stocks and most of the lines are repeatable . . . the prices are extremely good value and below normal trade price for small quantities.

All the types below are with pressure sleeve clamp

N TYPE

N plugs . . . for UR67/RG213	£2.60 ea
N plug . . . special for Westflex 103	£5.80 ea
N line sockets . . for UR67/RG213	£2.50 ea
N plugs for 5mm cable (UR43/76 RG58 etc)	£2.60 ea
N chassis sockets . . . 4 hole fix	£2.00 ea
N in line adaptors . . . 2 x N sockets back to back	£3.00 ea
N in line adaptors . . . 2 x plugs back to back	£3.60 ea

BNC

BNC plugs for UR43/76/RG58 or any 5mm coax	£1.20 ea
BNC chassis sockets, round hole fix, open back	80p ea
BNC chassis socket, round hole, insulated type	60p ea

SPECIAL OFFER!

GREENPAR 5mm entry PL259s with pressure sleeve entry glands (like N type cable entry), the ultimate quality in PL259s with silver plated bodies and PTFE insulators, were £3 ea . . . **now only £2.50 each** . . . 10 for £23.00.

Popular standard connector lines

PL259 PLUGS

PL259 plugs . . . excellent quality to take 10.3mm coax UR67 etc	60p ea
Reducers for above to take 5mm coax . . . ie RG58/ UR43/76	20p ea
Reducers for above to take 7mm coax . . . UR70/TV coax etc	25p ea
PL259 plugs . . . with built in reducer for 5mm coax	60p ea
Angle PL259 plugs . . . side 5mm coax entry	£1 ea

MICROPHONE PLUGS & SOCKETS

4 pin mic plug . . . the piece on the end of the mic lead	80p ea
4 pin mic plug . . . angle type, with side cable entry	£1.30 ea
4 pin mic socket . . . chassis mt to suit above	80p ea
4 pin mic line males . . . used to extend mic leads etc	£2.40 ea
6 pin mic plug . . . with 5 holes on the outside, 1 in the middle	£1.20 ea
6 pin mic socket . . . chassis mt to suit above	£1.20 ea
6 pin mic line male, used to extend leads etc	£3.00 ea
7 pin mic plug	£1.50 ea
7 pin mic socket . . . to suit above	£1.50 ea
7 pin mic line male . . . like to piece on the set but line type	£3.00 ea
8 pin mic plug	£1.50 ea
8 pin mic socket . . . to suit above chassis mt	£1.50 ea
8 pin mid line male . . . other way around from the bit on the mic	£3.50 ea

NB The piece which goes on the end of the mic lead we call a plug . . . it is in fact a line female connector and the male side which is fitted on the rig we term a socket . . . it is in fact a chassis mt male.

TNC

TNC plugs for 5mm coax	£1.80 ea

PL259

PL259 plugs . . . high quality, with PTFE insulation & silver plated bodies for UR67/RG213 (not pressure sleeve type)	£1.20 ea

ADAPTORS

BNC plug one end to N socket the other	£3.50 ea
N plug one end to BNC socket the other	£3.50 ea
PL259 plug one end, N socket on the other	£3.50 ea
SO239 socket to SO239 socket . . . in line	£1.50 ea
BNC socket to BNC socket in line	£1.60 ea

All the above connectors are 50 ohms

BNC SERIES

BNC plugs . . . 50 ohm for 5mm cable, standard quality	75p ea
BNC plug . . . 50 ohm high grade MIL spec, silver plated .5mm coax	£1.20 ea
BNC plug . . . 50 ohm for 10.3mm coax, RG213 etc	£4.00 ea
BNC 50 ohm chassis sockets, round hole	80p ea
BNC 50 ohm chassis sockets, round hole, insulated mount type	60p ea
BNC 50 ohm chassis sockets, square flange type, 4 hole	90 ea
BNC coupler . . . 2 sockets, back to back in line, 50 ohm	£1.60 ea
BNC coupler . . . 2 plugs back to back in line, 50 ohms	£2.00 ea
BNC adaptor . . . 50 ohm, a plug and socket at right angles	£2.00 ea
BNC T connector . . . 50 ohm, 3 x BNC socket outlets	£3.00 ea
BNC T connector . . . 50 ohm, 2 x BNC sockets & 1 x BNC plug out	£3.00 ea
BNC chassis socket . . . Greenpar to take RG174/ UR95 etc	£1.00 ea
BNC dustcaps . . . to fit on any BNC socket, Greenpar	50p ea
BNC sockets . . . 75 ohm, 6mm coax cable entry, chassis or line, MIL spec	70p ea
BNC coupler . . . 75 ohm, 2 sockets back to back, line or chassis mt, HQ	80p ea

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TNC plugs . . . 50 ohm, 5mm cable entry, MIL spec, silver plated	£1.80 ea
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TNC couplers . . . 50 ohm, socket to socket back to back, line/chassis	£1.50 ea

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N plug . . . 50 ohm, 10.3mm entry, UR67/RG213/ 103 etc MIL spec	£2.60 ea
N plug . . . 50 ohm, 5mm entry, UR43/76 RG58CU, MIL spec	£2.60 ea
N plug . . . 50 ohm, large 20mm entry, MIL spec, Greenpar	£4.00 ea
N plug . . . 50 ohm, large 23mm entry, MIL spec, Suhner	£4.00 ea

(Any of the above 3 large plugs could be adapted for Heliax cables)

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NOVICE NEWS

MRS ESDE TYLER, G0AEC
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MIXENDEN J & I School, featured in August's *Novice News,* has had a few visitors recently, myself among them.

Dick Ganderton, G8VFH, managing director of PW Publishing and editor of *Short Wave Magazine* travelled up from Dorset to present the school with a selection of books and two receivers - one for HF and one for VHF.

Two members of the Community Affairs team from the Halifax Building Society were there too - the Building Society shows a special interest in local affairs and sponsors some deserving local groups. They brought a cheque for £190 to add to a previous contribution, for David Haigh to use for the benefit of the radio station in the school.

David was one of the students on the intensive STELAR course at Easter and was hoping that I would be able to report complete success in the RAE. Unfortunately, there is still one part to pass, so the school must wait just a little longer before becoming a full transmitting station.

A SMART PAIR

INTERESTING ACCOUNTS from two A class Novices have reached me. The first concerns Roger Moore, 2E0AHQ, (right) who expresses disappointment at the lack of A-licence Novices. He feels that they are missing out because of the activity on the bands open to them.

There is plenty of scope for Morse working on the HF bands, where the Novice power allocation is in line with the power used for QRP working. Also, there are many excellent kits for constructing QRP Morse-only transceivers which should be within the capabilities of many Novices. If you feel less than confident of your building prowess, I am sure a local amateur who is skilled in this field would be willing to at least supervise.

Top band and ten metres offer a chance to talk to other amateurs. Roger says there is plenty of activity and, again, there are kits available to build at budget prices.

During January and February he made contact with 14 different countries spread right across the world in addition to those here in the UK.

I also received word from Tom Stevens, 2E0AIZ, who cheerily reveals that he is "over twenty one". Tom learned Morse during his army days but, at that time, did not think he could achieve an amateur licence.

After reading an article about a Novice who was "past the first flush of youth", he was pressed by his wife to do the same. He joined the Novice course run by Wilf Dunnell, G3BYW, along with three very young men.

Tom passed, bought a kit and ran what he terms a very strange dipole around the garden and sat down to communicate to the world. He cannot yet claim the same success as Roger, but is working at it. He has contacted Italy, Spain and some of the members of the former USSR. He finds the present QRM on the bands distracting but feels a surge of excitement whenever he receives an answer to his call. He hopes that this excitement doesn't fade with time though his wife may not agree as he wakes her to announce he has received a reply. I am sure that she doesn't regret pointing Tom in the right direction!

My sincere thanks to both for writing to tell their very different stories. I am sure there must be almost as many variations on a theme as there are Novices. Further contributions would be much appreciated.

KEEP IT CLEAR

SOMETIMES QSL cards are sent and a return card eagerly awaited in vain. This may not be due to non-reply nor to mail going astray.

When in contact with another amateur, *please* give your callsign clearly. If using 'phone, give it phonetically, speaking slowly and clearly. If using CW, send it clearly and, possibly more slowly, a few times. Listen carefully to it being repeated by the other station and correct it if there is a mistake.

Why am I repeating the obvious? There have been cases reported of cards giving details of QSOs that did not take place. Some letters sound similar in speech and can be confused. 'T' and 'D', 'B' and 'P' for example. There are others. In CW too, there are letters which can be confused. An extra short dah or long dit can change a letter, which in a callsign, can result in the situation described above. If your card turns up at a wrong destination because you did not take enough care, don't be surprised if someone thinks there is a pirate about!

MEMORY HINT

CONCERN HAS BEEN expressed in previous City and Guild reports over the number of candidates who would wrongly wire a three pin plug.

Although this question did not arise this time, it will no doubt surface again in one form or another. Ron Luff, G4UMO, suggested the following memory aid:

The *brown* knocks you *down*, The *blue* is quite *new* (tral). And the one with the stripe around goes to *ground*.

Ron hopes that this will help students to get this particular question, in whatever form, right in future.

JOINING A CLUB

HAVING EARNED your Novice licence, you may have doubts about your local club. You may question whether the club caters for your interests. These could include construction ventures, the opportunity to listen to - and maybe use - other bands under supervision, foxhunting, contesting, portable working and antenna building. Youngsters need to realise that they must help to organise and run their own club. As for radio club members, many of you have a great deal of expertise in many fields and maybe time to spare. Are you prepared to help a budding generation of amateurs? If you have any ideas, I would be interested to hear from you.

CALLSIGNS

SOME CALLSIGNS CAUSE a smile and you wonder if the holder is quite so amused. Some callsigns trip off the tongue - or key - and you may have wondered at how lucky the holders were to receive such a distinctive callsign. Did they apply for it - and did they wait long?

Some advice from Roy, G4SSH, may help you to choose such a callsign for yourself. If you are currently upgrading your Class B Licence and know that you will receive a callsign which may be yours for life, why not give this matter some thought - and choose one that you can turn to your advantage. Some differences apply depending on which mode of transmission you intend to use most - and Roy has given advice to cover everyone.

When you are ready to apply for your licence, pause a moment and plan ahead. The GB2RS news broadcast each week tells the latest callsigns issued, or you could ring SSL (tel: 0117 925 8333) and ask them for details. If you intend to use Morse, Roy suggests that you avoid single character letters such as E or T as the single character may be lost in poor conditions or run into the next symbol. Avoid also G and K as the last letter as they may be confused if the call is repeated.

For SSB working, the advice is different. Try to avoid a string of letters which have three syllables each when said phonetically. SUN sounds a nice callsign but Sierra Uniform November takes a long time to say when you are trying desperately to catch the attention of a rare station in a pile-up.

The rules state that you can reserve a callsign six months in advance of its expected date of issue, so you have quite a wide choice of options to choose from - SSL will give you an approximate date of issue for your choice. When you have tried and tested your proposed new callsign - and it has met with your full approval (and you have chosen an alternative, just in case) it is time to act. Ring SSL to confirm that the combination is still available and if it is, send your cheque, application and your request in writing. Then sit back and be patient. ♦

RADCOM NEWS FEATURE

Red Cross and UNHCR Relief Operations

by Peter Casier, ON6TT*

WHAT DO F6EXV, PA3DZN, G3MRC, F2CW, SM0AGD and OH2BBF have in common? Well, they are all highly-respected DXers and most of them have been on major DXpeditions. But there is more: all of them provide telecommunications services for relief organisations. Some do it as a profession, some voluntarily. I am one of them. Let me share my story with you.

Installing the Red Cross Yagi in Malawi.

Relief Organisations' Telecoms

DURING THE 1993 *CQ* World Wide DX contest, Paul Granger, F6EXV, who was one of the operators at our OT3T contest station, received a phone call. He came back into the shack, smiling. "I have a new job," he said as he picked up the headset again, "I am leaving for Africa, working for UNHCR, the United Nations High Commissioner for Refugees. Oh, and do we still need BV on 40 metres?" After the contest he explained that UNHCR, as much as any other relief organisation, has a vast need for a reliable telecommunications service. They call it a 'telecom network'. Typically, the network consists of local, national and international parts. VHF / UHF repeaters, linking up all the cars and handhelds in a certain province or city, typically form the local network. HF SSB stations spread over a number of provinces and remote areas form the national network. Often these also link up the cars on field trips. And then there is the international part: the satellite phone and fax communication, routed over the Inmarsat system, complemented with one or more HF PacTOR links. These PacTOR stations hook up to a central BBS system (yes, with software written by amateurs!) typically in Geneva, to drop off and pick up mail.

These organisations also use the telecom network for everyday internal communications and co-ordination. We are working in remote areas, where a working phone is as difficult to find as an extension cable or a car battery. In conflict areas we also use radios for the security of our staff.

Use of Radios

FOR THE IFRC (International Federation of Red Cross and Red Crescent Societies) in Angola, we had two UHF repeaters in the local network. One linked all Angolan Red Cross ambulances and HQ staff, whilst the other was used by the international delegates, not only to have a flexible communications and co-ordination system, but also for our own security when we moved about during the evening and night. There have been several attempts to hijack our cars or kidnap staff, especially in the last few months. On a national level, we used Codan SSB HF radios. Codan, made in Australia, is a manufacturer often encountered in HF relief telecommunications. We installed 25W transceivers in the cars, with 'Outbacker' pre-tuned antennas. For the bases, spread over the western provinces, we had 100W Codan or 150W Icom commercial rigs feeding a broadband folded dipole. All base stations have a battery hooked up to the power supply, so that one could still operate during the frequent electricity cuts.

The Luanda headquarters of the IFRC had a PacTOR station with a Fritzel 3-element Yagi for 10, 15 and 20m fixed towards Geneva. Why 10-15-20? Well, the IFRC as well as its Red Cross brother, the ICRC (International Committee of the Red Cross), uses frequencies very close to the amateur bands. This makes it easier to find commercially-available antennas. For the lower, local frequencies, we use a broadband folded dipole, with a big resistor in the middle. UNHCR and some other organisations use log periodics, so they have a wider spectrum of frequencies to choose from.

In Malawi, the IFRC had the same set-up, but without any UHF repeaters. There, too, the radios were used to link up the divisional co-ordination centres and the quite extensive number of cars driving around the country.

Goma, Zaire, was quite different, in the sense that UNHCR, the organisation I worked for then, was the main centre for the entire Rwandese relief operation in the area, co-ordinating the work between more than 100 NGOs (Non-Governmental Organisations). Here, the local radio network was much bigger: about nine VHF repeaters covered the four refugee camps, spread over more than 150km from north to south. There were 750 users on the VHF network, most of them using handheld transceivers. Again, a lot of co-ordination work was done through this local network, but even more important was the security aspect: security calls came in through the UNHCR radio room and were forwarded to the security officer. He would often jump into his car and drive to the hot spot, keeping a constant

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radio link with the radio room.

The HF PacTOR stations were not only used to link with Geneva, but also to drop off mail to several UNHCR bases in neighbouring countries.

Use of Amateurs

WHERE WOULD ALL this telecom infrastructure be without the right people? The right people to install, maintain, repair and move the installations, the right people to negotiate licences with the local authorities, to operate the radios, to make a site assessment and work out a proposal for a new radio network, to choose the right frequencies and times to communicate with different parts of the world? You guessed it: this is where the radio amateurs come in.

In Angola, my first job was to put up a five-element Yagi on the top of the HQ building, which was already bristling with TV and UHF antennas. Not much of a challenge for a radio amateur: how many antennas have we assembled during our life as a ham? Twenty? Thirty? So up the antenna went, not without first putting up a system so the Yagi would glide up on two ropes, over the already-installed antennas. In the office, a PacTOR station was assembled. PacTOR doesn't have too many secrets for amateurs, does it?

After that, a whole series of HF installations had to be refurbished. It is only then that you realise just how versatile radio amateurs are: we can work on electric circuits, we are mechanics (installing a radio in a car for instance), construction workers ("can you get on to that roof? - that antenna needs to go higher"), and can use a wide range of tools that others have never seen before.

Next in Angola came a series of new base and mobile installations. Try installing new software on a computer, and debugging a computer network link. Big deal! Done it all during a contest!

It is a good thing too that DXpeditions and contests make us less dependent on 'home comforts' - I often went on a mission in the field for two days, with nothing more to eat than biscuits. Or then again I had to work through

Left: UNHCR HQ in Goma, Zaire.

Have you ever operated a contest like this? The author operating as 7Q7XT in an unfinished Red Cross building in Malawi.

the night, climbing trees or repairing a generator to get an installation ready on time. Not without asking myself "why the heck am I doing this?", though!

Malawi was pretty much the same: up the Yagi went, and two HF base stations. About 15 HF mobile installations had to be refurbished too. One specific challenge where my experience as an amateur came in was in finding a new national SSB frequency. Until then, the bases in the provinces and the cars used a frequency close to 7MHz. The distances to be covered varied between 'next door' and 600km. It was clear that 7MHz during the day was far too high, and thus the network had become really unreliable and so under-utilised. As an amateur, we know that on 40m, we can often hear DL and HB9 from G-land, but cannot hear our neighbour 10 miles down the road. So, down came the frequency, to around 5.8MHz.

We did not have a licence for that frequency. No problem, I already knew the PTT officials, as I received my 7Q7XT licence from the same people a few weeks earlier.

Goma, Zaire, was a totally different mission. I supervised the UNHCR telecom department for the region of North Kivu. It felt like managing a contest team, with 10 international operators from Scotland, Ireland, France, Uganda, Zaire and Djibouti manning five stations, a seven-line satellite telephone, and fax. Throw in a couple of technicians, and you are ready for a multi-multi contest. The noise certainly added to the comparison! And the operating: the operators passed traffic from VHF to HF or to PacTOR, dispatched messages, broadcast announcements and followed up on emergency calls, like passing multipliers from band to band. Certainly during distress calls, the tension was like the excitement of being in the heat of a contest. The only difference was that often here there were lives, and not just multipliers, at stake.

Apart from the pure people management aspect of the job, I had to supervise all the technical aspects of our network. One of the greatest experiences was finding a new location for our most northerly repeater. Imagine driving for miles and miles with a convoy of 4x4s, on roads comparable with those of the Camel Trophy [see cover pictures -*Ed*]. Then, at the foot of the hill, mount a real jungle expedition team, with the first guy machete-ing his way through the dense jungle, the second carrying the battery on his head, the third and fourth the crate with the repeater, the fifth the solar panels, and so on. After an hour's climb, you come to the summit, put everything together and - it works! You have just installed a repeater with a coverage of roughly 200km. Worth the climb.

As you can see, the different qualities of a radio amateur keep popping up. Even more so, they are the qualities of an active DXer and contester, or a DXpeditioner. People with this profile have enough versatile skills and are creative enough to find solutions for all kinds of practical problems.

Now why amateurs, and not what they call 'professionals' - electronic engineers? Well, first of all, I think the average DXer / contester is more 'professional' than the professionals. They take pride in a neatly-installed, well-functioning radio network. And contesters or DXers are the best radio operators around, especially when conditions are marginal. Professional army or navy operators pass traffic for an hour or two a day. How many hours does an active amateur spend in front of his rig, digging out those weak, muddy signals? Two or three? And during an expedition or contest? Twelve, or eighteen?

I think one of the main reasons, though, why many relief organisations employ amateurs in their telecoms department is because we are so versatile. We know how to handle concrete, metal, wood, electronics, propagation, computers, politics, neighbours and electricity. And on top of that, we are not afraid of getting dirty while climbing roofs, towers and trees. I do not want to brag about 'us hams' too much, but do think about it!

Is it for You?

IN A GOOD marriage, both partners are attracted to each other. So why do amateurs work for relief organisations? Well, it is an unusual job for unusual people. It gives you plenty of opportunities to travel around, to places where only few outsiders go. You get to know many people who have the same 'the world is my home' spirit. And you get to operate a lot of radio, not only at work, but also being DX in your spare time. The work is quite varied (understatement) with every day, or every hour, presenting new 'challenges' (nice word). On top of all that, of course, comes the fact that you work for a humanitarian cause.

The reason I, personally, do it is mainly people, radio and travel. I like people - meeting, talking and working with people from different nationalities is something which has always fascinated me. Radio was my hobby, but after three major expeditions, my wife has other words for it (a joke - she is actually quite supportive!) And then travel - for a couple of years, when I have been at home for more than two months, the itching starts, and I have to *go*. It doesn't matter where, I just need to *go*.

But, all that glisters is not gold. Most telecoms missions take several months and the bigger organisations such as the UNHCR or Red Cross seldom take anyone for less than a six-month contract. Knowing that most missions lead to 'non-family' postings means living without your loved ones for a considerable period of time. Second, the missions are not always easy. Some people cannot get to grips with the idea of living or working in the middle of a million refugees. Others cannot stand the continuous nightly shoot-outs you get in some places. Others get ill, tense or homesick - one should never underestimate the pressure of living under such conditions. On top of that, you cannot make a career out of this line of work. That is not the goal of relief work.

But, if, like me, you get bored with your normal job, give it a thought. The scent of Africa, a sunset in the Pacific or the food of Asia are waiting for you. See you in the Lotus Bar in downtown Goma, or on the plains of Kenya, on a roof or in a tree. ♦

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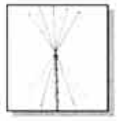

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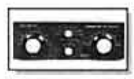

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HP2000 2mtr whip
5.35 dBi, 75W £24.95
HP2000C 2mtr whip
7.15 dBi, 150W £29.95
HP2070 Dual bander
5.35/2.15 dBi, 100W £22.95
HP2070H Dual bander
5.35/2.15 dBi, 100/150W £31.95
HP7000 70cm whip
5.35 dBi, 100W £21.95
HP7000C 70cm whip
7.15 dBi, 100W £28.95
HP2070R Dual bander
8.15/515 dBi, 100/150W £29.95
HP AC/U Base mount
comes with cable £15.95

TS VHF Antennas

Base Antennas

TSB 3301 ....144/70, 6.5/9dB..... £79.95
TSB 3302 ....144/70, 4.7/7.2dB..... £64.95
TSB 3303 ....144/70, 3/6dB..... £44.95
TSB 3304 ....144/70, 6/8.4dB..... £89.95
TSB 3603 ....144/70/23, 6.5/9dB..... £99.95

Mobile Antennas

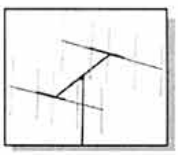
TSM 1002 ....144.4.1dB..... £22.95
TSM 1022 ....70cms, 5.0dB..... £19.95
TSM 1309 ....144/70cms, 3/5.5dB..... £29.95
TSM 1316 ....144/70cms, 2.15/3.8dB £21.95
TSM 1320 ....144/70cms, 2.15/3.8dB £21.95
TSM 1339 ....144/70cms, 3/5.5dB..... £26.95

TS Accessories

TSA 5003 ....Adj gutter mount..... £15.95
TSA 5005 ....Adj hatch back mount..... £16.95
TSA 5303 ....4m/cable assm..... £16.95
TSA 6001 ....144/70cm duplexer(PL)..... £25.95

YA205 10 element 2 mtr beam

Built to professional standards using a pair of 5 element yagis with power splitter and harness this array offers 11.9 dBi gain with a boom length of just 1.65 metres per beam. Power handling is 500 watts, F/B is 18 dB. Special introductory offer



~~£139.90~~ £69.95

50W Docking Booster

For handheld transceivers 1-5 Watts input 50 Watts output.max Built in GaAs FET pre-amp £99.95

Accessories

Yaesu Rotators

A wide range of rotators to suit all applications.

G-250 ..... Light - medium use £129
G-450XL ..... Medium duty £269
G-600RC ..... Medium - heavy duty £339
G-800SDX ..... Heavy duty with presets £419
G-1000SDX ..... H/Duty ver. of G-800 series £479
G-2700SDX ..... Premium/Commercial series £899
G-500A ..... Basic elevation rotator £279
G-5400 ..... AZi/ELE rotator light duty £519
G-5600 ..... M/Duty AZi/ELE rotator £599

Dummy Loads

For "off air" tune-ups we keep a wide selection of dummy loads:-

PSDL ..... 15W, 3 GHz ['N'] type £29.95
DL50 ..... 50W, 500 MHz £11.95
DL61 ..... 1KW, 500 MHz £59.95
DL650M ..... 1.5KW, 650 MHz £59.95
DL2500 ..... 2.5KW, 150 MHz £179.95

Vectronics LP30

Low pass TVI filter 9 pole Chebyshev design 1.5KW

Price £49.95
AKD BB1 ..... Braid breaker £8.50
AKD HPF1 ..... High pass filter £8.50
AKD TR ..... Toroid rings (pair) £3.50

AKD Wave Meters

Check your frequency with these British made wavemeters.

WA1 ..... 2m,120 - 450 MHz £29.95
WA2 ..... 4m/6m, 50 - 210 MHz £29.95
WA3 ..... HF, 1.8 - 92 MHz £54.95

Pro-Am - Mini mag mount antennas, lightweight and discreet.

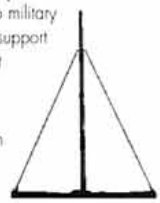
PM 144-40 Dual band
144/70cm 0/2.1db 150W.. £24.95
MM 270B Dual band "Micro"mag
144/70cms 25W Max..... £25.95

Tonna Beam Antennas

20505 ..... 5 El, 6mtr, 10dBi £72.95
20624 ..... 23 El, ATV, 18.1 dBi £48.95
20804 ..... 4 El, 144 MHz, 8.9 dBi £42.95
20809 ..... 9 El, 144 MHz, 13.1 dBi £44.95
20817 ..... 17 El, 144 MHz, 15.3 dBi £92.95
20818 ..... 9 El, crossed 144 MHz £86.95
20909 ..... 9 El, 432 MHz, 13 dBi £43.95
20919 ..... 19 El, 432 MHz, 16.2 dBi £52.95

New Military Style 35ft Telescopic Masts

Russian manufactured to military specifications an ideal support for wire and lightweight VHF beams.



- Seven sections
  65mm bottom section
  20mm top section
- Base plate
- 1 set guys/ground stays
- Spring loaded locking pins
- Colour Green • Weight 9.9kg

Price ..... £139.95 + p&p £10

Yaesu FT1000 MP

The very latest HF radio from Yaesu.

As a Yaesu Master Dealer Nevada can offer the very best deals and after sales service, on this radio.

Why not part exchange your old HF rig today and pay the balance by three post dated cheques interest free!

Call Paul or Lloyd now for further information.

Kenwood TS-870SAT

A New H.F Transceiver from Kenwood!

There's not much information about yet on this new model but what we have heard is that its going to be good! Due to replace the TS-850SAT the '870' will have all the refinements of its predecessor including not 1 but 2 stages of Digital Signal Processing (DSP) in the I.F chain, now that is a first! How much? Our sources tell us it will be under £2,400.

Morse Keys & Keyers

Here is a small selection of our most frequently asked for keys & keyers

HK-708 Competitively price standard key. Adjustable tension & travel £41.95
HK-709 A well engineered and upgraded version of the 708 ..... £44.95
MFJ-564 Deluxe iambic paddle, fully adj. & compatible with many modern rigs £59.95
MFJ 407C Deluxe keyer with fitted Curtis chip, includes dot/dash memory £84.95
MFJ-401B The best selling budget keyer around £59.95
MFJ-557 Practice kit. Key and oscillator combo £31.95

Russian Made Antenna Parts

Built to military spec. for outdoor antenna use.

Baluns
200W 1:1 ..... £23.95
200W 6:1 (for windoms) £23.95
2 KW 1:1 ..... £34.95
5 KW 4:1 ..... £39.95

Roller Coaster

Ceramic former, silver plated wire, fully geared drives
0.8 - 70µH 1KW.
193 x 97 x 86 mm £59.95

License Free Handhelds

Operating on 49 MHz these handhelds do not require any licensing & as such can be used by all the family. Short range & interference free suitable for many applications.

Maxon 49HD
5 channel & call tone ..... (pair) £59
Maxon 49 HX
5 channel headset/radio £69.95
Maxon Spare Headset for 49HX £16.95

Daiwa PS304

A fully protected "Bench" type PSU capable of delivering up to 30 amps.

- Metered
- Variable volts
- Cigar socket output
- Twin outputs ideal for HF 100W rigs or as a general shack supply ..... £139.95 p&p £6

Microset Amps- Last Few!

Give your 2m handheld a bit of a boost! We have just a few R50 amps left to clear at a special price.

- 50 watts out from 1 - 7 watts input
- 18dB pre amp
- Current - 5 amps ..... £89.95 p&p free

Introducing The New Drake R8A

- 100KHz - 30MHz wide coverage
- Passband tuning
- Built-in Pre-Amp & Selectable AGC
- Twin VFO's & Timer Functions
- Dual Noise Blanker
- AM, LSB, USB, CW, RTTY & FM

The new R8A with its full compliment of filters as standard now boasts -

- Improved ergonomics
- Faster scanning
- Expanded RS232 control
- Tone control
- More memory
- Alpha numeric display
- Improved AGC
- Improved FM reception

The R8A's performance is truly staggering, it has a full compliment of filters; synchronous AM detector; multiple scan facilities; 440 memory channels; plus all mode coverage. Why not part exchange your old receiver for this latest model from the USA, we offer excellent PX deals - call our hotline now! £1295

SHOWROOMS:- 1A MUNSTER ROAD, PORTSMOUTH PO2 9BS

MAIL ORDER:- 189 LONDON ROAD, PORTSMOUTH PO2 9AE

NEVADA

Icom IC-706

New and unique all-mode mobile transceiver with ultra wide band receiver plus 2m and 6m all mode! 100 watts on HF + 6m and 10W on 2m ..... £Call

Alinco DX-70

For those of you who feel they don't need 2m in their HF rig this is the ideal choice. We've tried it here in the showrooms and its good! ..... £1095 ..... £995

We offer excellent part exchange deals and our Post-Dated Cheque Scheme!

Stop Press - Arriving Soon an Outbacker Mobile Antenna that covers HF plus 6 mtrs - an ideal companion for the new Icom IC706 or Alinco DX70

Yaesu FT900AT

Unlike some of our competitors - this item is available from stock at a special one off price, including **Free** UK delivery £1299
Order Today and you'll receive it tomorrow.

Continuing with our "Best Buy British" the Drae Magnetic Loop Antennas & Power Supplies are continuing to be a success. Designed & manufactured to a very high standard the Drae range of Amateur Products will not let you down! . . .

Magnetic Loop Antennas

Our new Drae magnetic loops use high quality semi rigid 13mm Japanese Ultra Low Loss cable for the radiating element, making loft mounting & portable operation possible. Packs easily away into the car boot. Fibreglass construction ensures full weatherproofing.
ML80:- 7 - 30 MHz (continuous)
Diameter:- 80cms £169.95
ML170:- 3 - 10.3 MHz (continuous)
Diameter:- 1.7 mtrs £189.95
ML1 Control Unit - Not Supplied
Optional 2 way control unit allows remote tuning & switches between 2 loops ... £24.95

Wire Antennas

New from Drae using "Flex Weave" antenna wire and high quality construction these are the Best!

G5RV	Full size ... (80 - 10 mtrs)	£45.00
G5RV	Half size ... (40 - 10 mtrs)	£35.00
GW40	Windom ... (40 - 10 mtrs)	£55.00
GW80	Windom ... (80 - 10 mtrs)	£65.00
EFW	End Fed Wire... (s/waves)	£59.95
DLB	Long Wire Balun	£39.95
Flex Weave Wire		74p per metre

G5RV Plus Antennas

For the perfectionist a G5RV that uses 450 ohm ladderline terminated in a balun for coax feed without cable radiation.
G5RV Plus Full size (80 - 10 mtrs) £75
G5RV Plus Half size (40 - 10 mtrs) £65

Power Supplies

Solid, reliable and fully protected - Why gamble, Buy the Best!

• Over Current, Over Voltage & Short Circuit protection • Over Temperature protection • High Peak Surge current • 13.8V

24 Amp Power Supply £99.95
12 Amp Power Supply £89.95

High Power ATU Components

. . . and for the constructors among us, take a look at these high power ATU components:-

TC 250 Variable Capacitor
250pf @ 7.8 KV £24.95
TC 500 Variable Capacitor
500pf @ 7.8 KV £34.95
TC26 Roller Coaster
1 - 30pH @ 1KW £39.95
Control Knob
A professional graduated control knob. 6 cm outer diameter with 6mm shaft. £3.57
TC48 Turns Counter
Dial indicates 1 unit for 1rev of counter. 48 turns maximum. 1/4" drive shaft £19.95

Rexon Handies - Offer

A quality handheld that's fantastic value for money.
RL102 - 2mtr
c/w Nicad & Chgr £189
RL402 - 7cm
c/w Nicads & Chgr £199

OUTbacker

One antenna does it all! 160m -10m including Warc bands without the need for an ATU. Get mobile this summer on H.F. with Outbacker!

OB Junior	80 - 10m 4ft	£179
OB Full size	80 - 10m 6ft	£189
OB(T) Full size	160 - 10m 6ft	£219
OB Perth	80 - 10m 7.5ft	£199
OB (T) Perth	160 - 10m 7.5ft	£235
OB Spring Base		£59
OB + 6 mtrs		£POA

Pro-Am

A superior range of HF mobile antennas designed for the DXer. Slimline design & rated at 500W for top performance.

PHF-10	10m whip	£19.95
PHF-12	12m whip	£19.95
PHF-15	15m whip	£19.95
PHF-17	17m whip	£19.95
PHF-20	20m whip	£19.95
PHF-30	30m whip	£19.95
PHF-40	40m whip	£22.95
PHF-75	80m whip	£24.95
PHF-160	160m T.band	£54.95
Pro AB5	A 5 band antenna	£79.95

GAP Verticals

We are pleased to be appointed distributors for these super Verticals from the USA. Using an elevated feed system and no traps, coils or transformers these antennas dramatically reduce losses so more RF radiates into the air! Gap Verticals do not require tuning just assemble the antenna & your ready to go with full band coverage (at less than 2:1 SWR).

Challenger DX
Cvrs:- 2, 6, 10, 12, 15, 20, 40, 80 Mtrs.
Height:- 31.5 ft £259
Titan DX
Cvrs:- 10, 12,15, 17, 20, 30, 40, 80 Mtrs.
Height:-25 ft £289
Eagle DX
Covers 10, 12,15, 17, 20, 40 Mtrs.
Height:- 21.5 ft £269
Voyager DX
Covers 20, 40, 80, 160 Mtrs
Height 45 ft £399

MFJ Antenna Analysers

Are you in tune?
MFJ make easy work out of antenna tuning with these antenna analysers.

MFJ 259
Covers 1.8 - 170 MHz with LCD frequency display and resistance bridge. £249
MFJ 249
Covers 1.8 - 170 MHz as 259 but without resistance bridge £229.95
MFJ 209
An economy model without frequency counter. Utilises analogue read out. £129.95

Yaesu Master Dealer

YAESU

FT2500m - A superb 2m Mobile transceiver offering exceptional selectivity & sensitivity with a punch packing 50W output. This month we can offer it at a massive £70 saving...RRP £399 ..... £329

FT51R	RRP £529	£449
FT840	RRP £959	£799
FT990DC	RRP £2399	£1759
FT 5100	RRP £679	£559
FT11R	RRP £324	£269
FT41R	RRP £369	£299
FT 790 RII	RRP £749	£599
FRG 100	RRP £599	£490
FRG 9600	RRP £629	£575

Kenwood

TM-255E	RRP £785	£695
TS-50S	RRP £1059.95	£955
TS-850SAT	RRP £1959.95	£1765
TS-450SAT	RRP £1649.95	£1485
TH-48E	RRP £369.95	£335
TH-79E	RRP £479.95	£432
R-5000	RRP £1059.95	£955

AKD

A range of British made low cost transceivers - that offer outstanding value for money. At these prices we just can't keep up with the demand!

2001	2mtr 25/5W FM	£193
4001	4mtr 25/5W FM	£193
6001	6mtr 25/5W FM	£193
7003	70cm 3W FM	£193
WA2	VHF Wavemeter	£32.95
WA3	VHF Wavemeter	£32.95
HPF1	High Pass TVI Filter	£8.50
BB1	Braid Breaker Filter	£8.50

ICOM

Icom 707 - Budget HF Transceiver with options for FM & filters. Just passed your morse? Then look closely at this exceptional value rig. Save £80 ..... £749

Alinco

DJ-G5	New Model	£479
DX70	New HF + 6	£995
DRM06	6M Mobile	£299
DJ480E	70cm H/Held	£239
DJ180E	2M H/Held	£199

Alinco Specials

DJ-580 Twin Band Handie
• 5 Watts
• Full DTMF
• AM Airband RX
• Full Duplex (repeater)
• Receives to 950 MHz
only 3 left at this crazy price £369

DR130E 2m mobile

• 50 Watts
• CTCSS fitted
• 20 memories
• Extended RX
• CH or freq. Display
Special "one off" price £299

USE YOUR CREDIT CARDS FOR SAME DAY DESPATCH

ORDER HOTLINES: TEL: (01705) 662145 FAX: (01705) 690626

Pay By Three Post-Dated Cheques

On Any Item Over £100 In Value

Simply divide the price into 3 equal payments. Write 3 cheques dated in consecutive months starting with today's date. Write your **telephone no.,cheque card no. & expiry date** on the back of each cheque. Post them to us, enclosing your name and address & we will (subject to status), send your goods immediately.

AEA Data Products

We are pleased to welcome Lloyd Arrow G1JAR. As one of the countries leading Data Experts Lloyd will be able to help and assist you with all the aspects of Digital Comm's.

PK-12

1200 bps VHF, Packet TNC unit. Features include GPS Firmware, 18K Mailbox Standard (32K RAM) expandable, Forward & Reverse forward messages, Special easy command set for beginners, Gateway Firmway £119.00

PK-232MBX

Multi mode Data Controller. Modes include:- Packet, AMTOR/SITOR, Morse Code, Baudot, & ASCii. RTTY, WEFAX, NAVTEX, PACTOR & TDM reception. Now supports gateway facilities with both ports handling HF & VHF.....£299.00

Software

Skyview Fax H.F.RTTY,FEC,CW + Fax £139
Skyview Synop WMO RTTY £149.95
Sky Call Windows Based Call Book £19.95
IC-RX Computer cont. Icom TX/RX's ..£44.95

Handheld Transceiver PSU 200 Desk Stand/Power Supply

Provides a convenient way to use your handheld on the desk top at home with a 12 volt 2 amp mains power supply to power the handheld. The unit comes complete with a selection of DC plugs/leads to suit most handhelds.

Note - Stand /PSU are separate items
Special offer.....£29.95 (+ £2.50 p&p)

Vectronics

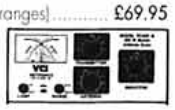
A range of high quality accessories imported by us direct from the USA.

HFT1500 - A 3K Watt (PEP) ATU, with all the extras. 4 way ant.switching, roller-inductor, SWR/PWR meter, Balun for open wire feeders and Peak reading digital meter. Price.....£349

VC300DLP - Our most popular ATU. 300W (PEP), Dummy load, VSWR meter, 3 way ant. switch & Balun for open wire feeders.....£129.95

PM30 - Displays Peak or Average forward power, reflected power & SWR simultaneously. 1.8 - 60 MHz Pwr 3Kw (in 2ranges)..... £69.95

VC300M -New mobile ATU covers all bands. Dual meter reads Power and SWR simultaneously. Can be used at home or in the car £89.95



New From OPTO

OPTO 3300 - A new miniature H/Held counter that's very sensitive.

- 1 MHz - 2.8 GHz
- 10 Digit LCD Display
- Hold Switch Locks Display
- Good Sensitivity
- Supplied c/w Ant, NiCads & Chargers

Special Offer.....~~£159.95~~.....£139.95

OPTO Scout V.3.1

- 10 MHz - 2.8 GHz
- 400 Memories
- Reaction Tune of RX
- Digital Filter & Auto Capture
- 16 Segment Bargraph for Signal Level
- Software Supplied For PC Upload/Down
- Supplied c/w Ant, NiCads & Charger
- Use the Opto Scout to reaction tune your AR8000 Scanner - call for details.

Special Offer.....~~£449.95~~.....£399.00

OPTO M1

H/Held counter
10 Hz - 2.8 GHz
Data port for interface to PC with optional CX12AR.....£239.95

OPTO 3000A Plus

H/Held counter
10 Hz - 3 GHz
RS232 interface plus many other features.....£369.95

Opto SB220A Bench Counter

A general purpose and SSB freq. counter.

- Range 10Hz - 3GHz
- RS232 I/face
- Ext. audio & PTT for auto operation
- 12 Volt operation.....£339.95

Startek ATH50 Counter

- Range 0.5 - 2,800 MHz
- Auto trigger & hold
- RF bargraph display
- Includes NiCads/Charger

Few only at special Price.....~~£289~~..£189

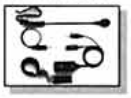
Mobile Headset/Mics

Japanese high quality easy to use and a must for safe mobile operations.

FM50

Headset mic with earphone and lockable PTT will suit most radios.
Price.....£49.95

FM80



Mini boom microphone that clips to the sun visor. Uses lockable PTT for hands free operation £49.95

EM700 (K)

An earphone and microphone combination with lockable PTT for the Kenwood range of hand helds. Superb audio.....£39.95

Quality Used Equipment

All Safety Tested & Guaranteed For 3 Months

Amateur

Alinco DJ-580	Twinband	£299
FDK Multi 700EX	2m FM Handie	£175
Icom 720A	HF Trans. PSU	£695
Icom IC2E	2m Handie	£100
Icom IC4E	70cm Handie	£115
Icom IC-P4E	70cms	£195
Kenpro KT-22	2m thumb-wheeler	£125
Kenpro KT 22	2m Handie	£95
Kenwood TS-120S		£450
Kenwood TS-140S	Gen Cov HF	£695
Kenwood TS680S	HF + 6m	£795
Kenwood TS-830S	Classic HF	£595
Kenwood TS-130V	HF	£395
Kenwood TS940/S	Base HF	£1095
KW1000	H.F Amp	£285
NAG 144XL	2m Base Amp SOB	£345
Rexon RL102	2m H/Held	£165
Sommerkamp FT690I	6m m/mode	£295
Standard C500	Choice of 2	£225
Standard C528	Twinband	£325
Swan 100 MX	H.F Mobile	£345
Tentec Corsair II	V.G condition	£849
Tono TT40	70cm TX	£199
Trio TS830/S	Average cond	£575
Yaesu FT101ZD	Choice of 2	£495
Yaesu FT-102	Base HF	£595
Yaesu FT-107M	+ Matching PSU	£575
Yaesu FT221R	2m M/M Base	£245
Yaesu FT-707	HF Tx/Rx	£475
Yaesu FT-727R	Dualband	£295
Yaesu FT901 DM	Line up	£629
Yaesu FT5100	D.Band Mobile	£399
Yaesu FTV901R	With Fitted 2m	£175

Scanning Receivers

AOR AR2002	Base Model	£199
AOR AR3000A	Super W/Band	£725
Bearcat 580XLT	Mobile/base	£120
Bearcat 142 XLT	Basic model	£99
Bearcat 220 XLT	As new	£150
Commtel 102	Basic handie	£85
Commtel 204	H/Held	£165
Fairmate HP1000		£195
Realistic Pro-37	Good Starter	£150
Realistic Pro 39	Average Cond.	£150
Realistic Pro-50	Clean.	£95
Trident TR-2400		£299
Yupiteru MVT7000	H/Held	£185
Yupiteru MVT7100		£265
Yupiteru VT125	Airband	£125

Shortwave Receivers

Drake R8E	Boxed	£725
Drake SW8	Portable RX	£549
Grundig YB400	Portable RX	£95
HF 225		£365
Kenwood R1000	Digital S/wave	£325
Kenwood R2000	Gen.Cov	£375
Sangean ATS 803	Portable RX	£95
Sony 7600	Portable RX	£135
Steepletone MBR7		£45
Trio 9R-59D	Basic S/Wave	£45
Yaesu FRA7700	Active antenna.	£45
Yaesu FRG7	+ Digital Display	£225
Yaesu FRG2000	Clean Example	£265
Yaesu FRG7000	Digital S/W Rx	£265
Yaesu FRG7700	Gen Cov+VHF	£450
Yaesu FRG8800	+ VHF	£475

Accessories

AEA PK232 MBX	Data Comms	£199
Ameriton ATR15	ATU	£145
Daiwa DK210	Electronic keyer	£65
Datong D70	Morse Tutor	£45
Datong FL3	Filter	£65
Icom PS15	20A PSU	£99
Kenwood AT230	ATU	£175
Kenwood MC50	Base Mic	£45
MM30LS	2m Amp	£75
MM 70cm	Transvertor	£145
SEM	Transmatch	£75
SEM	Mulitfilter	£35
Spectrum Comms.	6m Amp	£49
Standard C500	BaseCharger	£49
Sure 444	Base mic	£75
Vectronics VC300DLP	ATU	£99
WELZ CT300	Dummy Load	£45
Yaesu 2m 50W	Amplifier	£99
Yaesu FP 757 HD	PSU	£225
Yaesu FL-6020	6M Amp	£85
Yaesu FT101ZD	AM Board	£10
Yaesu FV401	Ext. VFO	£30
Yaesu FT901	Band scope board	£45
Yaesu YM34	Base mic	£45
Zetagi 1210/S	10A PSU	£45
Zetagi M700	Swr/Pwr meter	£65

Wanted For Cash

Your good quality used Amateur & Shortwave equipment.
Call Lloyd G1JAR now on our hotline.
(01705) 662145

Advanced Digital Audio Filters - From Timewave USA

- New V3.1 For Voice, CW & Data modes

These filters really help you pull the weak station out of the noise and QRM by simultaneously reducing noise up to 20dB and heterodynes up to 50dB. Using 3rd generation 16 bit processing that provides razor sharp audio for SSB, CW and Data modes.

DSP-9 - Push button selectable noise filter, notch filter, SSB & CW filters 100, 200 500 Hz, 1.6, 2.0, 2.4 KHz bandpass for CW/SSB with AGC.....£189

DSP-9 Plus - Push button selectable, noise, notch, SSB & CW filters. Prog CW centre freq., HF data filters. SSB 1.6, 2.0, 2.4 KHz CW 100, 200 & 500 Hz. All modes with AGC £239

DSP-59 Plus - All modes with AGC. Hundreds of CW & bandpass filters allow you to select almost any filter combination. Inc. all data filters in DSP9+ plus SSTV,EME & WEFAX £299

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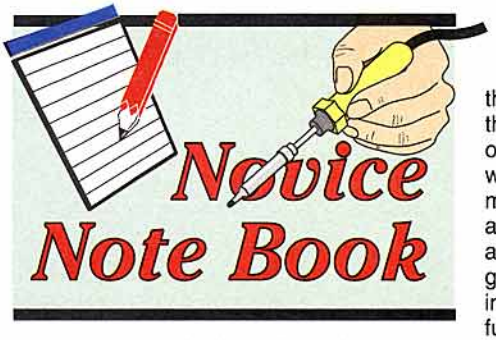

IAN KEYSER, G3ROO
Rosemount, Church Whitfield, Dover, Kent CT16 3HZ

THIS MONTH WE have a few descriptions for the real beginner, perhaps just starting in amateur radio. At this time in our hobby we are bombarded by a large number of new names and phrases that mean little to us, it is hoped that this month we will help clarify some of them.

CELLS AND BATTERIES

A CELL GENERATES direct current electricity, the most common is the Leclanche cell as found in most torches etc. It has a terminal voltage of about 1.5V. These are non rechargeable but, due to deficiencies in the construction, the life can be extended by careful 'charging'.

The most common rechargeable cell in amateur use is the Ni-Cad (nickel cadmium). This has a fully charged terminal voltage of about 1.24 volts.

Another rechargeable cell that is commonly known is the lead/acid accumulator. These were a common form of power in the early days of radio and there are still plenty of people that remember taking their accumulators to the local cycle shop for charging! These are now usually found in electronics as sealed blocks known 'gel cells' with terminal voltages of 6 or 12V.

When we connect a number of cells in series we call this a battery. The effect of doing this is to add the individual cell voltages so increasing the terminal voltage of the battery ie four new Leclanche cells will form a battery with a terminal voltage of 6V.

LAMPS

THESE ARE USED FOR illumination and indication, they come in a number of types in three families.

Incandescent lamps generate light by heating a wire or 'filament' and are still by far the most common. They can be made to generate light with working voltages of between 1.5V up to many hundreds of volts depending on the application. The majority of household lighting is incandescent but gas discharge is taking a greater and greater share due its higher efficiency.

Light Emitting Diodes are semiconductor diodes designed to generate light. The active elements of an LED are very tiny and a lens is used to increase its apparent size.

Gas discharge lamps include neon, mercury, sodium and fluorescent. Neon is the only commonly used gas discharge lamp used in electronics and is used for indicators and give a reddish light. They require between 60 and 150 volts depending on construction and are mainly used as mains power indicators. (Not used in Electronics but as an aside)

Mercury lamps are used for bright illumination and give a bluish white light. Found in earlier street lighting, football stadiums and the like. Sodium is used for street lighting and its colour is a well known orange light. It is ideally suited for this application as the eye does not lose its night vision enabling the driver to drive from a lighted street to an unlit street safely.

Fluorescent lights were originally 'strip' lights in the form of a long tube but modern construction techniques have enabled these to be compacted into a bulb shape making them more acceptable in the home. They are considerably cheaper to run than an incandescent lamp, but have a higher initial cost. All Gas discharge lamps have a disadvantage that a few people (me for one) are sensitive to the 100Hz flicker rate of these lamps. As they are powered from the AC mains supply they extinguish for a few tens of milliseconds one hundred times a second and this can cause disorientation.

FUSES

THESE ARE USED to protect our equipment and our lives. In a fault condition, sufficient heat could be generated in a piece of equipment to cause it to catch fire. Luckily for us, for this to happen the equipment has to draw considerably more current from its supply than it was designed to. If we place a very thin piece of wire in the supply wire this will melt and break so 'turning off' the equipment. These 'thin pieces of wire' are manufactured to melt in a large range of currents. Fuses can be obtained to rupture from as little as 65 milliamps (the lowest I have ever seen, but no doubt there are lower!) up to many hundreds of amps. There are two basic types, slow blow and fast blow... self explanatory!

There is another type of fuse known as the thermal fuse. As its name implies, this breaks the flow of current but not due to the amount of current flowing but due to the temperature where it is mounted. They can often be found mounted within the windings of transformers as well as in coffee percolators, hand irons and many other domestic appliances which get hot and must be protected from overheating. Some of these thermal fuses are true fuses in as much as they fail and have to be replaced but there are others which are resetable. These are not to be confused with thermostats which are also found in equipment. A thermostat will remove the supply from the equipment when it has overheated but will reconnect on cooling.

Can you identify the components in this photo?

LOUDSPEAKERS

THESE ARE USED to convert the varying electric currents in a circuit to audible sound. They come in a variety of sizes from a few centimetres in diameter to massive horn types for public address. The construction of all common speakers is the same and consists of a coil of wire mounted in a magnetic field.

SWITCHES

THESE ARE EITHER for breaking a circuit so stopping the flow of current or for diverting the flow of current from one circuit to another. They come as toggle, slide and push-button switches and their names aptly describe them!

RESISTORS

THESE ARE USED in electronic circuits to hinder the flow of electric current. Their value is measured in ohms. When they are being used in a circuit they are doing 'work' and so will get warm. When they are made they are given a certain power rating, for example:1/4 watt, 1 watt etc.

They also come in a two variable forms. The variable resistor or potentiometer and the preset resistor, the potentiometer/variable resistor has a shaft to fit a knob to and the preset it adjusted by screwdriver. Both these variable components come in either 270° rotation or ten turn for use where accuracy of setting is important.

CAPACITORS

THESE COMPONENTS have the ability to store a charge of electricity. The quantity they can charge depends on their value and their values are measured in Farads. The Farad is a very large value for electronic and radio use and more common values are:

picofarad (a millionth of a millionth of a farad)

nanofarad (a thousandth of a millionth of a farad)

microfarad (a millionth of a farad)

Due to their massive range of values, as well as different types being better than others in various circumstances, the types available are considerable.

There are two groups:

1. Polarised types which must have one of their terminals more positive than the other to

CONTINUED ON PAGE 46

RADCOM TECHNICAL FEATURE

Three-Band QRP Transceiver for CW

The first of three parts by Bernie Pallett, G3VML*

I REALLY BECAME enthusiastic about low power transceivers after I constructed the 4 watt CW QRP Transceiver designed by Gary Breed, K9AY [1].

I was very impressed with the receiver circuit design, which used relatively cheap and readily available domestic radio receiver and computer integrated circuits and components. The original design was intended as a light and compact basic single 20 metre band transceiver for back-packing treks; in this respect I found the transceivers performance to be first rate.

However, for base use the transceiver's lacked some basic user facilities. Additionally, I found the receiver to be a little insensitive, and also at times prone to stray broadcast station pick up from the 31 metre band. After incorporating various modifications, many of these receiver shortcomings were eventually overcome.

The Receiver and Audio Processor circuits of this three band transceiver is based on the Gary Breed design; with a few refinements, such as RIT control, and an additional active narrow band pass filter, plus some other minor circuit alterations.

Other aspects of this transceiver design were influenced by previous *RadCom* published circuits by G3TSO.

Although this article gives enough constructive details and a detailed parts list (in part 2) to enable the three-band transceiver to be constructed it does not have PWB layouts. The modular approach is suited for home constructors as a source of ideas.

An overall description of the transceiver, which should be read in conjunction with the transceiver block diagram in **Fig 1**, is as follows:

When in the receive mode the signal from the antenna is input to the Receive Mixer and

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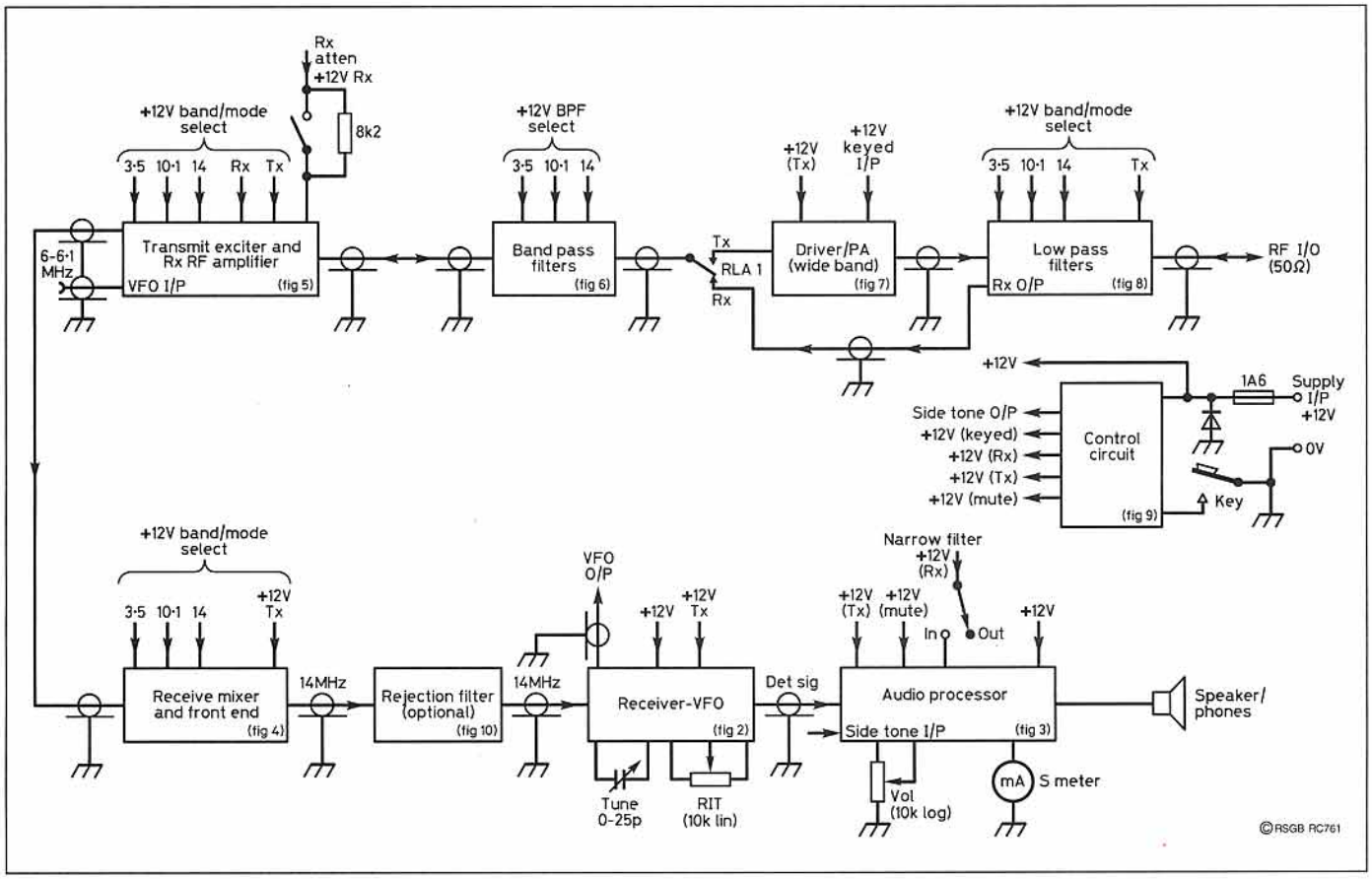

Fig 1: Three-band transceiver, block diagram

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Front End via the Low Pass Filter module, the Band Pass Filter and the Transmit Exciter and RF Amplifier module. The antenna signal is amplified by an IC RF amplifier, located on the Transmit Exciter and RF Amplifier module.

The Receive Mixer and Front End operates as a converter on the 3.5 and 10.1MHz signals to change the frequency to a common 14MHz intermediate frequency, but acts as a straight buffer amplifier when the 14MHz band is selected. The 14MHz IF is connected to the Receiver VFO module via an optional Reject Filter.

The Receiver VFO module is a single band superhet receiver for the 20 metre band, incorporating a RIT facility. The receiver local oscillator also forms a VFO, which is also utilised by the transceiver transmitter circuits. The detected signal output from the receiver is further processed and amplified within the Audio Processor module before being output to the Speaker/Phone socket.

During transmit mode, the VFO signal is mixed with the output from one channel of a three channel crystal controlled oscillator (part of the Transmit Exciter circuit).

The combined waveforms from the mixer are then cleaned up by an appropriate Band Pass Filter, before the resultant carrier waveform is applied to the input of the Driver/ Power Amplifier via relay contacts A1 (relay A1 is energised in the transmit mode). The amplified carrier from the Driver / Power Amplifier is in turn routed to the antenna via one of three selectable Low Pass Filters.

Band selection is achieved by switching a +12VDC to the appropriate module frequency select lines, via a single pole three way wafer switch located on the transceiver front panel. Side tone generation, and the module +12VDC mode select line inputs are derived from the Control Circuit.

When the Key Input is high, only the +12VDC(RX) output will be present. With a Key input grounded, all the other outputs will be present with the exception of the +12V(RX). The notional 750Hz side tone output, will only be present during Key down periods, whereas when the Key input goes to high, there will be a finite delay before the other Control Circuit outputs return to their original receive condition.

A Modular circuit design concept has been adopted to simplify construction and fault finding. Each module can be regarded as an electronic building block, enabling each module to be adapted to suit other related projects.

Throughout the remaining part of this article, each module will be treated as a separate stand alone unit, complete with its own parts list.

BASIC SPECIFICATION

Harmonic and spurious radiation levels:

At least 40 dB below the mean power of the fundamental transmitted carrier.

emmision.

Transmit frequency stability:

After 20 minutes warm up time, Transmit frequency will remain within 850Hz of the orginal set frequency.

Receiver Sensitivity:

Better than -100 dBm for 6 dB S+n/n.

Transmitted Power:

3.5MHz	5 watts.
10.1MHz	4 watts.
14MHz	3.5 watts.

TUNEABLE RECEIVER VFO MODULE

THIS MODULE IS A single band superhet receiver for 14MHz. The heart of this module is IC2(MC3362P), see **Fig 2**, which was originally designed by Motorola, with AM and FM domestic radio applications in mind. The received signal, centred on 14MHz, passes through a narrow Band Pass Filter formed by L1 and L2 plus associated capacitors, to the 1st mixer input, pin 24.

The second input to this mixer is derived from an on chip Local Oscillator, which tunes from 6MHz to 6.1MHz.

The off chip frequency determining components associated with this local oscillator, are inductor L3, capacitor C9, frequency trimmer VC8 and the external tuning capacitor VC7 associated with pins 21 and 22.

An on chip Varicap also affects the tuning of this Local Oscillator, which is determined by an externally derived DC tuning voltage applied to pin 23, derived from a RIT control circuit.

The resultant output waveforms from the First Mixer are routed to pin 19, via an on chip Buffer Amplifier. The amplified mixer waveforms present at pin 19, are in turn routed via an external 8MHz crystal filter circuit, formed by four 8MHz crystals (Y1 through Y4 plus associated components)to the input of the second on chip mixer.

The on chip local oscillator is also used as a VFO, the signal of which is output at pin 20. The RIT circuit comprises of two potential divider circuits which are formed by R5, RV6 plus R10, and R7, RV8 also R9 respectively. Both potential divider circuits derive their supply from the same stabilised 6 volt source. The output voltage potential from each re-

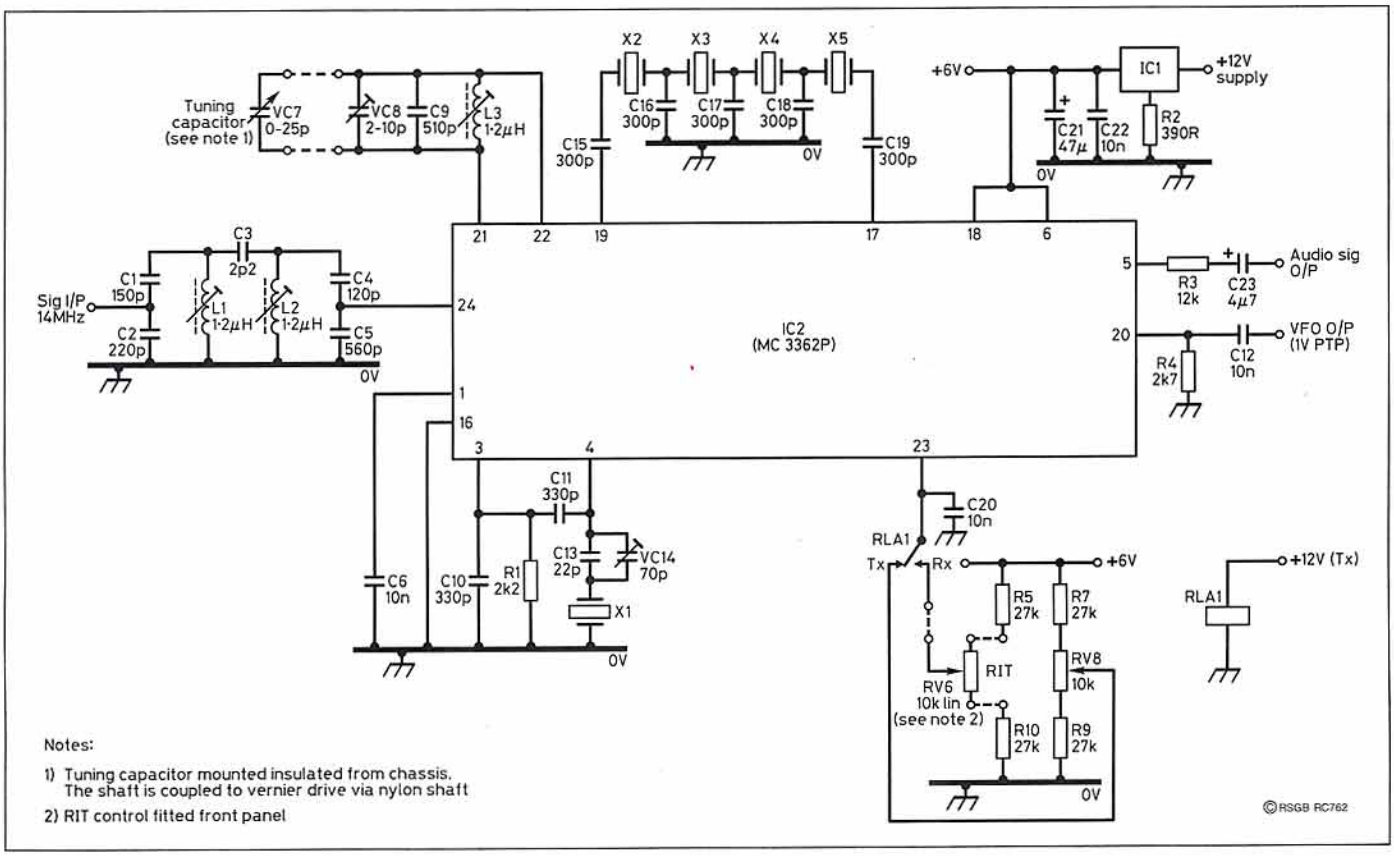


Fig 2: Tunable receiver and BFO, circuit diagram

spective divider forms a tuning voltage for the on chip varicap of IC2, which is then routed to pin 23 of IC2 via relay contacts A1. This voltage is decoupled to earth via C20.

A second on chip local oscillator (external components C6, C10, C13, VC11, R10 and 8MHz crystal, between pins 3 and 4) forms a crystal controlled Beat Frequency Oscillator. The output of this BFO is input to the second on chip mixer (product detector) and mixed with the IF signal from the 8MHz crystal filter on pin 17 of IC2.

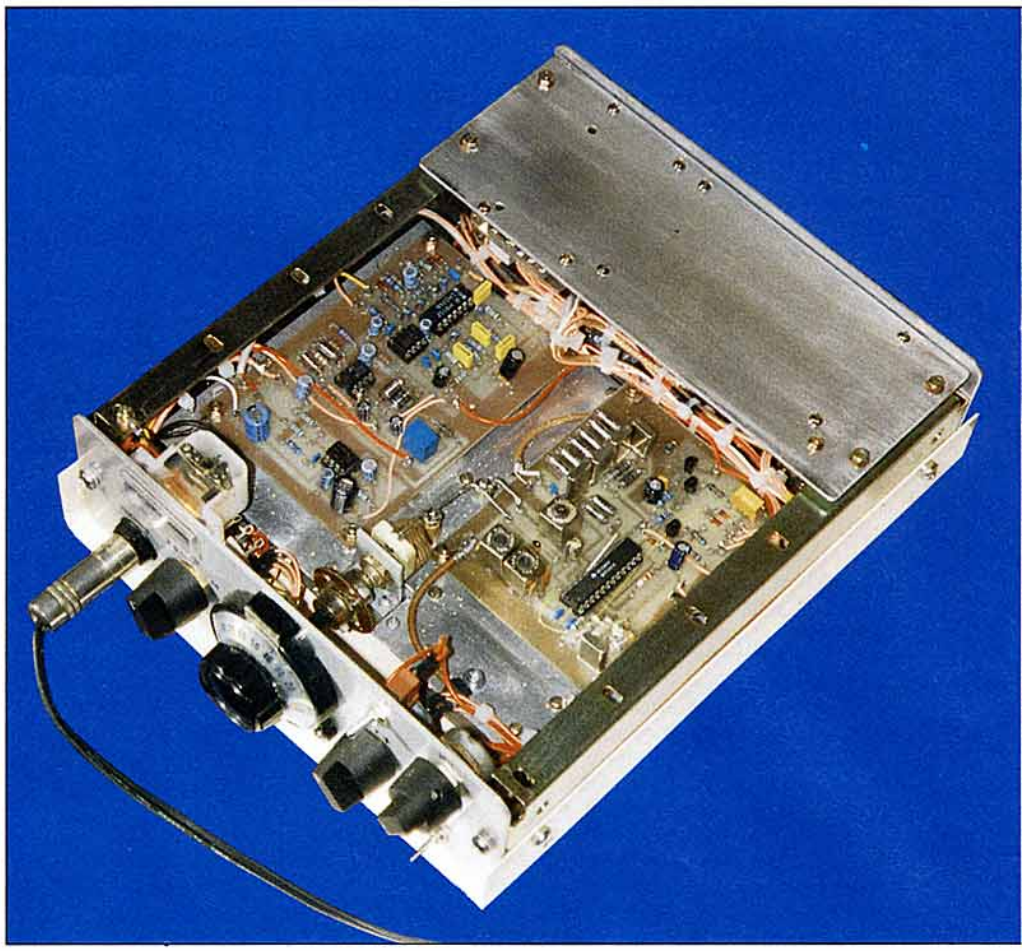
Slightly off-tuning this BFO frequency relative to the received signal results in a detected audio beat signal to be present at the second mixer output on pin 5 of IC2. The signal is then fed to the Audio Processor via R3 and C23

The Module +6 volt supply is obtained via voltage regulator IC1. A common stablised power supply rail is used for both the IC2 and the RIT voltage divider circuits. This is done because IC2 may be damaged if the voltage at pin 23 exceeds that presented to pins 6 and 18.

The broadcast break through problem discussed earlier, is caused by inter modulation products that originate within the receiver during the reception of very strong signals. In addition to improved receiver front end filtering, this problem can be further eliminated by incorporating an RF gain control to prevent receiver overload.

These and other related topics will be discussed later. ♦

... to be continued



View of transceiver with top cover removed.

RADCOM TECHNICAL FEATURE

Automatic level control for VFOs

By Jack Hardcastle, G3JIR*

FREQUENCY DRIFT IN oscillators is caused by temperature changes and three distinctly different mechanisms are involved. The oscillator described here covers from 4.00MHz to 4.35MHz with an output of +7dBM and a worst case drift of 28Hz for a 5C rise in temperature

The first case of drift is when the oscillator is first switched on when a rapid change of frequency is seen which is due to heat generated within the oscillator transistor and its associated components. Since the thermal time-constant of all these items is small this phase is completed in very few minutes so can usually be disregarded. The second phase commences when heat generated by buffer amplifiers and other stages reaches the frequency determining components, causing a long slow drift.

Because inductance and silvered mica capacitors have positive temperature coefficients (TC) this slow drift is in a lower frequency direction and can be counteracted by incorporating a suitable proportion of negative TC ceramic capacitors. This will allow the period of slow drift to be reduced to an acceptably short time, and if the circuit is left undisturbed it will eventually reach a stable frequency. Of course this compensation is also effective for changes in ambient temperature.

The third and final cause of drift is only apparent when the oscillator is retuned to another frequency. At the new frequency the oscillation amplitude will be different because the gain within the oscillator is different at each frequency. As a consequence of the level change, the power dissipated within the circuit changes and this precipitates a whole new sequence of short and long-term drift. In a poorly designed oscillator this can be more annoying than each of the other effects because it ensures that every time the tuning knob is touched it triggers yet more drift.

Controlling the amplitude of the oscillator at a reduced level reduces the causes of the first two phases and virtually eliminates the third.

VACKAR VFO MODIFICATIONS

APART FROM THE ADDITION of the level monitor and DC amplifier the circuit (**Fig 1**) is very little change from a conventional Vackar oscillator. However, the capacitor ratios have been modified slightly and the capacitor from

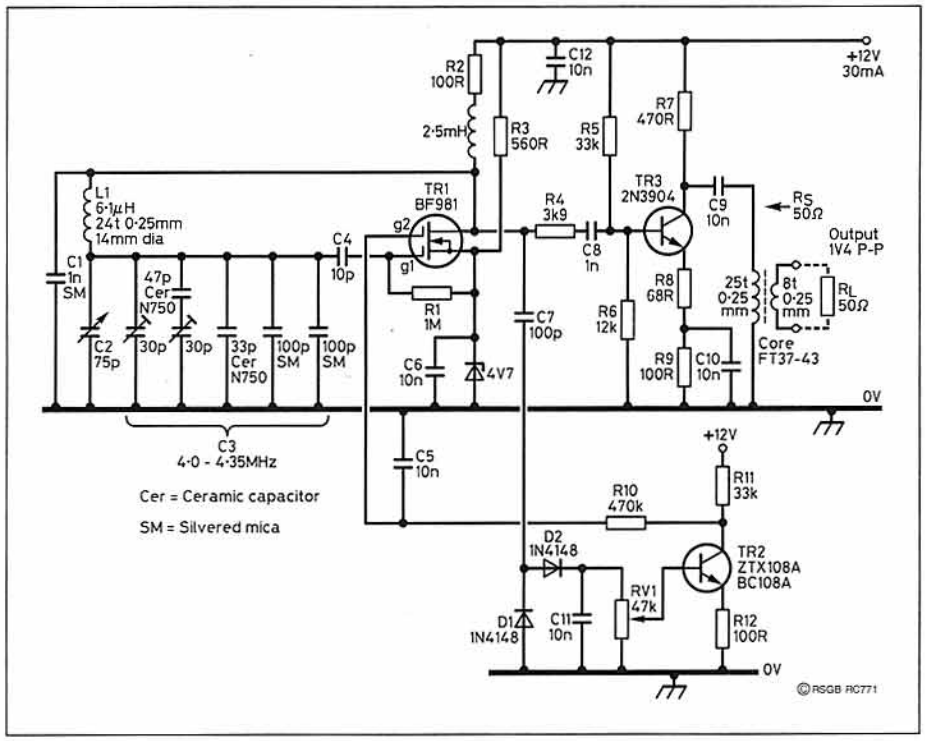


Fig 1: Vackar VFO with automatic level control.

gate 1 to ground has been omitted. This was done to increase the oscillation amplitude to give the automatic level control (ALC) system enough flexibility to be effective.

A dual-gate MOSFET was incorporated so ALC could be readily implemented and the BF981 was chosen because it is a low noise device. This has proved itself able to withstand all sorts of abuse although R2 was added in order to limit the dissipation after the first sample was accidentally blown-up by shorting gate 2 to the positive supply, when the meter probe slipped!

Gate 2 of TR1 exercises tight control of oscillation amplitude and its useful range only extends from 4.5 to 6V DC, but this is sufficient to allow the output amplitude to be varied between 2.5 and 6 volts peak-to-peak ac. Above 6 volts DC on gate 2 the oscillation tends to become unstable and the waveform is chopped at a lower frequency (squegging), but this tendency has been minimised by selecting a low value for C4. Below 4.5 volts on gate 2 oscillation ceases altogether and once stopped does not restart until gate 2 is raised above 5 volts.

Thus it can be seen that it is important that adjustment of the ALC loop takes account of these no-go regions because misuse of RV1 allows some very undesirable waveforms to be produced. However, so long as one is aware of the above limitations it is easy to adjust the oscillation amplitude to a region which allows C2 to be swung over its complete range with virtually no change in output level. In the prototype this level has been set to 4 volts peak-to-peak at the drain of TR1 which is near the centre of the range of satisfactory operation.

The buffer amplifier has been designed to drive a SBL-1 balanced modulator and it will deliver +7dBm to a 50Ω load from a source impedance of 50Ω. The output transformer is wound on a FT37-43 ferrite toroid. The frequency response from the input at R4 to the output is flat up to 6MHz and may be extended to 10MHz by shunting R8 with a 47pF capacitor. The output level in the prototype was set by selecting the value of R4, which may be changed if necessary.

INDUCTOR CONSTRUCTION

L1 CONSISTS OF 24 turns of 0.25mm (32SWG) enamelled wire on a ceramic former 14mm diameter. This was wound while 4 amps was passing through it in order to heat it. Even more current would have been used

*8 Norwood Grove, Rainford, St Helens, Merseyside WA11 8AT

if it had been available; it is surprising how much current it takes to heat a single strand of wire suspended in free air. Winding the wire while hot ensures that when it cools it will be under sufficient tension to hold it firmly to the porcelain former. Any dimensional changes with temperature thereafter will be primarily due to the coil former, which has a much lower TC than copper.

	Frequency	Actual level	Relative level
Fundamental	4.36MHz	+8.2dBm	0
2nd harmonic	8.72MHz	-22.3dBm	-30.5dB
3rd harmonic	13.08MHz	-27.4dBm	-35.6dB
4th harmonic	17.44MHz	-46.2dBm	-54.4dB
5th harmonic	21.80MHz	-47.2dBm	-55.45dB

Table 1: Relative levels of fundamental and harmonic outputs.

PERFORMANCE

TEMPERATURE COMPENSATION has been applied by making part of C3 from ceramic capacitors having a negative (N750) TC. 33pF was found to be almost sufficient and 47pF too much for perfect compensation, so an arrangement has been made whereby an airspaced trimmer in series with the 47pF allows the compensation to be fine tuned. Another 30pF variable allows the frequency to be trimmed without changing the TC significantly.

Although C2 is a good quality variable capacitor, it has a slightly positive TC which results in the tuned circuit tending to drift LF when C2 is fully meshed and to drift HF when fully open; even when the compensation at the centre of the range is virtually perfect. The best results to date are drift rates of -22Hz/ C at 4.0MHz, +8Hz/C at 4.175MHz and +28Hz/ C at 4.35MHz. These measurements were made while heating the oscillator to 5C above ambient temperature over a period of 2 hours, in each instance. Any attempt to speed-up the heating only gives false results because of the time taken for each component to stabilise at the new temperature.

The ability to achieve such low rates of drift would be sufficient reward in itself but the oscillator and buffer amplifier were found to have a very good harmonic performance as well **(Table 1)**. This was felt to be a bonus for a very small increase in circuit complexity.

CONCLUSION

THE DESIGN OF any stable oscillator has always been complicated by the need for the frequency determining components to be suitably proportioned so as to give the required bandspread, while at the same time providing just the right amount of positive feedback to maintain a low level of oscillation.

These two functions can never be totally separated, but this design has considerably eased the situation by adding a circuit whose sole function is to regulate the feedback, by controlling the gain of TR1. Setting the oscillation level is now merely a potentiometer adjustment. An element of cut-and-try still remains if the lowest rate of drift is to be achieved, but even this has been minimised by the strategic placement of the trimmers which are part of C3.

No constructional details have been provided because the main purpose of the article is to stimulate discussion and further developments by experienced amateurs: for instance, does this technique reduce oscillator noise?

APPENDIX

THE VACKAR OSCILLATOR is not easily arranged to tune over a given bandspread using cut-and-try methods, particularly since the use of a slug-tuned former for L1 is not recommended if a high degree of stability is required. It is therefore worth spending a little time with a pocket calculator to work out the values for L1 and C3.

The frequency determining components L1, C1, C2 and C3 resonate at a frequency

$$f = \frac{1}{2\pi\sqrt{LC}}$$

where C is the resultant of C1 in series with C2, and C3 in parallel.

When C2 is at maximum capacitance

$$C_{max} = \frac{(C_2+C_3)\times C_1}{C_1+C_2+C_3}$$

C2 at minimum can be neglected for these purposes so

$$C_{min} = \frac{C_1\times C_3}{C_1+C_3}$$

Published designs suggest C1 should be 1000pF.

The desired frequency range is 4.0 to 4.35MHz

which is a ration of $\frac{4.35}{4} = 1.0875$

The capacitance change required to achieve this is the square of the frequency ratio ie, $1.0875^2 = 1.1827$

Therefore $$A = \frac{C_{max}}{C_{min}} - 1 = 0.1827$$

Breaking down the rest of the calculation into easy stages

For C1 = 1000pF and C2 = 70pF

Note that the value of C2 is deliberately made slightly less than the nominal value, since this is the actual capacitance swing from maximum to minimum. It also allows for a small overlap at the band edges.

$$B = C_1 + C_2 = 1070$$

$$D = C_1 \times C_2 = 70000$$

$$E = 4D / A = 1532567$$

$$G = \sqrt{B^2 + E} = 1636.29$$

$$C_3 = (G - B)/2 = 283.1pF$$

$$From(1)\ C_{max} = 260.9pF$$

$$L1 = \frac{1}{(2\pi f_{LF})^2 C_{max}} = 6.1mH$$

♦

CONTINUED FROM P40

form the electrolytic between the plates.

2. Non polarised types that can be connected in the circuit either way round. Generally speaking, smaller values (not physical size) are non polarised and larger types are polarised. This is due to the fact that to make a non polarised capacitor in a large value means that it is going to be very large indeed.

Non polarised types include ceramic, polystyrene, polyester, and mica and are used in radio frequency applications.

Polarised types include electrolytic and tantalum capacitors. These are used in lower frequency circuits such as audio stages and power supplies.

They also come in two variable forms. The variable capacitor is generally used for tuning radios and has a shaft to fit a knob to. The other form is the 'trimmer'. As its name implies it is used for trimming a circuit and this is usually much smaller and has a screwdriver adjustment.

DIODES

THESE UNITS HAVE the ability to allow current to flow in one direction only. The current flows in the direction of the arrow in the symbol (the arrow being the Anode and the bar being the Cathode). On the unit itself the band on one end indicates the Cathode.

They come in many ratings, being able to withstand a few tens of volts at a few milliamps for the smaller units right up to thousands of volts to hundreds of amps. Of course, the physical size varies enormously but in the vast majority of cases, when a current is flowing through them, the voltage developed across them is almost constant at about 0.6 volts.

TRANSISTORS

THESE DEVICES AMPLIFY. In other words, they will make a larger copy of the current that is fed into them. If we change the current into the base of a transistor we will see a much larger change of current in its collector circuit. The gain is the ratio of these two currents. If we change the base current by one milliamp and we see the collector current change by 100 milliamps the gain of the transistor will be 100.

INTEGRATED CIRCUIT

THIS IS A VERY clever bit of modern technology where a large number of transistors, diodes, resistors and some capacitors are all 'printed' on the surface of a piece of silicon to make an almost complete circuit that will perform a function. Some components cannot be printed on the 'chip' and so there are many pins to enable these to be connected externally. Some simple integrated circuits may only contain a few components but others may contain many thousands of components enabling equipment to be constructed very much smaller than it was only a few years ago.

HINT OF THE MONTH

THE CLIPS ON THE TOP of PP3 batteries can be salvaged and re-used by dismantling the old battery and soldering wires to rear of the clips. ♦

The Leicester Show Guide 1995

Leicester Amateur Radio and Electronics Exhibition

Granby Halls, Aylestone Road, Leicester

Friday 20 October – 10am to 6pm (disabled 9.30am)
Saturday 21 October – 10am to 5pm (disabled 9.30am)

Admission price £1.50, concessions £1 (discounts for block bookings)

All enquires to Frank Elliott, G4PDZ, tel/fax: 0116 2871086

The LeicesterAmateur Radio Show Committee organises the annual exhibition at the Granby Halls, Leicester with a view to furthering the interest and aims of amateur radio. We encourage all the local clubs to enlist their members as stewards, car park attendants, ticket collectors, etc to assist in the smooth running of the exhibition; in return any profits realised are distributed to these local clubs. All national amateur radio organisations are represented at the Leicester exhibition with the RSGB taking pride of place in the number one stand in the Exhibition Hall. The committee is: John, G4MTP, Chairman; Frank, G4PDZ, Organiser/Secretary; Geoff, G4AFJ, Treasurer; Tony, G1YEZ, Floor Manager; Tony, G4NWS, Personnel Manager.

- Extensive Trade Exhibition
- RSGB Book and Information Stand
- Bring and Buy Stand (run by the Leicester Radio Society)
- RAOTA AGM, Conference Room, Saturday
- Talk-in by GB2GH on S22 and SU22

Special Hotel Arrangements

Block booking terms have been negotiated with the following hotels for the duration of the show:

GRAND HOTEL, Granby Street, from £29.50 pp B&B. Tel: 0116 2555599.
ALEXANDRA HOTEL, London Road, from £25.00 single room, £35 double / twin, including breakfast. Tel: 0116 270 3056.
FORTE POSTHOUSE, Braunstone Lane East from £23 pp, including full English breakfast. Tel: 0116 263 0500.
LEICESTER INTERNATIONAL, Humberstone Road, £32 single, £39 twin / double, including full English breakfast. Tel: 0116 262 0471.
HOLIDAY INN, St Nicholas Circle, £32.50 pp (twin), £55 pp (single room), not including breakfast. Tel: 0116 253 1161.
STAKIS LEICESTER, Junction 21 Approach, Braunstone, £35 pp twin or double room including full English breakfast. Tel: 0116 263 0066.
THE GABLES HOTEL, 368 London Road, £17 pp twin or double room or £20 pp single room, including full English breakfast. Tel: 0116 270 6969.

To qualify for these concessionary rates it is essential to quote 'The Amateur Radio Exhibition at Granby Halls' when booking. All accommodation is subject to availability.

LINEAR AMP UK

2m & 6m DISCOVERY LINEAR AMPLIFIER

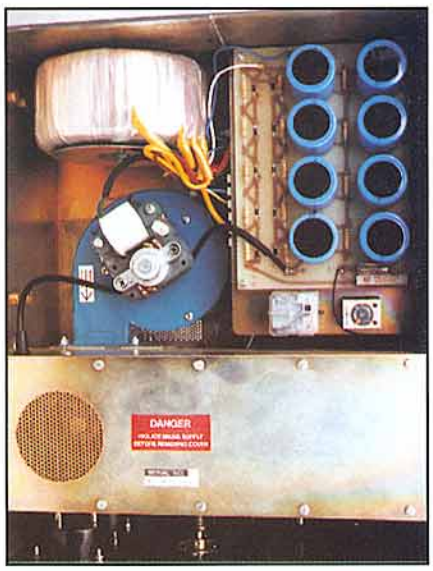
SEE US AT LEICESTER SHOW!

The Discovery is a self-contained power amplifier which is designed to give the full legal limit at the aerial, allowing for feeder losses.

The amplifier uses the Eimac 3CX800A7 high mu triode, which has a valve anode dissipation of 800 Watts. The unit has its own self-contained power supply which is fully protected. Specification:-

Power	800 Watts with 25 Watts of drive	**Max O/P**	1 kW PEP with 35 Watts of drive
Input	1500 Watts input DC at 25 Watts drive	**Supply**	220 - 240 V AC, 50 - 60 Hz @ 8 Amps

The new 2m and 6m Discovery are designed for the serious DXer who wants long distance QSO's on 144 and 50 MHz. The 3CX800A7 has been chosen for its very high stability and its capability of giving 400 Watts O/P with only 10 Watts of drive.



- The amplifier is fan cooled with an Airflow 33BTFL fan which is quiet and very efficient. The O/P of the amplifier is a tuned cavity to give maximum efficiency on 2m (on 6m the O/P is a Pi - L network)
- Full metering of Plate input and Grid current are provided on the front panel along with LED status lights to give present Tx/Rx mode.
- A 3 min timer is incorporated to give a delay on switch-on to ensure that the valve cathode is thoroughly warmed up.
- The power supply incorporates an ILP toroidal transformer which has been used in our HUNTER HF amplifier for the last 5 years with not one failing on us, into our voltage-doubler power supply board to give 2300 Volts.
- The amplifier is housed in a strong newly designed cabinet for easy operation whether at home or on a Field Day site etc.

Dimensions:- 13in (330mm) wide....8.75in (220mm)....16in (410) deep

2m (with 1kW coaxial relay fitted as standard)

6m (optional relay as above may be fitted as extra)

LINEAR AMP UK,
Field Head,
Leconfield Road,
Leconfield, Beverley,
E. Yorks., England.
HU17 7LU
Phone/Fax
(01964) 550921

London stockist — Martin Lynch

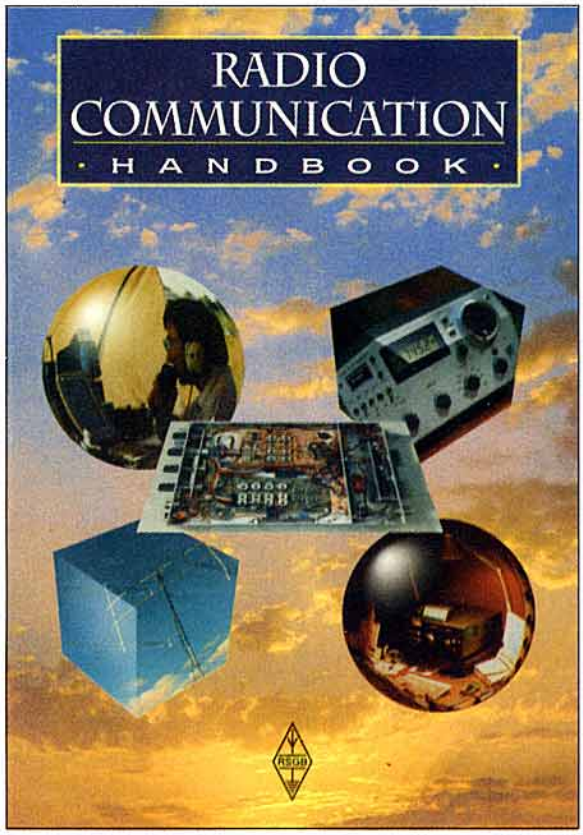
Peter Rodmell G3ZRS

LEICESTER SHOW OFFERS

RADIO COMMUNICATION HANDBOOK

The radio amateur's bible - this is a comprehensive handbook which provides the reader with a wealth of information which will quickly become a valued reference book on your bookshelf.

Show Offer Members price: £15.00



RSGB 1996 CALL BOOK

The 1996 edition of the RSGB Call Book and Information Directory is available for the first time at the Leicester Show.

You will be able to search quickly and easily for the contact you require, either by callsign, post code or by surname. Callsigns included in this edition include 2E0AMO, 2E1EIZ, G0WJF and G7VOT.

You all heard how good the 1995 RSGB Call Book was, well the 1996 one has even more facilities!

Don't miss out - buy your copy at the show and be one of the first to realise how good it is!

Members Price: £9.50 (non-members price: £11.23)

MICROWAVE HANDBOOK SET

Inc Vols 1,2 and 3

These books contain the essential information you need to find out all about the microwave bands and to keep up to date with developments in amateur microwave techniques and designs.

A must for the microwave enthusiast!

Show Offer Members price: £24.00

(a saving of £10.47 + P&P)

MARCONI CHRISTMAS CARDS

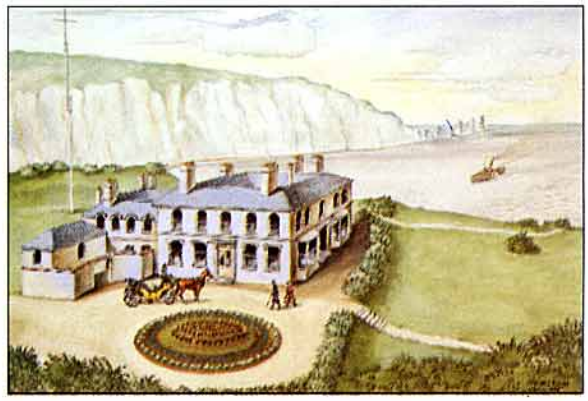
Get your Christmas cards at the Show and save on postage costs - this way the cards will cost you only 16p each!

The picture on the front of the card was painted by Denis Knight and depicts the Needles Hotel, Alum Bay, on the Isle of Wight, at the time when Marconi first conducted his early radio transmissions.

Each card measures 9.25in by 6.5in.

Each pack of 25 cards £4.00

Buy four packs and pay only £15.00



MARCONI FIRST DAY COVERS

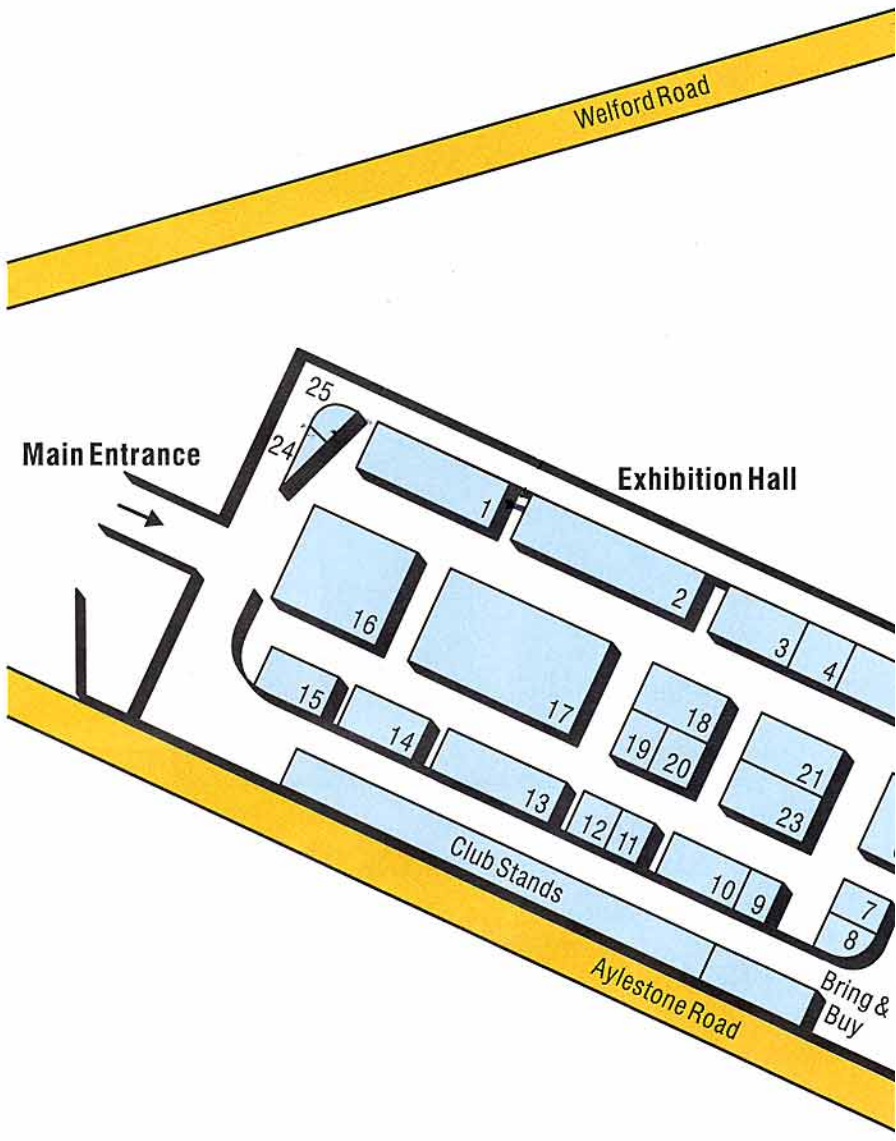
This is the first set of stamps which has been overstamped by the Radio Society of Great Britain, and hence will obviously be of great interest to philatelist and to radio amateurs.

Each FDC has been over printed on the reverse from the Society and a special RSGB handstamp has been designed which cancels the two Marconi Stamps.

Members price: £7.50

The Leicester Show

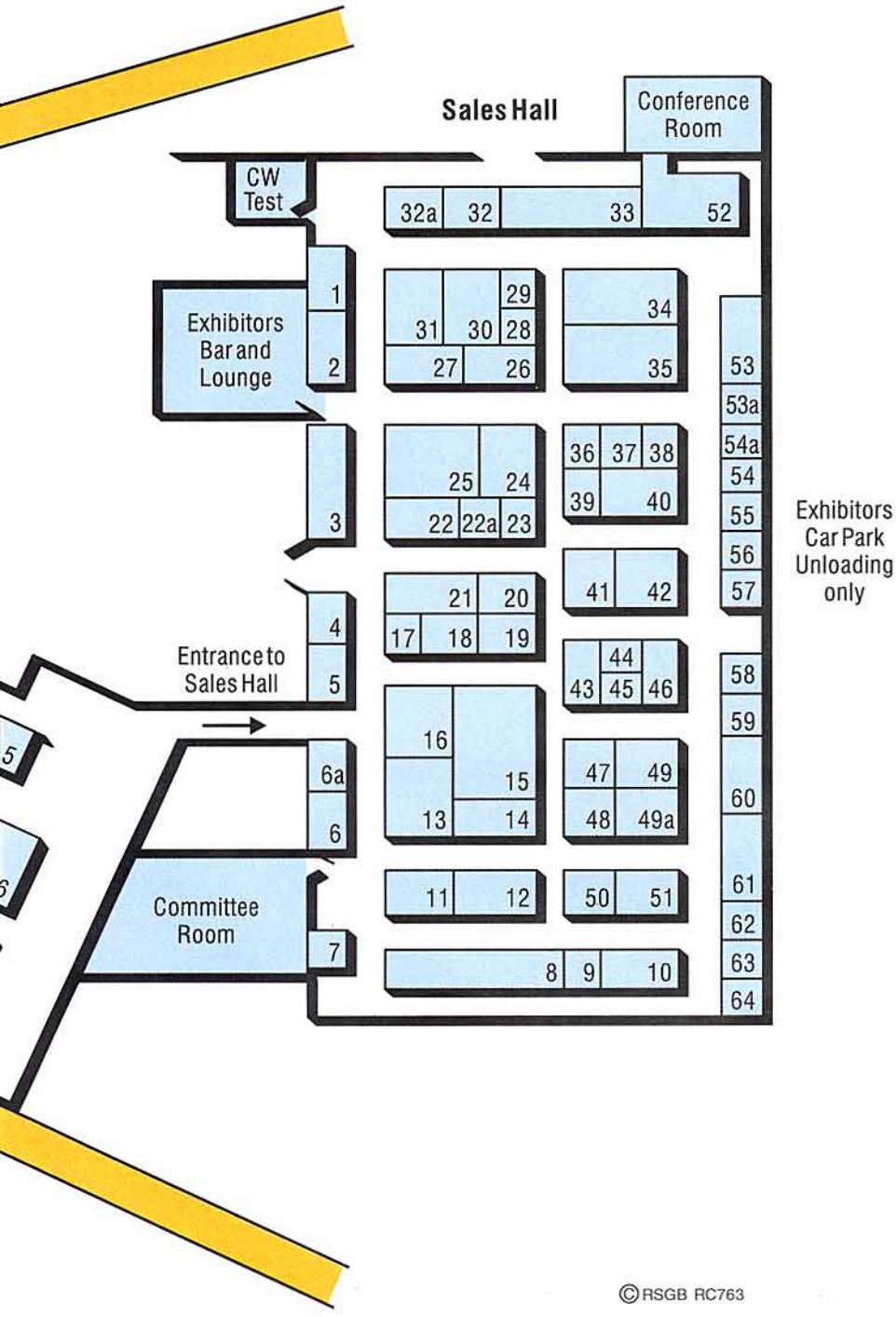
The 25th Exhibition takes place at Granby Halls, Aylestone Road, Leicester, on Friday 20 and Saturday 21 October. Talk in will be on SU22 and S22 using the show callsign GB2GH. Entrance for disabled visitors at 9.30am.



EXHIBITION HALL

EXHIBITOR	STAND
RSGB	E1
Icom (UK)	E2
Practical Wireless	E3/4
Linear Amp UK	E5
Haydon Comms	E6
2J Sounds	E7
Microgenisis	E8
Venus Electronics	E9
Siskin Electronics	E10
AOR (UK) Ltd	E10a
Howes Comms	E11
Poole Logic	E12
Trio-Kenwood	E13
Alan Hooker	E14
Videoquip	E15
Lowe Electronics	E16
Yaesu (UK)	E17
Tennamast	E18
Field Electrics	E19
R A Kent	E20
Mailtech	E21
Rich Electronics	E23
R & D Electronics	E24
U B M	E25

FLOOR PLAN AND EXHIBITORS



SALES HALL

EXHIBITOR	STAND NO
Gemini Electronics	S1/2
Taurus Electronics	S3
Harwood Trading	S4
Amstrutt	S5
LMW Electronics	S6
Lake Electronics	S6a
KM Publications	S7
South Midlands Comms	S8
JPE	S9
Timestep	S10
Sandpiper Comms	S11
Weirmead	S12
Display Electronics	S13
Strumech Engineering	S14
Waters & Stanton	S15
Telford Electronics	S16
Mutek	S17
JMG Electronics	S18/19
Capital Products	S20
JAB Electronics	S21
Eastern Comms	S22
G3TUX QRP Components	S22a
H Morgan Smith	S23
Satellite Surplus	S24
Martin Lynch	S25
Barenco	S26
J Birkett	S27
R J Holderness	S28/29
Syon Trading	S30
Capital Products	S31
Electrocomp	S32
Wilson Valves	S32a
Mainline Electronics	S33
Dataphone	S34
Nevada	S35
L & S Components	S36
	S37
J & P Electronics	S38
Stevens Electrical	S39
M & B Radio	S40
ARE Communications	S41
SGS Electronics	S42
Brial Services	S43
Coltec Electronics	S44
	S45
A J Paddon	S46
R A S Nottingham	S47
Computer Junk Shop	S48
Oasis Computers	S49
Giacommelli	S49a
Westlake	S50
Radiotronics	S51
	S52
Mirage Designs	S53
Strikalite	S53a
Eagle Antenna Co	S54
Ham Videotronics	S54a
S E M	S55
G C Arnold Partners	S56
Badger Boards	S57
R N Electronics	S58
Dee Comm	S59/60
Radio Shack	S61
Loutronics	S62
	S63
Bonex	S64

TABLES

Ham Radio Products
PTV Electrical
Kanga Products

MARTIN LYNCH
G4HKS
THE AMATEUR RADIO EXCHANGE CENTRE

0181 - 566 1120

140 - 142 NORTHFIELD AVENUE, EALING, LONDON W13 9SB

OPENING HOURS **MON-SAT 9.30 - 6.00** Late night Thursday by appointment

NEW "SUPER MODELS" HIT THE STREETS - IN LEICESTER!!

Forget Naomi Campbell, (well try anyway), Yaesu Icom and Kenwood have just released their latest H.F. rigs and they will be displayed at this years LEICESTER SHOW. Stocks of that rather exclusive, (or should that read "elusive"?), Icom IC-706 will also be ready to purchase with the MARTIN LYNCH FIVE YEAR WARRANTY for those of you wishing to buy or order at the show. Its going to be a real winning Leicester this year - come along and pay a visit!

YAESU FT-1000MP
NEW MODEL

With the current FT1000 in its fifth year, Yaesu Musen have decided to continue with the model number - FT-1000, but up date its best HF Transceiver to date, from the ground up.

- EDSP - Enhanced Digital Signal Processing. A new multifaceted filtering technology unmatched in the Amateur Radio industry.
- Dual In-Band Receive with separate S Meters.
- Collins 455kHz 2.7kHz SSB mechanical filter - as standard! Collins CW filters as optional extras.
- Selected Cascaded Crystal & mechanical Filtering, independent 2nd & 3rd IF filter selection.
- New High Resolution DDS Tuning (0.625Hz tuning steps!)
- Wide Receiver Dynamic Range, with separate Optimised FET RF Preamplifiers for High & Low Bands "Shuttle Jog" Enhanced Tuning System. CAT System capability with built in RS-232C Level converter.
- Transverter jack for VHF/UHF operation (Display indicates actual VHF or UHF Frequencies).
- Selectable antenna jacks. Separate RX only jack also included.
- Custom Feature Configuration via new Menu system.
- Quick Memory Bank system to recall important memory channels.
- Built in high speed Auto Antenna Tuner.
- Built in Contest memory keyer.

Yaesu's exciting new Enhanced Digital Signal Processing system provides four random noise reduction settings, selectable bandpass filtering with adjustable low and high cut responses, and transmitted audio enhancement with four voice response equalisation technique.

In addition, an automatic seeking EDSP notch filter will identify and eliminate interfering hetrodynes and carriers should they appear in the passband. It's interesting to note the introduction of Collins mechanical filters in the new FT-1000MP. It's debut was actually at the Stafford Show in August and customers who visited the Yaesu stand commented how the Audio quality was in a different class, no doubt due to the DSP and more importantly the employment of Collins filtering. The price is in fact lower, (its true!), than the current out going FT-1000.

Retailing at only £2849 including a built in PSU and £2599 for the version without, that's a saving of over £1100 on the original. We will gladly take trade in's as deposit, (even the current FT-1000), and can offer the balance on our very advantageous finance terms. Martin Lynch is offering the FT-1000MP with FIVE YEAR WARRANTY as standard, once again proving customer peace of mind is our satisfaction!

KENWOOD TS-870S
NEW MODEL

The "Next Generation"

The first of a new breed, this HF all mode transceiver is equipped with not one but two 24-Bit digital signal processors at the "IF" stage - an innovation that leads to such benefits as high efficiency digital filtering, powerful noise-and interference-reduction, equalisers and DSP detection.

The NEW TS-870S does not employ any analogue "IF" filters - it uses post-IF digital filters for all modes - SSB, CW, AM, FSK and FM and is truly a world first - offering precise performance that is unobtainable with analogue circuits. The TS-870S also employs a "Line Enhancer" noise reduction system that actually pulls out signals buried deep down in the noise.

Add to this a Beat Cancel system that eliminates multiple beat frequencies and an auto IF notch, the new TS-870S should appeal to the most demanding of HF operators - especially on todays crowded bands. It replaces the out going TS-850S, (although they are still available), and the price, (considering there are NO filters to buy!), is, I think, **very competitive at only £2399.95.**

Deposits from only £399.95.

Available Now!!

ICOM IC-775DSP
NEW MODEL

Although the IC-775DSP has been around in production form for several months, with the introduction of the new TS870 and FT1000MP, Icom's new flagship really is the "Grand Daddy" of the trio. In size, it dwarfs both the Kenwood and Yaesu. In features it isn't lagging behind, either. DSP noise reduction is available on the IC-775DSP along with 200 Watts of power output, (the other two only produce 100W), Auto notch for those annoying interfering carriers, two receivers with independent tuning dials and a REAL "S" Meter - (I don't like flashing bar graphs!). It is our best selling flagship HF since the FT1000 was introduced back in 1990. We've supplied many to the U.K's top DX'ers and once you see and feel the overwhelming quality of construction, use the wealth of features the IC-775DSP has to offer, you too will find it difficult to pass this one by.

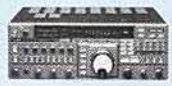
The new IC-775DSP still lists at £3699.00. At the price, it comes with FIVE YEARS WARRANTY, (Only from Martin Lynch), includes an internal PSU, auto ATU and is ready to go. **Finance packages are available, for a lot less than you think. What have you got to part exchange?**

THE YAESU FT-51R	Lynch Price £PHONE
THE YAESU FT-900AT	Lynch Price £PHONE
THE KENWOOD TH-79E	Lynch Price £PHONE
THE ALINCO DX-70	Lynch Price £PHONE
THE ALINCO DJ-G5	Lynch Price £PHONE

THE YAESU FT-990

With all the new wave of DSP transceivers, don't forget YAESU had Digital bandwidth control on the FT-990 three years ago! 100 watts out, Auto ATU built-in, plus the option of AC (internal PSU), or DC, the FT990 is still our best selling HF Transceiver. No other has plug in boards for easy maintenance either!!
FT-990 AC List £2399.00 Few at only £1849.00 FT-990 DC List £2099.00 Few at only £1699.00 SUPER LOW COST FINANCE AND 5 YEAR WARRANTY ALSO AVAILABLE!

THE YAESU FT-736R



Before the price shot up through the roof I bought 30 of the most popular VHF multimode Base Station. There are still some left but not many so hurry! You will not want to fork out £2000 for one.
FT-736R BRAND NEW, NOT "EX DEMO", £1499.00 - LIMITED SUPPLIES.

SPECIAL OFFER
KENWOOD TS-450SAT

SAVE A MASSIVE £400.00

First come, first served!

Bulk purchase of your favourite "midi" sized HF transceiver has enabled us to offer them on a spectacular money saving offer. The TS-450SAT is despite it's size, a full feature 100W all mode HF transceiver, including a built in AUTO ATU, IF Shift and much more. The list price is £1599.00 but we are offering 10 pieces at only £1195 including FREE DELIVERY, saving a massive £400.00!!

REMEMBER REMEMBER Saturday the EIGHTEENTH of NOVEMBER

Now in it's FIFTH YEAR, our yearly extravaganza is upon us again, thing is can we top last year for the most people ever seen at one time in NORTHFIELDS AVENUE? Make a note in your diary. Nearly a thousand people poured through the door and grabbed tens of thousands of pounds worth of equipment at virtually trade price.

Yaesu, Kenwood Icom and Alinco will be on hand to answer all your queries, (and I'll be in the back ground ready to debit your credit card!), so make sure you visit the best single day of the year - MARTIN LYNCH actually paying for all the food and drink out of his own pocket!

***ARE YOU SURE YOU'RE BUSY THAT DAY?** What ever you've got on - cancel it and come to LYNCHY. Make him sweat and give yourself a big grin - grab a bargain!*

All these items, and more, are available on INTEREST FREE FINANCE

Call today for your tailor made quotation.

FAX: 0181 - 566 1207
AFTER HOURS: 0973 339 339
B.B.S.: 0181 - 566 0000

Call 0181-566 1120 for details of my MA

END OF SUMMER Sale

"Never knowingly made a profit on new Icom, Kenwood, Yaesu, Alinco & more...they're all at knock-down prices"

ANTENNAS

TONNA ANTENNAS *LOWEST PRICES!*

2 METRES

20804	4 ELE FIXED	£38.95
20809	9 ELE PORTABLE	£44.95
20089	9 ELE FIXED	£40.49
20818	11 ELE FIXED	£70.25
20811	9 ELE CROSSED	£78.25
20817	17 ELE FIXED	£83.65

70CM

20909	9 ELE FIXED	£39.55
20919	19 ELE FIXED	£47.65
20438	19 ELE CROSSED	£55.75
20921	21 ELE FIXED	£61.95

6M

20505	5 ELE FIXED	£65.95

23CM

20623	23 ELE FIXED	£43.95
20635	55 ELE FIXED	£65.65

CUSHCRAFT ANTENNAS

R7 VERTICAL	£369.00	A3S 3ELE BEAM	£349.00
R5 VERTICAL	£279.00	A3WS 18/24 BEAM	£275.00
A4S 4ELE BEAM	£428.00	D3WS 10/18/24	£179.00

TS SERENE ANTENNAS

BASE *THE LOWEST PRICES, HIGHEST QUALITY*

TSB-3315	2/70 BASE 8.5/11.9db	£119.95
TSB-3304	2/70 BASE 6.0/8.4db	£79.95
TSB-3303	2/70 BASE 3.0/6.0db	£42.95
TSB-3301	2/70 BASE 6.5/9.0db	£74.95
TSB-3302	2/70 BASE 4.5/7.2db	£59.95
TSB-3302	2M BASE 6.5db	£37.95

MOBILE

TSM-1005	2M 7/8TH 5.2db MOBILE	£39.95
TSM-1320	2/70 2.1/3.8db MOBILE	£19.95
TSM-1326	2/70 2.1/5.0db MOBILE	£27.95
TSM-1332	2.70 4.5/7.2db MOBILE	£42.95
TSM-1607	2/70/23 2.8-8.8db MOBILE	£49.95

PRO-AM ANTENNAS

AS FEATURED IN RADCOM

PHF-160 Enormous 160M Centre Loaded Whip	£54.95
PHF-80 Almost as big 80m Centre Loaded Whip	£24.95
PHF-40 The nuts nuts on 40m, at a mere	£22.95
PHF-20 The way to DX, (safely) on 20m	£19.95
PHF-15 You guessed it, the same but on 15m	£19.95
PHF-10 I'll give you one guess	£19.95
AB-5 5 bander 10-80 in one antenna. It works!	£89.95
BB-2 Massive Spring mount for L.F. Whips	£49.95
116-NP gutter mount with 3/8 thread	£6.95
142-ADP Body mount with 3/8 to SO239	£9.95

Heil Sound

At last the excellent range of Bob Heil's Headset and Boom microphones, together with his famous replacement microphone inserts are now available.

Heil Proset-5

Professional Quality Boom Headset, dual padded earphones, flexible mic boom, includes HC-5 "Full range" insert for superb speech quality. Requires AD-1 cable ADAPTOR for KENWOOD/ICOM.
£119.95 incl. VAT

Heil Proset-4

Identical to Proset-5, but includes HC-4 "DX" microphone insert. Ideal for punching through the pileups.
£119.95 incl. VAT

Heil HC-4

Replacement microphone insert for existing fist or base microphones. With 10DB peak at 2KHZ and the low end rolled off sharply at 500HZ, (12DB per octave), the HC-4 is the ultimate DX mic insert.
£28.95 incl. VAT

Heil HC-5

Identical to HC-4, but High Articulation, offering superb SSB quality, rolls off sharply under 350HZ and above 3100HZ, peaking at 2.4KHZ. "Hi-Fi" SSB Audio.
£28.95 incl. VAT

Heil AD-I/K/Y

Adapter leads to interface the proset Headset/boom microphones to 8 pin Yaesu, Icom or Kenwood transceivers.

AD1-I "Blue" Lead for Icom	£11.95
AD1-Y "Yellow" Lead for Yaesu	£11.95
AD1-K "Red" Lead for Kenwood	£11.95

USED EQUIPMENT SPECIALS

Call or Fax for your FREE copy of the full listing

Nobody can offer 1 year warranty on used!!!

5 years ago, MARTIN LYNCH introduced the largest selection of USED equipment to the U.K. The list is so large that it would take 6 pages of condensed text to reproduce it. Here's a sample (we have at least two or three of each item listed in stock) but please check before ordering.

AEA	PK232MBX	TNC	£195.00
AEA	PK88	TNC	£99.00
ALINCO	DJ180	2M HANDIE	£129.00
AOR	AR1500E	SCANNER	£199.00
AOR	AR3000	SCANNER	£579.00
AOR	AR3030	RECEIVER	£499.00
AOR	AR8000	SCANNER	£349.00
BNOS	LPM144/3/50	2M 50W AMP	£89.00
BNOS	LPM432/3/50	70CM 50W AMP	£129.00
BNOS	LPM50/10/100	6M 100W AMP	£159.00
DRAKE	TR7+PSU	HF TCV'R	£499.00
ICOM	IC28E	2M 25W TCV'R	£169.00
ICOM	IC2E	2M HANDIE	£99.00
ICOM	IC735	HF TCV'R	£695.00
ICOM	IC736	HF+6M TCV'R	£1495.00
ICOM	IC765	HF TCV'R	£1495.00
ICOM	IC901E	2/70 FM MOB	£425.00
ICOM	ICR7000	BASE SCANNER	£749.00
ICOM	ICR7100	BASE SCANNER	£1100.00
ICOM	ICW21E	DUALBAND H/H	£395.00
ICOM	ICPS55	25 AMP PSU	£129.00
ICOM	ICRM3	CONTROLLER	£45.00
KENWOOD	TS130V	10W QRP HF	£349.00
KENWOOD	TS140S	HF TCV'R	£649.00
KENWOOD	TS680S	HF TCV'R	£695.00
KENWOOD	TS940S	HF TCV'R	£1100.00
KENWOOD	TS530S	HF TCV'R	£495.00
KENWOOD	TS830S	HF TCV'R	£525.00
KENWOOD	TS950SD	HF TCV'R	31995.00
KENWOOD	TL922	2KW HF AMP	£1150.00
LOWE	HF150	SW RECEIVER	£325.00
LOWE	HF225	SW RECEIVER	£349.00
STANDARD	C500	DUALBAND H/H	£225.00
STANDARD	C528	DUALBAND H/H	£249.00
YAESU	FRG100	SW RECEIVER	£399.00
YAESU	FT1000	TOP HF TCV'R	£2295.00
YAESU	FT101ZD	HF TCV'R	£395.00
YAESU	FT107M	HF TCV'R	£399.00
YAESU	FT2200	2M 50W FM	£249.00
YAESU	FT221R	2M M/M BASE	£295.00
YAESU	FT225RD	2M M/M BASE	£525.00
YAESU	FT290RMK1	2M M.5W M/M	£269.00
YAESU	FT290RMK2	2M 2.5W M/M	£399.00
YAESU	FT41	70CM H/H	£239.00
YAESU	FT840	100W HF TCV'R	£679.00
YAESU	FT780R	70CM 10W M/M	£395.00
YAESU	FT530R	DUALBAND H/H	£369.00
YAESU	FT707	HF TCV'R	£295
YAESU	FT790RMK1	1W 70CM M/M	£295.00
YAESU	FT736R	QUADBAND M/M	£1100.00
YAESU	FT23R	2M HANDIE	£125.00
YAESU	FT73R	70CM HANDIE	£145.00
YAESU	FT747GX	HF TCV'R	£549.00
YAESU	FT757GX	HF TCV'R	£549.00
YAESU	FT767GX	HF TCV'R	£895.00
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KNOCK OUT THE NOISE WITH A DIGITAL SIGNAL PROCESSOR

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AEA PRICES HAVE NEVER BEEN SO LOW

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THE IC-765

With the introduction of Icom's new flagship, we have a limited selection of it's predecessor, the brilliant IC-765 as "trade-ins".

Like the IC-775, the IC-765 has its own built in power supply, sports a very clever auto tuner and it still has one of the best ergonomically laid out front panel lay-outs of a modern HF Transceiver. Talking of front panels, the IC-765 is a pure solid aluminium construction, (not plastic like so many modern designs), and like the rest of the design - is built to last. Price? the last release from Icom was £2995.00. We have three only at a very healthy saving of £1495.00. Deposits of only £195 and your own trade-ins welcome. Phone the sales team today. 0181 566 1120
One only FT-1000 and TS950SD at £2295 Each!

Both used, as new in origional boxes, with all packing and full warranty of TWELVE MONTHS. FREE FINANCE IS ALSO AVAILABLE!

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High performance transverters coming soon

AMPLIFIERS

MML432-30 30W O/P 1 OR 3W I/P	£169.95
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MML432-100 100W O/P 10W I/P no pre amp	£399.95
MML220-80-10 80W O/P 10W I/P	£179.95
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MML 144-100-3 100W O/P 3W I/P	£199.95
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MTV 435 436MHZ 20W O/P TV TRANSMITTER	£199.95

IF YOU DON'T WANT TO TAKE ADVANTAGE OF MY FREE FINANCE AND WOULD RATHER PAY CASH, CHEQUE, CREDIT CARD OR TRADE-IN, THEN CALL 0181 - 566 1120 TODAY FOR EXPERT ADVICE. I promise you the best overall deal in the U.K. Get ringing, or you'll miss the bargains!
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The Leicester Show Product News

We asked exhibitors to tell us what products would be launched or featured at the Leicester Show. Here are some of the items they told us about . . .

The information below is compiled from information sent in by the manufacturers and distributors concerned. Details are published in good faith but the RSGB cannot be held responsible for false or exaggerated claims made in the source material.

G C Arnold Partners Stand S56

GEOFF ARNOLD will have several additions to the range of books on sale at the ***Radio Bygones*** stand. These include: ***Valve Amplifiers*** by Morgan Jones, a new book covering audio amplifiers and pre-amplifiers, including analysis of well-known designs such as the Quad II - £25.00; ***Electronic and Radio Engineering*** by F E Terman, a reprint of a classic volume from the valve days, exploring component characteristics, circuit techniques etc - £18.95; and ***Wires, Wheels and Wings - a Wireless Mechanic's Diary*** by Harry Reddin, the 'unputdownable' story of the author's life, including wartime experiences in RAF Signals Branch, and with a mass of nostalgic detail - £16.50.

Nevada Stand S35

NEVADA HAVE RECENTLY been appointed UK distributor for **GAP Antenna Products.** This American-made range of HF verticals uses elevated feed and no traps. GAP claim their verticals are nearly 90% efficient. Four GAP verticals will be assembled and on show at Leicester: prices are from £259 for the **Challenger DX** to £399 for the **Voyager DX**, a 45ft long vertical specifically designed to provide efficient operation on 160, 80, 40 and 20m.

The 'classic' **Drake R8A communications receiver** will also be featured on the Nevada stand. This top-of-the-range communications receiver comes supplied complete with all filters, has 440 memory positions and a user-programmable seven character alphanumeric display, which can be used to display the name of shortwave broadcast stations, for example. The R8A features improved ergonomics, allowing single key presses to select mode / bandwidth, as well as programmable auto selection of bandwidth when changing mode. The Drake R8A is available for £1295.

Nevada is also featuring the **Optoelectronics SSB220A general purpose and SSB bench counter**. By using DSP and Direct Digital Synthesizer technology, the SSB220A has the unique ability to measure the frequency of single sideband, as well as coherent single tone, signals. Its frequency range is 10Hz to 3GHz and it is available for £399.95.

Kenwood UK Stand E13

THE NEW **Kenwood TS-870S** HF transceiver will be featured on Kenwood's stand at Leicester. This 'new generation' transceiver has two 24-bit digital signal processors (DSP units) at the IF stage, which provide highly-efficient digital filtering (there are no optional filters to buy, as the TS-870S is fully DSP), powerful noise and interference reduction, equalisers and DSP detection. It can be fully computer-controlled using the built-in RS-232 adaptor to provide a high-speed link to your PC. A built-in automatic ATU is included as standard, and this can be switched into circuit on receive as well as transmit. For the keen CW operator, the TS-870S has a fully-featured K1 Logikeyer built in. The new Kenwood TS-870S costs £2400 (RRP). Optional extras include the PS-52 or PS-31 mains PSUs, and the new DRU-3 digital recording unit, which provides up to 60 seconds of digital recording.

Siskin Electronics (UK) Stand E10

SISKIN ELECTRONICS will be giving live demos of their **Multi-Cat MkII** computer tuning system for HF transceivers. Multi-Cat allows remote control of most transceiver functions from the keyboard. This permits the transceiver to be located well away from the operating position, which may help solve interference problems. Multi-Cat is also popular with visually-impaired operators, as support for PC sound cards has been added, together with a built-in CW keyer. It is available at Leicester complete with cables and software at a special show price of £59.95.

AOR (UK) Ltd Stand E10a

TWO BRAND-NEW receivers will be shown on the AOR stand. So new it does not even have a name yet, AOR will be unveiling a new UK-manufactured high-performance general coverage receiver. Designed by internationally-recognised expert John Thorpe, the new receiver has excellent strong signal handling, computer control, infrared hand control, dot-matrix display, and a number of features never seen before on receivers in the medium price range.

Also new from AOR is the **AR5000**, a high-performance all-mode receiver covering 30kHz - 2.5GHz. With excellent strong signal handling performance and multiple standard IF bandwidths, the AR5000 is intended for the dedicated listener and for commercial users.

Yaesu UK Stand E17

THE BIG NEWS from Yaesu UK is the release of their new **FT-1000MP** HF transceiver. Despite the name, this isn't a replacement for the top-of-the-range FT-1000, which continues to be available. Rather, the FT-1000MP is a 100W output DSP transceiver with optional world-renowned Collins mechanical 500Hz CW filters. Two 10-bit and three 8-bit Direct Digital Synthesizers are used in the local oscillator. The transceiver has a built-in automatic antenna tuner and full-featured CW keyer with two iambic keying modes, a 'bug' emulator, adjustable weighting and an automatic character spacing circuit to improve your sending if it is anything less than perfect! The FT-1000MP has two VFOs allowing simultaneous reception and display of two separate frequencies within the same band. The dual receiver audio can be monitored separately or mixed, and the two VFOs allow separate IF bandwidths or modes to be selected. Diversity reception using a separate receive antenna is also possible. With a recommended retail price of around £2800, which includes an internal AC switched-mode power supply, the FT-1000MP is bound to be a best-seller.

The wide range of Yaesu transceivers will also be shown on the Yaesu (UK) stand, including the **FT-10R** (2 metres) and **FT-40R** (70cm) tiny handheld FM transceivers, and the high-power (max 50W) dual-band mobile transceiver, the **FT-8500,** which is loaded with features and comes with a detachable front panel for easy installation.

Linear Amp UK Stand E5

THE WELL-KNOWN **Explorer 1000 HF linear amplifier,** which uses a pair of 3-500ZG valves, is to be 'revamped' and **Linear Amp UK** hope to have the new version on show at Leicester. The **Hunter 750**, using a single 3-500ZG valve, is also available from Linear Amp UK, as are the VHF and UHF **Discovery** series of amps.

Linear Amp UK's products are now earning a well-deserved international reputation for craftsmanship and reliability.

Martin Lynch Stand S25

EXPECT TO SEE new rigs from all the major manufacturers on the Martin Lynch stand, including the **Icom IC-775DSP** and **IC-706**, the **Yaesu FT-1000MP** and the **Kenwood TS-870S**. The 'radio-ready' PCs from **Peacock** and the range of **Heil** headsets and boom microphones will also be on show.

Waters & Stanton Electronics Stand S15

AS USUAL, A wide range of MFJ and Alinco equipment will be on display at the Waters & Stanton stand. Three MFJ QRP transceivers are reviewed by Peter Hart in this *RadCom* - see page 61. Also from MFJ is the **MFJ-784B DSP filter**, which is now available for £249.95 and which we hope to review soon. The 40-page 1995 MFJ catalogue listing many new products is now available on receipt of a large SAE.

The **Alinco DX-70** HF + 6m transceiver (reviewed in the August *RadCom*) will be on display, as will the new **Alinco DJ-G5 dual-band handheld.** This is available from Waters & Stanton at £459. It includes wide-band receive capabilities, a 'Monitor-scope' visual activity display and no fewer than 200 memory channels, all in a compact palm-sized handheld.

Lake Electronics Stand S6a

LAKE ELECTRONICS will be displaying the new **CT400 Antenna Coupling Transformer**. The CT400 is a broadband component designed to allow the use of co-axial cable with any end-fed wire antenna. It is connected between the antenna and co-ax and will work with any receiver on all the HF bands, enabling the co-ax to act as an effective downlead with minimal signal loss. The cost is just £6.75.

Also on display will be full range of **Lake Electronics** kits, including the **DTR7-5** 7MHz 5W CW transceiver, which is reviewed by Peter Hart on page 61 of this edition of *RadCom*. The matching **TU4 HF ATU / SWR Meter** will also be shown at Leicester and this is available for £68 in kit form or £88 fully assembled.

Lake Electronics will also have a wide range of vintage wireless books for sale.

Come and See the RSGB

on Stand 1 (Exhibition Hall)

First chance to buy Next Year's Call Book

PLUS a full range of special offers.

ALINCO - "NOW YOU'RE TALKING"

Look What's Being Said -

"Award Winner - absolute delight to use - Amazing first venture into HF"
- Rob Mannion G3XFD
- Editor, Practical Wireless

REVIEWED AUGUST ISSUE *PRACTICAL WIRELESS*

PREVIEWED IN JUNE *HAM RADIO TODAY*

"Superb for mobile use - Alinco have surprised the world" - Chris Lorek G4HCL

"Performed very well indeed during CQ worldwide contest"
- Mike Dennison G3XDV
- Editor, Radio Communication

"Very good transmit & receive audio" - Andy Durrant G7OEC
- Coastal Communications

REVIEWED AUGUST ISSUE *RADIO COMMUNICATION*

"The audio is unbelievably good" - Martin Lynch G4HKS

"It's brilliant" - Chris Taylor G1FMH

The DX-70 is the world's smallest HF transceiver - providing 100 Watts all- modes & 10 Watts on 6 metres. General coverage receive is included, and wideband transmit available for export. Detachable front panel for remote mounting & security. Plus superb specification and performance.

£1095

Two superb new transceivers for 1995

AVAILABLE AT ALL GOOD RADIO STORES

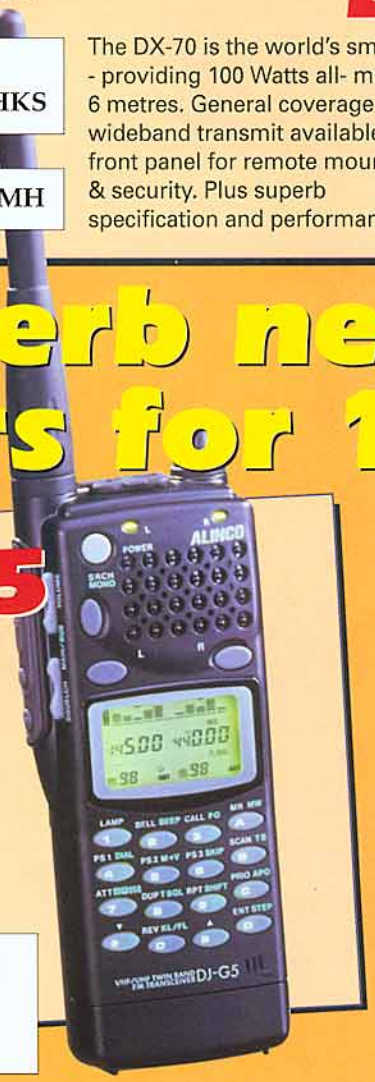
DJ-G5

£479

"I tried one at the Friedrichshafen Exhibition - it's superb"
- Mark Francis G0GBY

The **ALL-NEW** DJ-G5 compact dual band handheld transceiver replaces the well known DJ-580 which was a best-seller worldwide. Packed with state-of-the-art features including CTCSS tone encode & decode. 200 memory channels. Alinco's amazing 11 channel Monitorscope & new high efficiency power MOSFET module. Includes wideband receive coverage: 108-174MHz & 420-470MHz. Also 850-950MHz included.

REVIEWS COMING SOON



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01702 205843

ALINCO is distributed in the UK by:

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WATERS & STANTON ELECTRONICS

NEW HF TRANSCEIVER

Advanced HF Transceiver FT1000MP

Yaesu's advanced HF transceiver delivers outstanding performance with state-of-the-art features

Photograph courtesy of Ham Radio Today

Specifications

General

Rx frequency range: 100 kHz-30 MHz
Tx frequency ranges: 160-10m amateur bands only
Freq. Stability:
<± 10 ppm (-10 - +50°C)
<± 2.0 ppm (0° - +50°C) w/TCXO-4
<± 0.5 ppm (0° - +50°C) w/TCXO-6
Freq. Accuracy:
<± 7 ppm (except FM, <± 500 Hz)
w/TCXO-4: <± 2.0 ppm (FM <± 460 Hz)
w/TCXO-6: <± 0.5 ppm (FM <± 460 Hz)
Emission modes: LSB, USB, CW, FSK, AM, FM
Frequency steps: 0.625/1.25/2.5/5/10 Hz for SSB, CW, RTTY & Packet; 100 Hz for AM and FM
Supply voltage: 100-125, 200-234 VAC, 50/60 Hz

Transmitter

Power output: adjustable up to 100 watts (25 watts AM carrier)
Modulation types:
SSB: J3E Balanced, filtered carrier
AM: A3E Low-level (early stage)
FM: F3E Variable reactance
AFSK: J1D, J2D Audio frequency shift keying

Receiver

Circuit type: triple-conversion superheterodyne

Introducing the FT-1000MP our new advanced amateur transceiver. The FT-1000MP incorporates a multitude of new operating features providing competitive operation in all modes. For example, the FT1000MP offers dual-VFO reception and adjustable transmitter power output of up to 100 watts on all HF amateur bands (25 watts carrier AM). "Shuttle Jog" tuning ring allows large or small frequency excursions with a slight turn of the wrist - precision tuning with no more cranking.

And most of the advanced features and settings are now viewed and selected from the menu programming system, which is easily recalled from the front panel. We've made it easy to see operating frequency and other important settings of both VFOs from the bright display.

Superb receiver performance is a result of the direct lineage from the legendary FT1000D. New technology Direct Digital Synthesizers are used in the local oscillator resulting in extremely fine tuning with thirteen selectable tuning steps down to 0.625Hz.

Two VFOs allow simultaneous reception and display of two different frequencies, even in different modes and with different IF bandwidths. Receiver audio can be completely or partially mixed, or monitored in each ear.

To battle QRM, the FT1000MP comes equipped with formidable defence. Fine tailoring of the IF passband is made possible with individually selected, cascaded 2nd and 3rd crystal filters banks. World renowned Collins mechanical 500 Hz CW filters are available as options.

Introducing Yaesu's EDSP...

Yaesu's new EDSP (Enhanced Digital Signal Processing) system provides four random noise reduction settings, selectable band pass filtering with adjustable low and high cut-off skirts, and transmitted audio enhancement with four voice-response equalisation schemes. In addition, EDSP provides automatic notch filter that identifies and attenuates heterodynes as they appear.

EDSP uses A/D (Analogue to Digital) and D/A (Digital to Analogue) conversion techniques under microprocessor control to deliver enhancement of signals at audio level. Our digital filters meet tighter specifications than analogue devices on parameters such as voltage and temperature drift and noise problems.

YAESU

This Month's Book Choice

Reviewed by Mike Dixon, G3PFR

THE ARRL UHF / MICROWAVE EXPERIMENTER'S MANUAL

Published by the American Radio Relay League, 225 Main St, Newington, CT 06111, USA.

446 pages, 11 x 8.25in, soft covers. Price £12.87 (RSGB members) from RSGB Sales, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

ISBN 0-87259-312-6.

IN THE EARLY DAYS of amateur radio, it was said that 'wireless waves shorter than 200 metres are useless' - until amateurs proved otherwise! There is a modern-day parallel, except that most amateurs appear to have decided that radio waves shorter than 70cm wavelength (430MHz) are to be regarded as being of very little use, apart from radar or cookery. This attitude may be the result of a combination of factors since, on this occasion, the professionals knew differently!

Microwaves, as to be expected, are proving to be more and more useful as modern technology enables amateurs, as well as professionals, to exploit their rather special characteristics: freedom from the vagaries of the ionosphere, plenty of bandwidth, largely predictable system performance, low noise levels, compact high-performance equipment and manageable high-gain antennas.

Basic microwave technology (not solid-state, of course) was firmly established in the 1930s and '40s and professional microwave engineers have been well served by numerous 'classic', but very mathematical, reference books. These dealt with systems which comprised, as far as amateurs were concerned, unobtainable devices. It is, perhaps, not too surprising that microwave technology was perceived as mysterious and unattainable!

Just as inexpensive solid-state microwave devices and components have at last come within the reach of amateurs, so have powerful personal computers, now present in the majority of amateur shacks. These have removed the drudgery of manual calculation and the need for a deep understanding of the mathematics of microwave design theory.

Both the RSGB's three-volume *Microwave Handbook* (published between 1989 and 1992) and the *ARRL UHF / Microwave Experimenter's Manual* reviewed here (published in 1990) have been 'enabled' by these changes in technology, opening the door on what used to be considered abstruse and very much a minority interest.

THE MANUAL

The *Experimenter's Manual* touches briefly on UHF, but then concentrates on microwave matters. It presents a nice mixture of theory and applications without much emphasis on complete amateur designs, which it should do, being sub-titled *Antennas, Components and Design*. However, practical designs are the subject of a recently-published second volume. [We hope to publish a review of the new volume soon - *Ed*].

The book is a substantial, soft-backed volume with 12 chapters and some 446 pages of well and clearly illustrated text. This is the combined work of some two dozen specialist authors and, although dealing with a variety of individual topics, hangs together remarkably well. The 12 chapters cover the History of Amateur Microwave achievement, RF Safety, Propagation, Devices, Transmission Media, Design Techniques, a wide variety of 'Notes on UHF and Microwave Systems Design', Microwave Fabrication Techniques, Antennas and Feedlines, EME Communications, Getting Started in Microwave Measurements and 'Tackling Microwaves with Microcomputers'.

As one might expect, many of the circuit concepts may be familiar to European amateurs (indeed, they have made a number of direct or indirect contributions to the book); some of the devices, components, materials and interpretations may be less familiar. There are also differences in band allocations and usage. For instance, US amateurs appear to have easier access to sophisticated surplus test equipment, a thing comparatively rare in the UK and Europe: we tend to rely more upon simpler, home-built testgear or professional testgear at microwave Round Tables. ATV does not appear to be a popular mode in the USA, whereas it is in the UK, and EME and amateur satellite working are outlined in the ARRL book but are not mentioned in the comparable RSGB books. US amateurs appear to favour long Yagis or helical antennas on the lower microwave bands, whereas in the UK we tend to prefer G3JVL loop-Yagis or dual-mode feed dishes.

Fortunately, most microwave designs are sufficiently broadband to allow effective performance to be realised at frequencies possibly hundreds of MHz removed from the design frequency. In any case, the reader should be able, using the software, to redesign or re-optimise for a new frequency, should the need arise. The differences in approach, far from detracting from the value of this book to UK (or European) amateurs, add to its value: indeed the ARRL *Manual* and the RSGB *Handbook* are complementary.

THE SOFTWARE

MENTION WAS MADE earlier of 'Tackling Microwaves with Microcomputers'. There are some program listings and an appendix describing amateur microwave oriented software. This software is available separately , on a 3.5in 720kb PC format diskette (ISBN 0-87259-313-4), at a cost of £8.97 (members) from RSGB Sales. It comprises 25 BASIC programs and one compiled PASCAL program. The BASIC programs will run under MS-, PC- or GW-Basic on anything from a 4MHz 8088 machine to a 66MHz 80486 machine, whilst the PASCAL program runs happily under several versions of DOS.

The programs are really basic. That is, they lack 'slick' front ends, such as menus, or colour, or smart graphics. Nevertheless, the programs are competent, will be useful to the experimenter and are tersely but well documented by DOS-ASCII text files also included on the disk. Some of the subject areas covered are antenna design (Yagi, loop-Yagi, log-periodic, helix, dish and horn antennas), systems performance analysis, path and Locator ('Grid' in American parlance) calculations, troposcatter, lunar and solar ephemeris, PCB design and matching and others. In summary, a useful collection of programs, some of which may already be familiar to European amateurs.

None of the programs can be expected to have the power or accuracy of professional programs, but then the amateur is seldom in a position to exploit such precision. He or she is normally content to accept a trade-off between high cost, impossibility of construction and 'ultimate performance', against lower cost, ease of construction and acceptable, realistic performance. In this context, the programs are capable of giving acceptable, sensible, realistic results, despite their apparent lack of sophistication.

CONCLUSION

The *Experimenter's Manual* and its software supplement should be in the shacks of all amateurs who like the challenge of experimentation and equipment construction, followed by the thrill of finding out whether their newly-constructed equipment is capable of working the DX!

The book and software may even prove to be an eye-opener for large numbers of amateurs who, because of the ready availability of a multitude of 'all-singing, all dancing black boxes' have unwittingly forgotten (or, perhaps, never appreciated) that wavelengths below 70cm *do* have a lot to offer - now and in the future! ♦

This Month's Direct Deals

Biggest Range of QRP

From Your Favourite Dealer! 01702 206835

We carry the largest range of QRP - this month mostly at discounted prices.

The famous K1BQT 20M SSB/CW Rig

* 12 Watts PEP Output
* CW Option Kit ~~£249~~
* Low current drain

£199

This delightful little transceiver by K1BQT, and packaged by MFJ, will give you plenty of DX contacts. It measures 2.5" x 6.5" x 5," and is small enough to fit into a rucksack. Use it base or portable and enjoy the benefit of advanced technological design. Includes speech processor, double balanced mixer front end, "bullet proof" Motorola PA and analogue RF/S-meter.

Ref. MFJ-9420X

MFJ QRP CW Single Band Transceivers

* Semi Break-in ~~£209~~
* 4 Watts Output
* Sidetone monitor
* 500Hz xtal filter

£179

There's a model for 40m, 30m, 20m or 15m. Enjoy the fun of QRP with one of these superb little transceivers. The superhet receiver includes a double balanced mixer front end and razor sharp 500Hz xtal filter. With RIT, AGC and semi break-in you are ready to go! Just connect 12 Volts. And if you want to run lower power, even down to milliwatts, there's an internally adjustable control.

Ref: MFJ-9040, 9030, 9020 or 9015

Pocket HF QRP - 80m, 40m or 20m!

£279

* 2 Watts Output
* SSB & CW

This Mizuho transceiver is small enough to fit in your pocket. Connect an outside aerial to it and you can work the world. For a real challenge try one of the matching telescopic whips. Includes speaker, micro-phone, morse key, RIT, noise blanker and analogue meter. Frequency control is by VXO. 2 xtals can be fitted (one supplied) giving total coverage of 50kHz on 80 and 40m and 100kHz on 20m. Many different xtal segments stocked.

Ref: MX3.5S, MX-7S or MX14S

ALINCO DX-70 QRP - 3W to 100W

* All bands 160m to 6m
* 3-100 Watts SSB and CW

£1095

No bigger than some 2m mobiles, this rig will get you on all bands QRP or QRO. We can adjust down internally to 3 Watts for Novice or QRP operation. Other power levels are 10W, 50W and 100W. You get the best receiver in the business and beautiful speech quality. Use it mobile or base. For portable operation it will run 100W from a 5.7Ah sealed cell for about 2 hours! (6:1 Rx / Tx approx). Ask for info.

QRP Tx Kits - 20/40/80m ~~£31.95~~

£27.95

These Ramsey 1 Watt QRP Tx kits are ideal for QRP CW and great fun. They are complete with VXO xtal (but less case). There's even a built-in T/R switch with aerial output for your main receiver or transceiver. Just connect 12V and enjoy the challenge. There's models for **80m, 40m or 20m.** Matching cases **£14.95**

20W HF Linear Kits for QRP Rigs

£39.95

If you have a QRP rig, why not try one of these 20W linears to boost the power? Feed it with 0.5 to 2 Watts and beef up your signal. Ideal for home-built projects. RF sensed T/R switching relay included

~~£49.95~~

Carriage is extra - £2 for kits £5 for rigs.

Waters & Stanton
22, Main Road,
Hockley,
SS5 4QS
Tel. 01702 206835
Fax. 01702 205843

Please send me full data sheets on all your QRP rigs and kits.

Name: _____

Address: _____

_____

_____

THE PETER HART REVIEW

SSB & CW QRP Rigs for the HF Bands

By Peter Hart, G3SJX*

FOR MANY, and a growing band of enthusiasts, QRP holds a fascination which cannot be satisfied by the black box 'QRO' rigs. Although QRP by definition implies low power, it has also become synonymous with simplicity and low cost. It is this aspect of QRP which makes home construction a much more straightforward task and many home brew QRP rigs are heard on the bands. For those keen on home construction, much satisfaction is obtained from building your own, and resulting contacts can give a greater sense of achievement. For those who wish to buy rather than build, there are various rigs available and as a halfway house, a number available in kit form.

It is remarkable how effective QRP can be, particularly on CW. An efficient antenna becomes much more important and far more reliance on the skill of the operator. Even in these 'sunspot challenged' years, a few watts of RF on 14MHz with good antennas can bring CW contacts from all over the world. The 7MHz and 14MHz bands are both good bands for QRP operation, at any point of the sunspot cycle. Both will yield plenty of European-wide contacts, and world-wide coverage with reasonable antennas. This review looks at a selection of QRP offerings for these bands - the Ten-Tec Argo, Lake Electronics DTR7-5, the MFJ range of monoband CW and SSB transceivers and the small Mizuho 14MHz handheld. The overall facilities offered and measured performance are summarised in the tables.

TEN-TEC ARGO 556

TEN-TEC ARE RENOWNED for producing high performance radios and for their range of QRP radios. The Argo 556 is a 5W single band transceiver which uses plug-in modules to provide coverage of any particular band. Modules are available to cover all nine HF bands with 500kHz tuning range available and the review radio was provided with a 7MHz plug-in module. A higher power version is available, the Ten-Tec Scout 555. This is identical to the Argo but includes a 50W transmit power amplifier. The radio covers both CW and SSB, with the correct sideband transmitted according to the band in use. There is no mode switch, pushing the microphone PTT or keying the CW paddle will transmit appropriately. The receiver frequency remains the same in both cases. The radio includes variable receiver IF bandwidth, built-in iambic keyer (5 - 50WPM), S-meter, LED frequency readout to 100Hz resolution and a noise blanker is available as an optional extra. The RIT range is about +/- 1.5kHz. Note that the transmitted carrier on CW is 750Hz away from the displayed frequency. The built-in keyer (Curtis type B with 15% weighting) defaults to 25WPM and, although easy to set the speed, this setting is lost on power down - a small annoyance.

The radio measures 184W x 64H x 248Dmm and weighs 2kg. A single conversion superhet design is used for both receive and transmit with an IF of 6.144MHz. Five pole fixed and four pole variable bandwidth crystal filters are provided at this IF. The band modules plug into a slot to the left of the display and contain the front end filter and local oscillator mixer for the appropriate band. A permeability tuned VFO is contained on the main chassis deck. A microphone is not included with the radio but the audio sensitivity of 5mV max should allow virtually any microphone to be used. The measured performance is shown in the table. The receive current consumption was 450mA, rising to 2A on transmit.

The radio was very easy to use and generally performed well. I did notice some phantom signals and strong signal problems (7MHz) during evening operation which may be a combination of dynamic range and poor image rejection problems. The image on 7MHz is around 19MHz but on some bands this falls in more crowded parts of the spectrum and may cause problems. The variable IF bandwidth is a very nice feature and at the minimum setting gave a 6dB bandwidth of 600Hz (measured -60dB bandwidth of 2.9kHz). I found the tuning drive rather stiff, but this may be just my sample. The audio jack on the front panel is really an external speaker connection and rather excessive volume with low impedance headphones (over 1W audio output available). There was also a slight background audio whine. On transmit, good SSB reports were received and CW operation with full break-in was a joy to use. The CW note was very clean with no trace of clicks.

A very comprehensive 40 page instruction manual is provided which gives full operating instructions, circuit diagrams and descriptions, alignment etc. A model for all to follow.

LAKE ELECTRONICS DTR7-5

LAKE ELECTRONICS HAVE developed a range of equipment for the QRP enthusiast which is available in kit form or fully assembled. It includes monoband 2W CW transceivers for 160, 80 and 40m, a three band direct conversion receiver, ATUs and 5W CW transceivers for 80 and 40m. The DTR7-5 is a 5W CW transceiver covering 7.0 to 7.1MHz. The receiver is direct conversion using a dual gate mosfet product detector and audio filter-

*The Willows, Paice La, Medstead, Alton, Hants GU34 5PR

Ten-Tec Argo 556

ing tailored to CW bandwidths. The 6dB bandwidth is 250Hz centred on approximately 750Hz. A variable capacitor tuned VFO provides the receiver oscillator and transmit carrier with a silky smooth ball race reduction drive. IRT is provided over a range of + / - 4kHz, which is essential in a direct conversion receiver to give the receive beat note. A switchable 12dB input attenuator is included to cope with strong off channel signals. The receiver is intended to drive headphones and no internal speaker is fitted.

The transceiver is contained on four small PCBs inside a screened metal case. Overall dimensions are 210W x 85H x 190Dmm, the weight is 1.1kg and assembly is straightforward if purchased in kit form. As with all direct conversion receivers, a low noise and well regulated PSU is essential. The current consumption on receive was measured at about 60mA and on transmit 1.0A.

Direct conversion receivers handle in a totally different way to conventional superhet radios. First, there is no single signal, ie an audio beat note is obtained on both sides of zero-beat. Second, not having AGC, strong signals sound loud and weak signals need to have the audio gain advanced. For a direct conversion receiver, the DTR7-5 has a remarkable performance. Measurements showed the highest 3rd order intercept and dynamic range of any of the radios in this review with figures on a par with transceivers costing well over £1000. This is even more surprising considering the use of a dual gate mosfet detector which many regard as inferior to a high level double balanced diode mixer. One problem direct conversion receivers suffer from is direct demodulation of AM signals appearing at the product detector. This is a potential problem for a 40m receiver, with the 41m broadcast band directly adjacent to the amateur band. The DTR7-5 will tolerate 1mV of AM input (4mV with the attenuator switched in) before problems arise and was only just discernible on my multiband vertical antenna.

Having become used to the characteristics of a direct conversion receiver, I found the DTR7-5 remarkably effective considering its cost. My only complaint was the very loud click when switching in or out the receive attenuator. The transmit note was reasonable, just a hint of unsteadiness, but there was a slight click on the make and break. The sidetone frequency is 1000Hz but this can be changed to a lower value. Transmit / receive switching is via a front panel toggle switch, not just by pressing the key.

The radio is provided with an 18 page operator's handbook which also fully describes the circuitry, PCB layouts, alignment and servicing. The kit version includes a more detailed manual.

The Lake Electronics DTR 7-5

MFJ RANGE

MFJ OFFERS AN extensive range of QRP equipment including monoband CW transceivers for 40, 30, 20 17 and 15m, folded dipole antennas for each of these bands, 20m SSB transceiver, ATU and PSU / charger. Any single transceiver, ATU and PSU may be combined to form an integrated station. Three items from the MFJ range were reviewed as follows:

MFJ-9020 and MFJ-9040

These are single band CW transceivers covering 14.0 to 14.075MHz and 7.0 to 7.15MHz respectively. The transmit output power is nominally 4W but reducible by internal adjustment for QRPp operation. These radios are simple to operate with just tuning, volume and IRT controls, a switchable 250Hz CW audio filter is available as an optional extra. Operating the key switches to transmit in semi break-in mode and the delay time before switching back to receive is adjustable internally. A Curtis type iambic keyer is available as an optional extra.

The receiver is a single superhet with an IF of 10MHz for the 20m unit or 12MHz for the 40m unit. The transmitter uses a single mix to final frequency. A narrow bandwidth crystal ladder filter is provided for sharp IF selectivity. The VFO is variable capacitor tuned with a slow motion reduction drive. The circuitry is

MFJ 20m CW and SSB transceivers

contained on a single PCB inside a screened metal case measuring 167W x 62H x 147Dmm. Current consumption on receive is about 50mA rising to about 0.8A on transmit.

Both transceivers were assessed using my multiband vertical antenna. Although band noise was just audible, the 20m receiver seemed to lack gain particularly at the IF. With the band well open, the receiver was quite lively and the IF filter very good but weak signals were really very quiet. The 40m receiver suffered from strong signal overload problems, with broadcast stations audible across the band particularly after dark. Netting is simply a case of ensuring the received

MEASURED PERFORMANCE OF QRP RADIOS REVIEWED

	Ten-Tec Argo	Lake DTR7-5	MFJ 9020	MFJ 9420	MFJ 9040	Mizuho MX-14S
Supply voltage	13V	13.8V	13.8V	13.8V	13.8V	9.5V
Frequency band	7MHz	7MHz	14MHz	14MHz	7MHz	14MHz
Sensitivity for 10dB s+n/n	0.25uV	0.35uV	1.1uV	0.35uV	0.6uV	0.1uV
IF rejection	76dB	-	64dB	57dB	62dB	32dB
Image rejection	48dB	-	75dB	61dB	48dB	97dB
3rd order intercept	-3dBm	+5dBm	-11dBm	-10dBm	-3dBm	-32dBm
3rd order dynamic range	85dB	88dB	70dB	77dB	80dB	70dB
Selectivity -6dB bandwidth	2kHz	not meas	660Hz	2kHz	940Hz	2.7kHz
Selectivity -60dB bandwidth	5kHz	not meas	3.8kHz	7.2kHz	4.5kHz	5.1kHz
S meter S1	0.6uV	-	-	2.2uV	-	-
S meter S3	1uV	-	-	4.5uV	-	1uV
S meter S5	1.6uV	-	-	8uV	-	1.8uV
S meter S7	4uV	-	-	16uV	-	-
S meter S9	50uV	-	-	56uV	-	13uV
TX power output CW	5W	5W	4W	-	4W	2.1W
TX power output SSB	5W	-	-	9.5W	-	2.3W
TX harmonics	-55dB	-58dB	-42dB	-40dB	-40dB	-55dB
TX spurii	-55dB	none	-40dB	-40dB	-45dB	-65dB
TX SSB intermod products	-35dB	-	-	-16dB	-	not meas
Freq display accuracy	100Hz	4kHz	3kHz	6kHz	1kHz	3kHz

QRP RADIOS - SUMMARY OF FACILITIES PROVIDED

	Ten Tec Argo	Lake DTR7-5	MFJ 9020	MFJ 9420	MFJ 9040	Mizuho MX-14S
Frequency range	plug in	7.0-7.1	14.0-14.075	14.15-14.35	7.0-7.15	14.2-14.25*
Modes	CW/SSB	CW	CW	SSB	CW	CW/SSB
Frequency display	4 digit LED	mech	mech	mech	mech	mech
Supply	12-14V	12-15V	12-15V	12-15V	12-15V	9V (6xAA)
S meter	yes	no	no	yes	no	yes
TX meter	power/SWR	no	no	alc	no	RF
IRT	yes	yes	yes	no	yes	yes
TX power	5W	5W	4W	10W	4W	2W
Built-in keyer	included	no	option	no	option	no
IF bandwidth	variable	fixed	fixed	fixed	fixed	fixed
Phone jack	yes	yes	yes	no	yes	yes
Noise blanker	optional	no	no	no	no	yes
RX attenuator	no	yes	no	no	no	yes
Built-in speaker	yes	no	yes	yes	yes	yes
Price	£539	£158	£209.95	£249.95	£209.95	£239

* see text

note is similar to the sidetone. This is adjustable internally. On weak signals, the volume control will be near maximum and this gives rather loud sidetone. The transmitted CW signal has a clean note with just detectable clicks.

MFJ-9420

The MFJ-9420 is a 20m SSB transceiver covering 14.15 to 14.35MHz. CW may also be provided with an optional CW adapter module covering 14.0 to 14.15MHz. The transmit power output is 10W PEP, an RF based speech compressor is incorporated and a microphone provided. A tune switch gives carrier output for ATU adjustments. The receiver controls are simply tuning and volume, there is no IRT. A reasonable size speaker is fitted into the case as with the CW transceivers, but there is no provision for headphones. Also, this is not simple to add, as the speaker drive is balanced (bridge drive) and one side is not grounded.

Similar in size and construction to the CW transceivers, the MFJ-9420 is also a single superhet with 10MHz IF. Current consumption on receive is approximately 100mA, rising to 2.5A on transmit. This little transceiver performed very well. Good SSB reports were received and the receiver sounded lively. There is more gain built into this design than the CW transceivers.

MFJ-9140B

The MFJ-9140B is a complete 40m portable station. It comprises an MFJ-9040 40m CW transceiver, MFJ-971 ATU and MFJ-4114 AC charger and PSU. The three units are fixed together with side straps making a single unit. The MFJ-971 ATU is similar in size and styling to the transceivers, covers all bands from 1.8 to 30MHz at up to 200W power level and includes a cross needle type SWR / wattmeter. This wattmeter has a selectable QRP range giving easier reading at low power levels. The tuning element is a T-match section and is simple to adjust. The MFJ-4114 portable rechargeable power pack provides 13.8V output at 1.2A from either AC mains or from NICAD D cells installed inside. Twelve cells are needed. In addition the batteries may be charged from the mains. The unit uses an external 12V AC transformer for mains operation. The MFJ-9040 transceiver was evaluated separately as a standalone item.

Mizuho MX-14S and AN-14 whip antenna

MIZUHO MX-14S

MIZUHO MAKE A range of true handheld transceivers for 80m, 40m and 20m together with a range of telescopic whip antennas (yes even 80m!) These transceivers cover SSB and CW with 2W output power and may be fitted with internal AA sized battery cells or powered / charged from an external supply. The MX-14S is the 20m version. Features include S meter, 10dB attenuator, IRT, noise blanker, internal microphone / speaker or provision for external, and switchable modes CW / SSB. The tuning oscillator uses a variable crystal oscillator which gives 50kHz coverage on 20m (25kHz on 80m and 40m versions). Two tuning ranges are selectable, the unit is fitted with one, covering 14.2 to 14.25MHz.

The radio is a single superhet design with an IF of 11.2735MHz. The dimensions are 66W x 39H x 142Dmm and the unit weighs 590g less batteries. The current consumption is around 70mA on receive peaking to 0.7A on transmit. On my vertical antenna and beam, the receiver was very clean and lively. Certainly there is plenty of sensitivity and gain. The AN-14 whip antenna is 135cm long, retracting to about 20cm, and on this there were plenty of signals audible although with only 2W into this antenna only the strongest signals are workable. CW operation requires fitting a crystal to cover the CW end of the band but 50kHz is really rather a narrow range. There did not appear to be any sidetone for CW operation.

OVERALL CONCLUSIONS

LOOKING AT THE results, the best overall performer in terms of features and electrical performance is the Ten-Tec Argo, but it does cost over twice as much as the other rigs. If several band modules are purchased, then the cost starts to approach that of the cheaper multiband 'QRO' rigs, which also generally have a better electrical performance. The Lake DTR7-5 gives good value for £97.80 in kit form and the receiver has a remarkable performance for a direct conversion design. All the transmitters gave a good or acceptable performance but I was somewhat disappointed in most of the receivers. Although QRP implies simplicity and low cost as well as low power, there is still a need for sensitive receivers with good signal handling and low spurious responses. The single superhet is capable of excellent results at low cost but this has not been fully achieved in most of these designs.

However, all these radios will provide much enjoyment with plenty of QRP contacts given a good antenna. The MFJ monobanders are good to take anywhere and the Mizuho is really the only handheld. Its tuning range is rather narrow and needs to have a second crystal fitted.

ACKNOWLEDGEMENTS

I WOULD LIKE TO thank Lake Electronics of Nuthall for the loan of the DTR7-5, and Waters & Stanton Electronics for supplying all the MFJ units, the Ten Tec Argo and Mizuho MX-14S. Waters & Stanton stock quite a range of QRP units and accessories. ♦

INDEX LABORATORIES QRP PLUS

UNFORTUNATELY IT was not possible to obtain an example of the American-made Index Laboratories QRP Plus nine-band transceiver for review. This transceiver operates on all bands from 1.8 to 28MHz CW and SSB, with a power output of 0 - 5W, adjustable on CW. The rig costs £699, but is only available in limited quantities - and there is a waiting list. Further details are available from Waters & Stanton Electronics - *Ed.*

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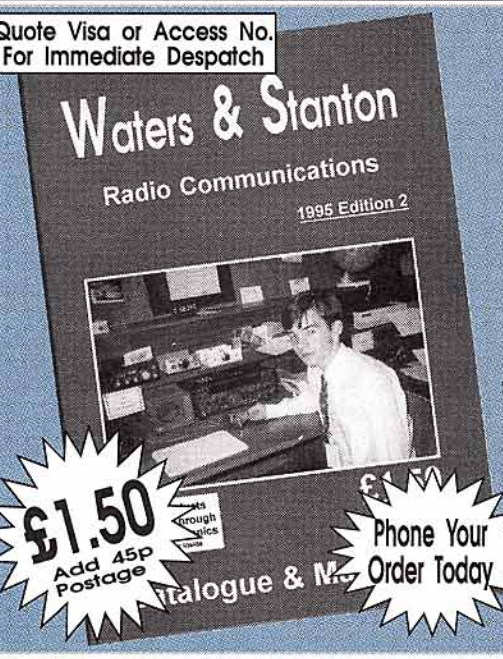

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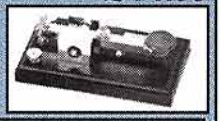

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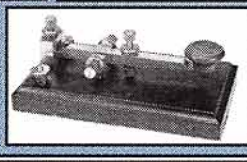

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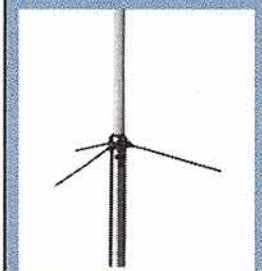

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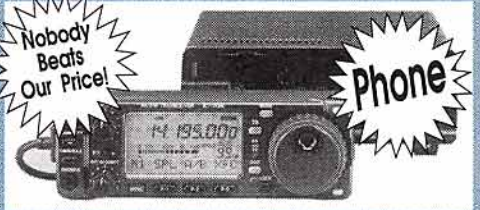

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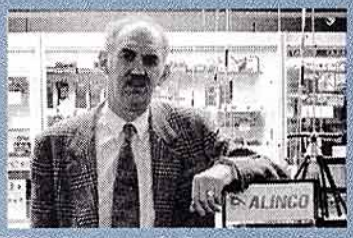

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CUTTING PC BOARD

HOW DO YOU CUT fibreglass PC board both neatly and accurately to size, so that it will fit in card guides for example?

AS THIS CORRESPONDENT found, cutting with hand shears leaves raw edges and tends to permanently distort the fibreglass, while an unguided hacksaw blade wanders off the required line. I've also tried the old-fashioned lever-blade office guillotine with little more success than hand shears, because the board tends to skid under the sideways force.

Apart from taking the board to a friendly local metalworking shop that has a power guillotine (and whom you can trust to cut accurately to your scribed lines), I've only found two ways that work well.

One is to use hand-operated nibbling shears which cut out a strip of waste material while supporting the board on either side to avoid distortion. With care and a little filing afterwards, you can get a good straight line. The other way is to use a hacksaw with a pair of steel bending bars.

Bending bars are described in the latest *Radio Communication Handbook* in the excellent chapter on 'Construction and Workshop Practice' by Tom Kirk, G3OMK. (This is one reason why there has been so little on metalwork in this column for a while; I felt Tom had said it all!).

Fig 1 shows what bending bars are, and G3OMK describes how to use them for bending flanges and boxes. They are also ideal for such purposes as cutting a clean edge on PC board or aluminium sheet. First you clamp the board between the bars, with the scribed cutting line accurately aligned to top edge. Tip: clamp both the bars and the PC board gently in the vice while you nudge all three items into the correct orientation, and then tighten the bars together using their own bolts then clamp the whole assembly firmly in the vice and use the top of the bars as a guide to saw away the unwanted PCB material.

Do not press the blade closely against the bars; it's okay to leave a ragged edge showing. Finally, file this cut edge flush with the tops of the bars (**Fig 2**). If you have taken sufficient care to align the board correctly, you will have a clean, straight, square edge.

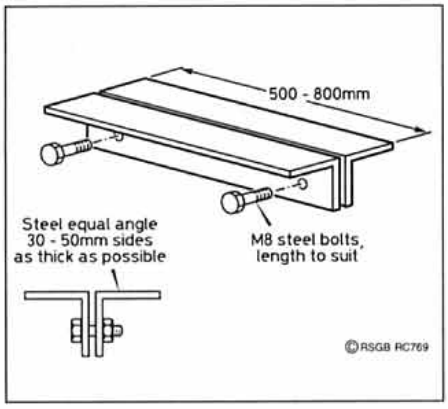

Fig 1: Bending bars - (from *Radio Communication Handbook*, Chapter 16).

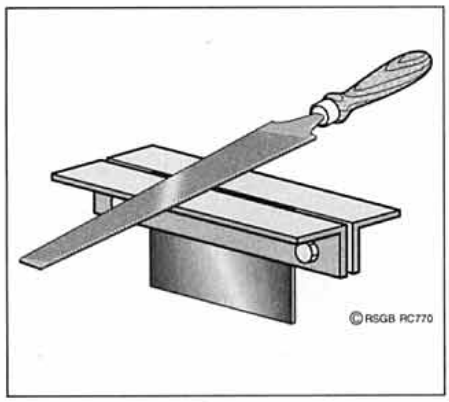

Fig 2: After using the bending bars as a guide to sawing, file the edge of the PC board flush to leave a clean, straight edge (from *Radio Communication Handbook*, chapter 16).

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REELING IT IN

IN AUGUST'S In Practice, G3XAQ challenged us to devise a simple, effective means of reeling in a wire antenna when lowering a telescopic tower. The problem was how to automatically tidy-up and let out 10-20m of slack in flexible wire and/or a string extension of the antenna, applying perhaps 1-2kg of tension.

IT CAN BE DONE! My thanks to G0VKY, GW3JSV, G3VNT, F/GW4WWN, G6TTL, G6XAQ and especially G4HYD for all your suggestions, which I'll summarise below. Radio amateurs come from all walks of life, and being a ship's captain, G4HYD answers this question from professional knowledge. To my surprise, he took up my joking suggestion about a counterweight and a 10-20m deep hole in the ground, but recommended instead a 10-20m deep hole in the sky! **Fig 3a** shows that the counterweight can be suspended from any convenient 'skyhook' (house, mast etc).

If the 'skyhook' is not where you wish to apply the tension to reel in the antenna, a couple of pulleys with suitable anchors provide a remedy as shown (note the use of a spiral 'dog stake' to take the upward pull).

If one end of the wire antenna is attached to the house, it's easy to envisage a single pulley at the top of a plastic drainpipe which

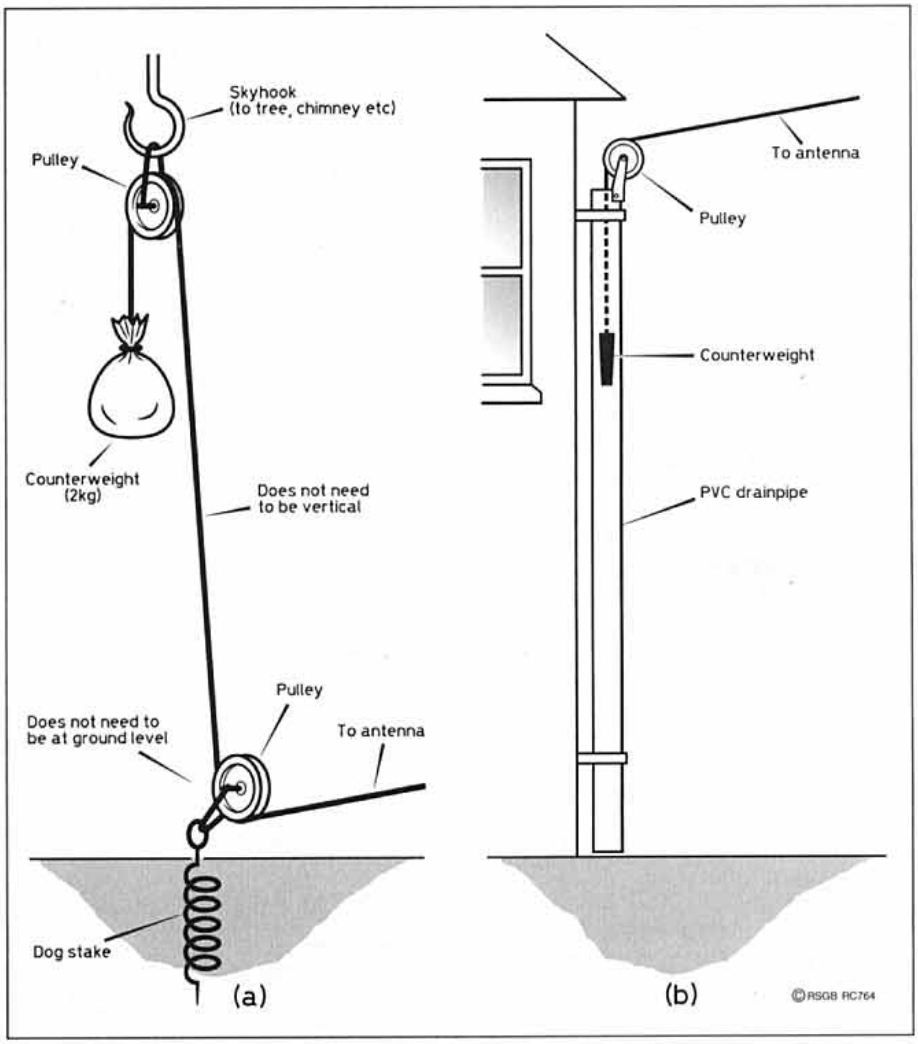


Fig 3: (a) G4HYD's suggestion for a counterweight at any height. (b) Simple derivative for end of wire antenna mounted on house.

holds the counterweight and prevents it from swinging in the wind (**Fig 3b**).

The next step, suggested by many others, is to use pulleys to exchange tension for distance. Neglecting friction for a moment, you can for example generate the required force of 2kg over 20m by moving a weight of 6 x 2kg over a vertical distance of 20/6m, ie 3.3m. As **Fig 4** shows, this requires a 'skyhook' only about 4m high. Unfortunately, it isn't quite as simple as that because frictional forces are also multiplied through the pulley system, so that much of the downward force applied by the counterweight is lost within the system and isn't available to reel in the antenna (a car engine hoist is rather similar, and the friction is so great that a little plastic catch on the loose end of the rope will hold the whole weight of the engine). Therefore, in practical terms you may need much more counterweight than Fig 4 suggests, and the whole system would need to be built quite strongly.

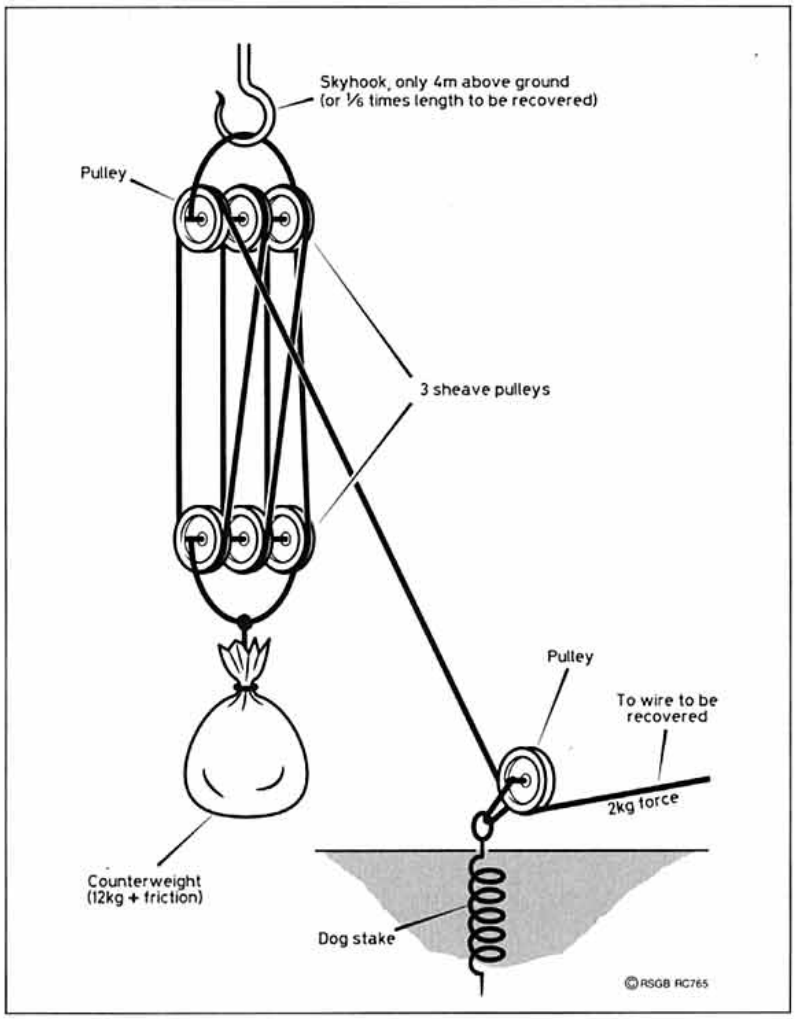


Fig 4: Using six pulleys to multiply the distance travelled by a heavier weight. Note that this example neglects frictional forces.

Yet another idea from G4HYD is shown in **Fig 5**. Once again, the desired effect is generated by moving a larger weight over a smaller vertical distance, but this time using a stepped drum with two diameters. The larger-diameter drum reels in the antenna, while the smaller diameter (which may be the axle) applies the force from the counterweight. Frictional losses in this system can be made very low, and the stepped drum also has the big advantage that it can potentially reel in the antenna guys followed by insulators and even the wire itself, without jamming in a pulley.

Meanwhile, G3XAQ himself has been experimenting with a Hozelock 'Tidyline' 8052, which is a retracting clothes-line reel which winds up a large spiral spring. Replacing the clothes-line, the spring will actually wind up enough to handle 14.5m of thin (2.5mm dia) terylene cord, but sadly it does not produce enough tension, even for a leg of a 22swg 80m inverted-V.

Thus, the antenna still has to be hand-fed into the reel after lowering the tower, so little has been gained. However, G0VKY has had good results with long retractable dog leads: again, these would not be adequate for a long antenna, but work well enough with his G5RV dipole installed as an inverted-V.

Thanks again to everyone who has supplied information and suggestions. So far, the stepped drum seems the most promising DIY option for most circumstances. You're going to need two for a dipole, of course, and for planning purposes the ever-tasteful GM4ZNX suggests they can be disguised as a matched pair of wishing wells - just what your garden always needed, right? More ideas are still coming in so you can expect further updates in due course.

N, BNC?

WHAT DO THE CONNECTOR names 'N' and 'BNC' stand for?

ONCE UPON A TIME, just after the Second World War, Bell Labs in the USA were working on a range of new constant-impedance 50Ω and 75Ω connectors.

The aim was to replace the optimistically-named 'UHF' connector that had helped to win the war, but was already showing its deficiencies at the new ultra-high frequencies. The screw-together N connector was designed by Paul Neill, and the bayonet C connector by Carl Concelman. Both of these were for RG8 cable. Neill and Concelman then pooled their resources and designed not one but two smaller connectors for RG58: the quick-action Bayonet Neill Concelman (BNC) and also the screw-together Threaded Neill Concelman (TNC).

There are many other explanations about the meanings of N and BNC in particular, including "N stands for (US) Navy" and "BNC stands for Bulk(head) Navy Connector", "Bayonet Nut Connector" or even "British Navy Connector", but it's still Mr N and Mr C who deserve the true credit.

All of these connector designs are still around and giving good service including the UHF, the connector they couldn't kill. The C has the advantages of quick-disconnect and a very rugged centre pin, but has largely remained confined to military uses. However, the bayonet designs are not so reliable at cellphone and microwave frequencies, so the TNC has staged a strong comeback in recent years and now appears in regular component catalogues.

CORRECTION

The source of conductive grease for aluminium is Eastern Communications and not Eastern Electronics as reported in last months In Practice. ♦

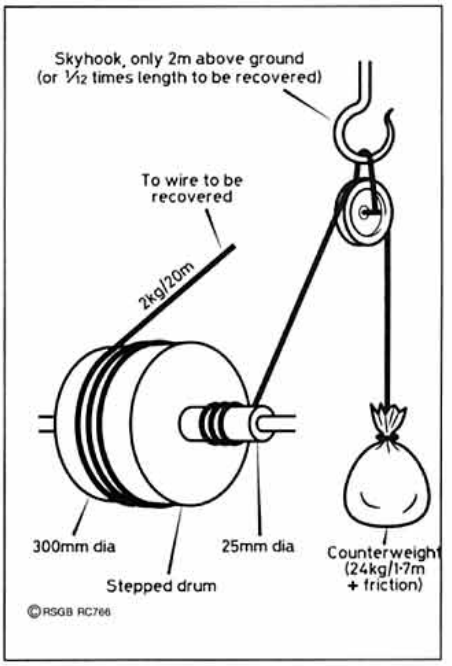


Fig 5: A stepped drum seems the most promising DIY option for most circumstances.

IF YOU HAVE NEW QUESTIONS, or any comments to add to this month's column, I'd be very pleased to hear from you by mail, packet or E-mail (see head of column). But please remember that I can **only** answer questions through this column, so they need to be on topics of **general** interest.

IDEAS FROM ABROAD

TRANSLATED AND EDITED BY ERWIN DAVID, G4LQI

MicFFT is a PC program which analyses the audio from your radio and presents it as a spectrum display. **Dr M Salzwedel, DK4ZC**, used it to analyse various digital HF signals. From *CQ-DL* 6/95 [1].

THE FRENCH MATHEMATICIAN Fourier (1768-1830) showed that any periodic (regularly recurring) wave form can be represented by a series of sine waves with appropriate frequency, magnitude and phase relationships. For the analysis of thermodynamic phenomena he developed the *Fourier Transform*, a mathematical technique with which engineering students have struggled ever since. With it, any periodic wave form (amplitude vs. time plot) can be described either as a mathematical series or as a spectrum (amplitude vs. frequency) plot.

Fig 1 shows the CW output of my old FT-757GX transceiver; what looks like a pure sine wave (upper trace), turns out, after transformation to the spectrum display (lower trace), to have not only the single tall steep-sided peak but also considerable unwanted sidebands!

Using a hand calculator, one could compute each term of the series and then draw the spectrum plot; that would be terribly slow. For that reason, the *Fast Fourier Transform* (FFT) was developed and the donkeywork is assigned to a computer.

With a PC and a suitable program, one does not even have to be a mathematician to apply this scientific wizardry to everyday amateur-band signals.

THE PROGRAM MicFFT

THIS FFT-BASED SOFTWARE was written by **Craig M Walsh**, a Los Angeles student, to test how well his Hi-Fi set-up met its specs. Several FFT programs have been developed since, but MicFFT has the advantage of being in the public domain. I have downloaded my copy from the Clover mailbox of Peter, TY1PS; that took about 20 minutes. Some packet BBSs also carry it. A sound card such as *Soundblaster* is required to use MicFFT.

In his program description, Craig calls a pure sine-wave boring as its spectrum plot is featureless. That changes if a microphone is connected to the Soundblaster and attacked with the loud *Oooaaah* which some amateurs use to tune their SSB transmitters. The wave form, **Fig 2**, looks like an amplitude-modulated sine-wave, which MicFFT turns into a whole family of peaks with the same frequency difference between adjacent ones. Note the dashed vertical cursor line; it marks an audio frequency of 785.16Hz and the height of that peak is 23.81dB. As the frequency scale is linear and starts at zero, the distance between adjacent peaks can be gauged: it is approx. 129Hz.

The lower trace of Fig **3** shows the spectrum of an almost pure 146Hz tone and the upper trace represents the phase; at the cursor it is -66.92°.

CAPABILITIES

HAVING DEMONSTRATED IN the first three figures what MicFFT can do, the limitations of my test set-up need mentioning.

The digital signals to be analysed were taken from the audio output of my communication receiver, which has a limited band width; even in the SSB mode, it is no wider than 2400Hz between -6dB points.

I used an 8-bit Soundblaster. This means that full scale is only 256x the smallest discernible value, a dynamic range of 48dB. On the other hand, the audio dynamic range (between max. undistorted output and noise level) of the receiver probably is no better. This assures that what can be seen on the spectrum plot can be heard as well.

As said, MicFFT was written to test Hi-Fi installations. This is done with a continuous (though not necessarily sinusoidal) test signal.A digital transmission is pulsed, not continuous. It therefore is pure chance whether a given sample yields a useful spectrum plot or not.

Several attempts are frequently required.

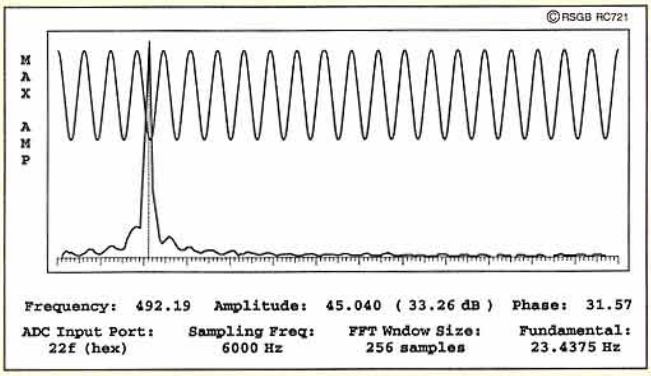


Fig 1: Though the sine wave looks clean, the spectrum shows a family of sidebands.

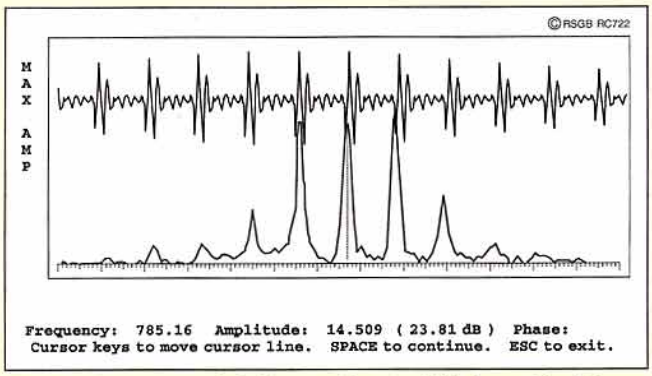


Fig 2: The frequency scale is linear and starts at 0Hz, hence the distance between the peaks can be gauged.

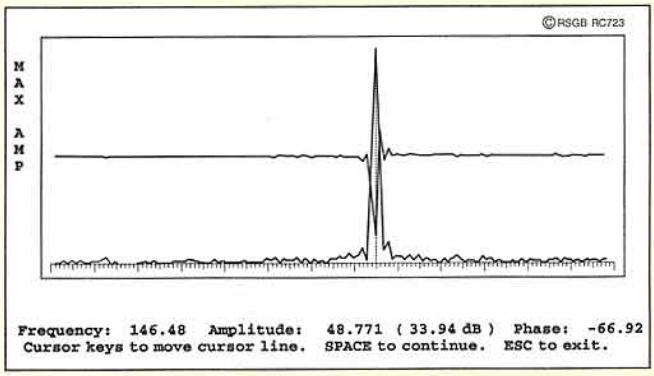


Fig 3: The phase of the 146Hz tone (upper trace) is superimposed on its spectrum plot.

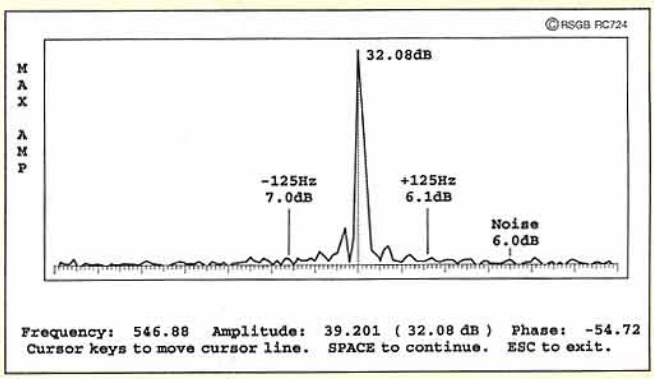


Fig 4: A typical CW signal.

14MHZ SIGNALS

A CW SIGNAL IS SHOWN IN **Fig 4**. The cut-off frequencies of a 250Hz crystal filter are indicated. The signal level is 32dB, the noise 6dB.

Fig 5 represents an AMTOR signal. The frequency difference between the two tallest peaks, 223Hz, is the shift between mark and space tones, each of which is typically represented by three peaks (triplet). The amplitude scale is linear.

In contrast to Fig 5, the amplitude of the AMTOR signal in Fig **6** is on a logarithmic (dB) scale. The signal level was 28dB, the noise 9dB.

Interested in DX mailboxes? **Fig 7** is the PACTOR signal of VK2AGE on a log scale.

The PACTOR signal of Fig **8** was recorded because there was a loud extraneous noise on it. Note the spurious peak between mark and space frequencies.

The HF packet signal of Fig **9** occupies the rather wide-band characteristic of this mode.

Fig 10 is a signal which still is quite rare: the Clover mailbox of TY1PS. The four constituent tones of the Clover mode are clearly visible.

The G-TOR spectrum of Fig **11** completes this series of digital signals recorded on 14MHz. It is basically identical to the AMTOR signal of Fig 5.

SOME BAD ONES TOO

THE SIGNALS IN FIGS 4 to 11 will raise few complaints. Some are a bit wider than necessary, but, with the techniques used, there is little an amateur can do about it. Misuse of these techniques, however, creates problems. Overdriving an amplifier, use of a speech processor or inadequate or non-existing earth-strapping between computer, modem and transceiver give rise to the equivalent of the splatter of poorly adjusted voice transmitters. In **Figs 12, 13 and 14**, note the large spurious peaks approx. 1300Hz below the intended ones; these contribute nothing to the readability of the transmission but do interfere with the use of adjacent channels.

I have connected to these three mailboxes, a DL3, an I5 and a 4X, and appraised them of my observations. Two of them got nasty and stated that they had new transceivers and PK232s which could not possibly transmit spurii; this proves once again that no equipment is better than the person using it! In the past six months none of these stations has improved its transmissions, which is regrettable as, being mailboxes, they are on the air for hours on end. The moral of the story: do from time to time check your own signal by tuning around your transmitting frequency with a separate receiver with a narrow CW filter. If you don't have another receiver, ask your QSO partner to do so.

The last in this series of observations, **Fig 15**, is an intruder with long RTTY transmissions on 14.061MHz. I cannot read or identify

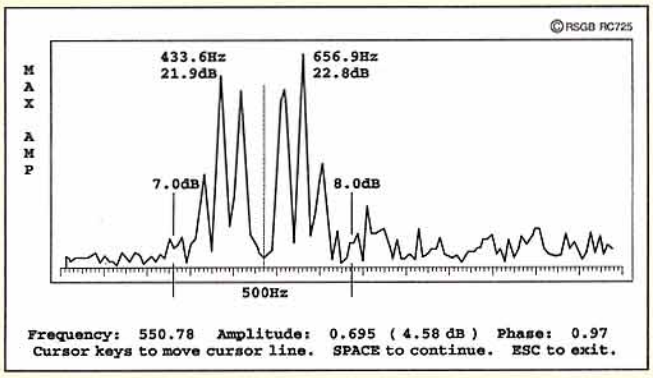


Fig 5: An ANTOR signal. the amplitude scale is linear.

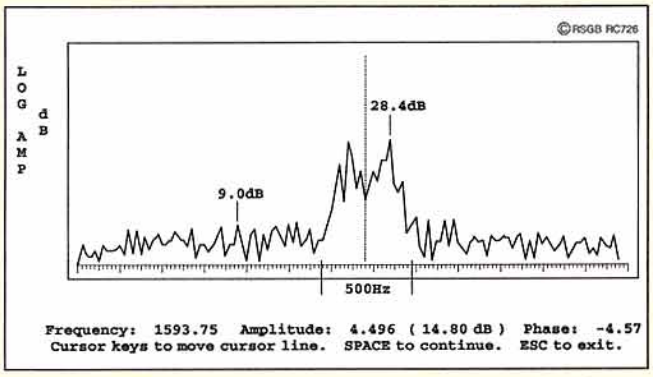


Fig 6: An AMTOR signal. The amplitude scale is logarithmic (in dB).

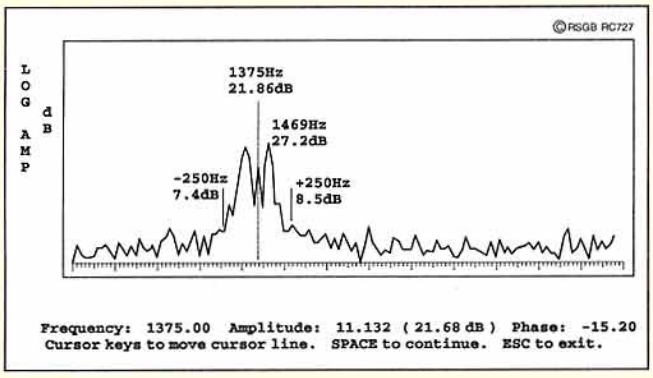


Fig 7: The PACTOR signal of VK2AGE (log amplitude).

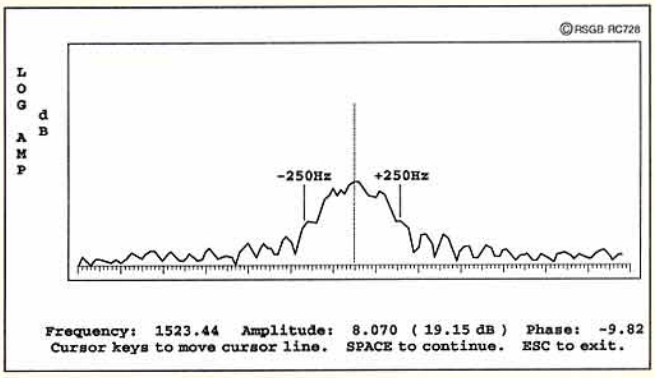


Fig 8: This PACTOR signal stood out because of a loud noise component.

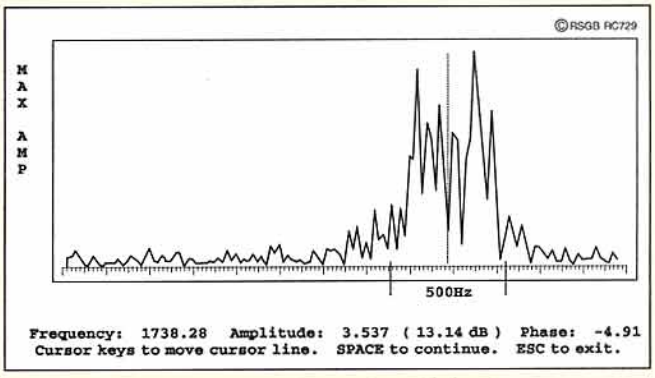


Fig 9: An HF-packet signal occupies a rather wide band.

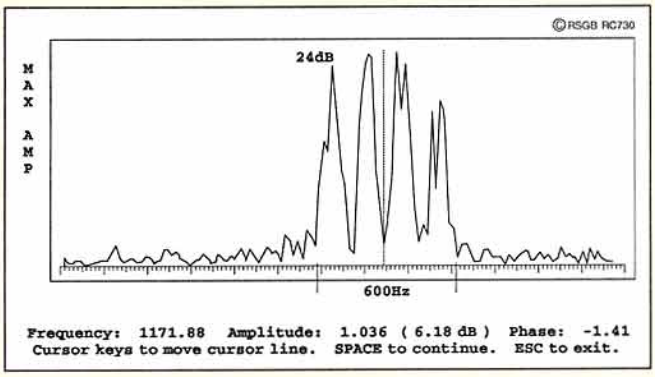


Fig 10: The spectrum of the Clover mailbox TY1PS.

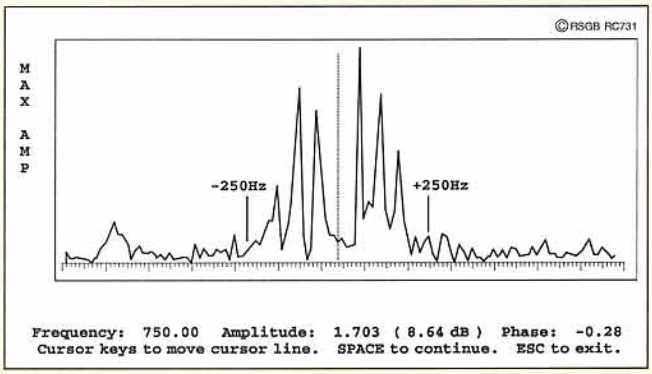


Fig 11: This G-TOR signal is almost indistinguishable from the AMTOR signal in Fig 5.

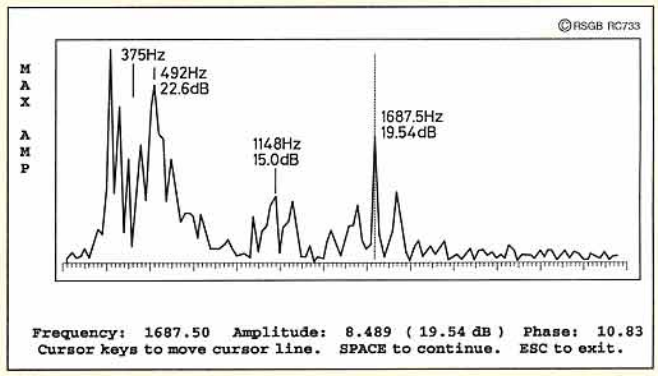


Fig 13: Another poorly adjusted station.

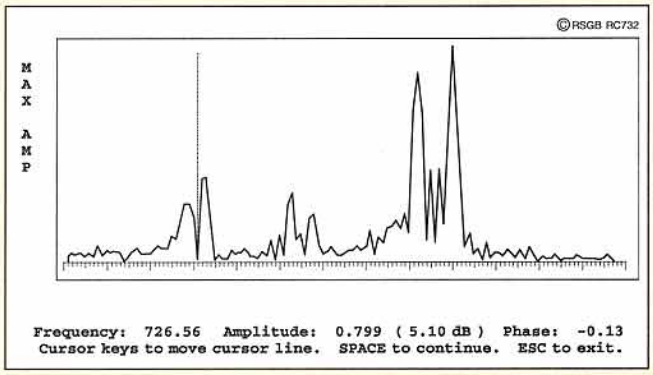


Fig 12: This distorted RTTY signal shows two groups of spurious peaks below the operating frequencies.

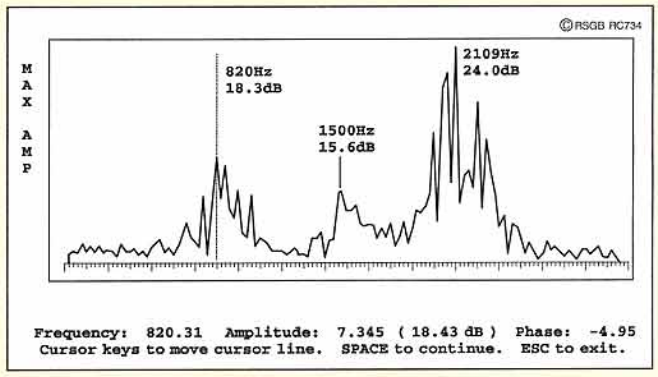


Fig 14: This I5 AMTOR mailbox radiates a dirty signal

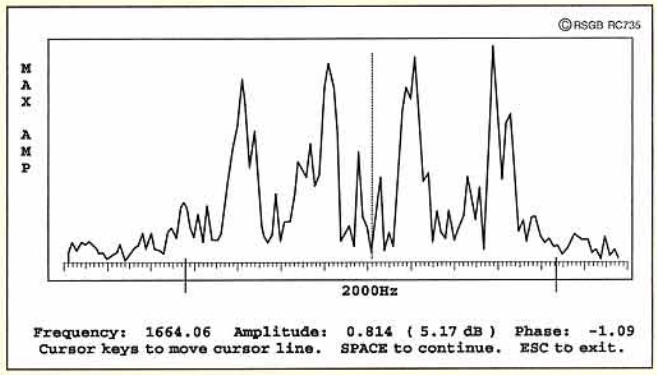


Fig 15: This unusual spectrum comes from an unidentified intruder on 14.061MHz.

this station as it uses a code unknown to me. At my present QTH in Kotka, Finland, it is strongest when I beam N-E.

FJVFAX/HAMCOMM CORRECTIONS

EUROTEK 8/95, FIG 1, HAS DRAWN the following comments from Peter Lockwood, G8SLB (see his ad in the *Computer Hardware Software* section, p. 97). He states:

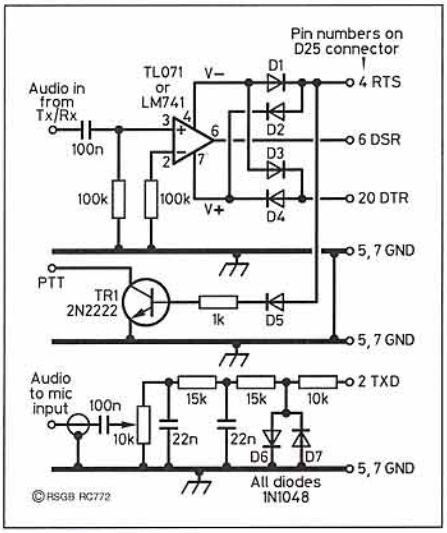
Fig 1 is of HamComm (DL5YEC) origin, not JVFax (DK8JV). It works with both, however.

The anode of D5 (PTT) should not be connected to the DTR line but to the RTS line, which goes positive to transmit. [Ham-Comm apparently uses some of the serial interface lines differently than their RS232 designations would suggest - *G4LQI*].

The 220Ω resistor should be used only if the audio to be transmitted is taken from the low-impedance speaker circuit in the computer; if it is taken from the TXD line this resistor should be omitted.

The modem contained in the manual of the current version 3.0 of HamComm is shown herewith.

The HamComm modem with pre-amplifier referred to in *Eurotek* 8/95 is used in 'simple modems' sold by G6HCL and PE1ACB.



This interface, from the HamComm v.3.0 manual, can be used for all HamComm modes (incl. CW, RTTY, AMTOR) and FM fax and SSTV as well.

REFERENCE

[1] The *Digital Journal* 8/94 of the American Digital Radio Society contained an article by Dr Salzwedel on the analysis of digital HF Signals. ♦

Pat Hawker's Technical Topics

PAT HAWKER, G3VA
London 37/SE22 8SS

COLLOQUIUM ON RADIO SCIENCE & ANTENNAS

I RECENTLY ATTENDED the Joint URSI (International Union of Radio Science) 12th National Radio Science and QMW 1995 Antenna Symposium at Queen Mary & Westfield College of the University of London. This was a busy three-day conference at which more than 40 short presentations and a number of invited papers were given.

These mostly represented reports on current postgraduate research projects at British universities but there were also papers from Germany and the Ukraine. While many of the papers were largely mathematical, way beyond my comprehension, some covered topics of interest to radio amateurs.

Professor Peter Clarricoats (son of John Clarricoats, G6CL, general secretary of the RSGB and editor of the *RSGB Bulletin* from the 1930s to 1964), in one of the keynote addresses, emphasised that university research faces a period of change as a result of the decline of the former Soviet Union as a military force.

One result is that there is now less funding of blue sky research: "You have to see an application if you are going to get funds - in the foreseeable future support for research in electromagnetics will be dependent on the expectation of a successful application. But because of the growth of Information Technology the future prospects remain quite bright, although the reduction in support arising from the decline in defence spending is unlikely to be fully compensated."

A subject of increasing interest to industry is more accurate calibration of the standard dipole antennas used for EMC testing. Dr Martin Alexander of the National Physical Laboratory explained how Europe's largest metal ground plane, measuring 30m by 60m, has been set up at NPL's antenna range. The range has been used to calibrate accurately over 40 different models of dipole antennas over the range 20MHz to 1GHz with uncertainties of less than +/- 0.7dB (+/- 0.2dB if required). It has been discovered that some EMC antennas can show uncertainties, according to the way they are mounted, as much as +/- 10dB (typically due to poorly balanced baluns).

David Palmer, radio amateur and mature student at the Centre for Satellite Engineering Research, University of Surrey, the department headed by Prof Martin Sweeting, G3YJO, outlined the proposed UoSAT Topside Sounder Satellite. This third-generation topside sounder for probing the upper side of the F2 ionospheric layer will require only 10W of electrical power during normal operation, compared to about 400W peak of earlier topside sounders which used antennas of up to 73m from tip-to-tip.

The new sounder is to be launched in cooperation with the Russians on an inexpensive low earth orbit microsatellite. It will feature an advanced receiver using DSP techniques as well as an automatic tuning unit which can be programmed to follow the rapid frequency sweep of the sounder. Although in the 1960s, top-side sounding was seen as a major advance in probing the ionosphere, it proved difficult to reconcile the topside measurements with those made by ground-based sounders. It is refreshing to see how the work under Prof Sweeting is making a major contribution to satellite research including the setting up of a commercial operation. One hopes that it will not be forgotten that this all originated in conjunction with AMSAT and represents an important contribution to the technology based on amateur radio.

One of the few undergraduate projects to be reported was that of a group of four students at Liverpool University under the guidance of Dr Brian Austin, G0GSF. They were given the task of building a 151MHz phase-switched interferometer to detect noise radiation from the Sun.

This required construction of a low-noise receiver with good dynamic range, a solid-state-switched 180° phasing line and down-converter to a 51MHz which could be mounted close to the twin 6-element Yagi antennas. Signal detection is via an integrator with a time constant of 200s, determined by the period of the interference fringes as the Sun transits through the lobes of the interferometer. Signal conversion and processing used an 8-bit successive approximation ADC interfaced to a PC with graphical display and storage of data in 24h blocks.

Unfortunately for the students, the minimal solar activity in the current phase of the sunspot cycle combined with intermodulation products of two very strong local signals spaced a few MHz above 151MHz has - at least up to the time of the colloquium - prevented them from achieving entirely satisfactory results.

My own feeling is that this project underlines the necessity on VHF as much as on HF of developing super-linear receiver front-ends based on such techniques as the H-mode mixer and RF stages of improved dynamic range.

But it was good to learn of a student project involving the practical skills of soldering and construction as well as the design of high-performance RF hardware!

Another paper that I found of great interest was 'Large Bearing Errors at HF' presented by Dr E Warrington of the University of Leicester. This added to a paper 'Some Recent Measurements of the Direction of Arrival of HF Signals Propagated Over a Path Tangential to the Mid-latitude Trough' presented at the 1995 IEE Conference on Antennas &

THAT TUNEABLE NOTCH (OR PEAK) FILTER

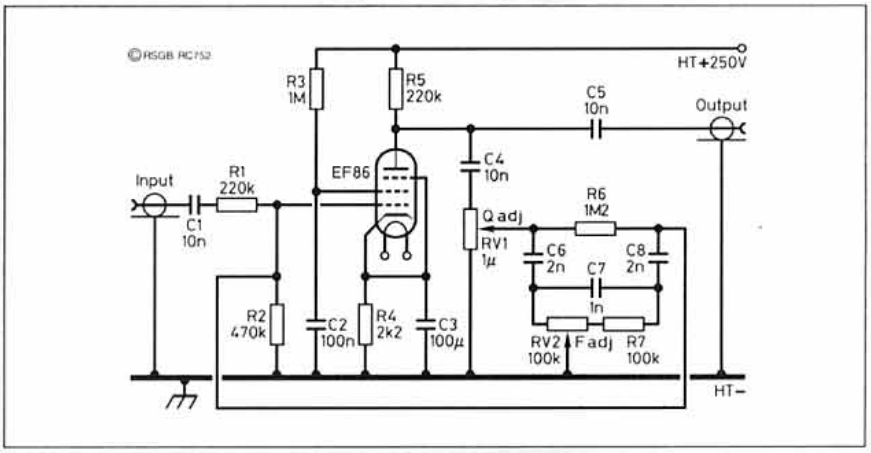


Fig 1: The tuneable CW filter with variable selectivity based on the Hall RC filter as described by G3GKS in the May 1966 issue of the *RSGB Bulletin*. Tuneable about 540 to 3600Hz (highest Q at lower frequencies). VR1 controls the circuit Q, and the frequency of the peak is set by VR2.

COMMENTS CONTINUE to arrive on the variable-frequency resistance-capacitance filter (*TT*, June & August 1995) brought to my attention by Peter Cole, DA1PE/G3JFS, and elucidated by Bob Pearson, G4FHU.

Roger Wheeler, G3MGW, has analysed the circuit arriving independently at similar results to G4FHU but he also identifies it as a 'Hall Network' quoting the reference: H P Hall, 'RC Networks with Single Component Frequency Control' (*IRE Trans CT-2 1955, pp283-284*). R C Christian, G3GKS, also identifies P Hall as the originator giving as a reference 'Single-Component-Controlled RC Null Circuits' *(General Radio Experimenter*, July 1961).

Interestingly, G3GKS recalls that he described in the May 1966 issue of the *RSGB Bulletin* (as *RadCom* was then named) 'An Audio CW Filter - a versatile design featuring variable frequency and selectivity'.

His CW filter was based on the Hall circuit and offered a tuning range of about 540Hz to 3600Hz (highest Q at lowest frequency). As shown in **Fig 1**, this was based on an EF86 valve, but the basic idea could be adapted for use with an op-amp IC device. Since wrting the above notes a high-performance CW-type filter design, based on this type of RC-filter, developed in 1964, has arrived from DrTom Seed, ZL3QQ.

Propagation and published in *IEE Conference Publication No 407*. The mid-latitude trough is an F-region electron density depletion region a few degrees wide in latitude on the equatorward edge of the auroral oval in which the critical frequencies drop by a factor 2-4 or more and the altitude of the electron density maximum rises by over 100km.

Signals over the paths between the UK and Canada, and some paths within Canada have been shown at times to deviate greatly from the Great Circle.

During the last few years, an experiment has been undertaken in conjunction with Canadian researchers accurately to measure the bearings and signal characteristics of HF transmissions from CFH Halifax; Iqaluit, Baffin Island; and Wainwright, Alberta. The transmissions on approximately 6, 10 and 18MHz have been measured at Ottawa and Alert in Canada and Cheltenham in the UK where the long-distance D/F system has an instrumental accuracy on the arrival bearings of approximately 0.1°.

It has been shown that deviations in excess of over 50° can occur at high-altitude sites at the beginning and end of propagation at 10 and 15MHz on roughly 50 per cent of days. The magnitude and frequency of occurrence are largest at the end of the day's 'opening', ie as the MUF of the path drops below the transmitted frequency. A broad maximum in the frequency of occurrence takes place during the spring with a minimum in the summer months.

All three of the frequencies, roughly 6, 10 and 18MHz, exhibit large deviations but not necessarily of the same magnitude or even at the same time intervals. The magnitude of the bearing swings and the time intervals at which they occur are strongly dependent on geophysical conditions, with the geomagnetic index Ap found to provide a good indication of the magnitude and times of the occurrence of these large bearing errors.

Many years ago in *TT*, I mentioned that Roly Shears, G8KW, while acting as one of the link stations with the special station G7AE, Point Barrow, Alaska during the 1968 British Trans-Arctic Expedition, found that his rotary beam antenna for optimum signals often needed to be swung well away from the Great Circle path.

The present measurements not only confirm the very wide deviations of the direction of signal arrival but also strongly suggest that they are due to the ionospheric tilts that occur when the Mid-latitude Trough opens and closes. The Trough opening time varies from day to day with changes in geomagnetic activity.

The closing time is essentially constant and is determined by the sunrise when photoionisation rapidly fills the depleted region of the Trough. The Canada-UK path tends to open around 0930UTC or around 1120UTC indicating a strong dependence on the solar-zenith angle.

The path deviations tend to be towards the South. It all adds up to the fact that it is wrong to think of the ionospheric layers as smooth mirrors in the sky.

Indeed, the layers, in practice, are complicated by troughs, blobs, travelling ionospheric disturbances (TIDs), patches and tilts; all of which are phenomena that can greatly affect amateur HF operation.

The objective of this particular investigation is to provide D/F operators with information from which they could determine the probable errors in the bearings that they obtain on accurate direction-finders.

The callsign of the Halifax transmitter, CFH, has apparently become known to D/F operators, unaccustomed to wide deviations from the Great Circle path as 'Can't Find Halifax'!

It was evident from many of the short presentations that computer simulation and progressing is now the dominant design tool throughout the field of antennas. However, as emphasised in an invited paper from Dr Pat Foster (Microwave and Antenna Systems, Malvern), the Method of Moments with versions of NEC (as now commonly used by both professionals and amateurs at HF) runs into practical difficulties as the frequency is increased and has to give away to systems based on the Geometrical Theory of Diffraction (GTD/UTD code).

The reason for this is that the Method of Moments depends on modelling the surface of the structure using wire segments or elemental surfaces over which the current can be assumed to be nearly constant. This means that as the frequency increases the number of segments rises rapidly, requiring not only more preparation time but also, even with the largest mainframe computers, vastly more computing time.

Even when the largest CRAY computers are used there is a practical limit of about 30,000 segments representing a structure of seven wavelengths.

On the other hand, the GTD/UTD system has a lower frequency limit depending on each item of a structure whereas the MoM limitations are of the entire structure. Dr Foster pointed out that although hybrid methods can be used whereby MoM is used for the antenna and its local structure and the computed results fed into a GTD/UTD code to model the parts of the structures which are further away.

Such a mixture has to be treated with care and some physical insight into the problems in order to avoid creating yet more problems. The best results using this technique, Dr Foster suggested, are obtained when the antenna and the local structure are physically divorced from the rest of the structure.

However, she emphasised that there is no agreed methodology for using hybrid methods and therefore there is no perfect solution.

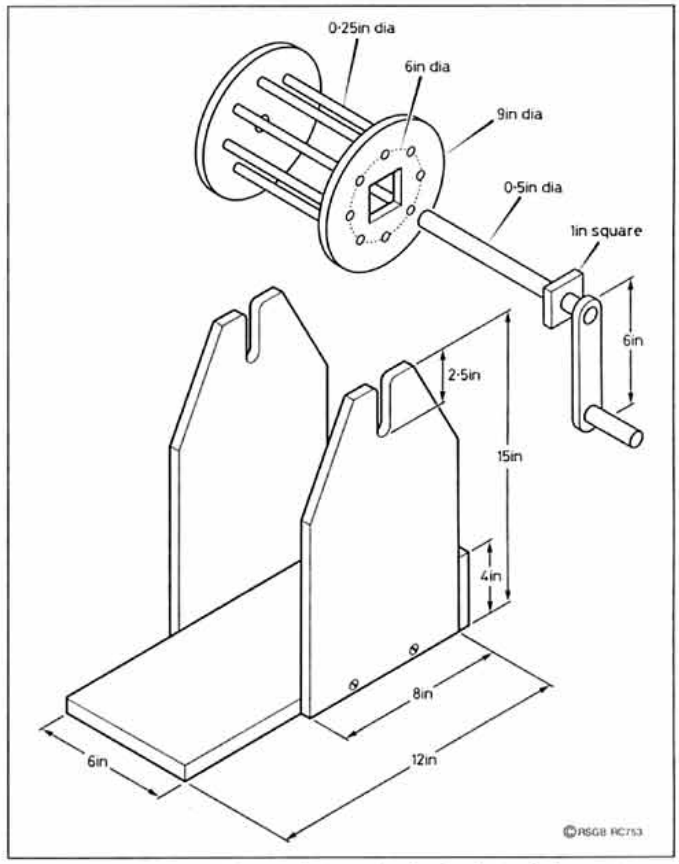


Fig 2: G3YXJ's drum and drum winder makes it simple to wind up antennas and feeder cables without kinks or twist

EASING THE WIND-UP!

DANNY BEGG, G3YXJ, has always found it a tedious task to wind up the soft wire antennas and feeder cables used at special events or portable stations without creating kinks or twists.

He writes: "Probably the best method is to wind the wire on a drum, but winding wire on a drum by hand is a slow process. **Fig 2** shows an easy-to-construct frame which will hold a drum and also enable the user to wind up wire or coaxial cable quickly and easily.

"The prototype was constructed from 1/2 inch chipboard salvaged from old, redundant kitchen units but any available timber of similar thickness could be used.

"The dimensions shown in Fig 2 are also not mandatory, but the best plate should be wide enough to accommodate a large foot, used to steady the frame whilst winding. Clearly, the drum must be of a width to fit freely between the sides of the frame.

"A number of identical drums can be made on which to wind different antennas or lengths of coax. The handle/drum combination can be fitted from either side to suit right or left handed users."

G3YXJ adds that the device is being used by the Braintree Radio Club. To receive a report on its performance, contact GB20AY, the club's special event station on the air most weekends and Monday club evenings to celebrate their 20th anniversary.

CAPACITOR CONFUSION

JAY CRASWELL, WB0VNE, in the Technical Correspondence columns of *QST* (July 1995, p76) writes: "Disc capacitors have undergone changes in the way they're identified. In 'The

Good Old Days' you'd find, for instance, a capacitor marked .0068 to indicate 0.0068µF. This worked too well and everything had to be changed. In many schematics 0.0068µF began to be referred to as 6.8nF with nF standing for nanofarads.

"But by now you've probably seen disc capacitors marked just 15, 682 or 821. What do those numbers mean? The current procedure is to mark capacitors in picofarads in a system that is like our resistor-identification scheme. The last number of the digit series is the number of required zeros - sometimes!

"For instance, a capacitor marked 821 is 82 followed by one zero, ie 820pF. One labelled 682 would be 6800pF, that is 6.8nF but what about the one labelled 15. You might expect it to be 100,000pF ie 100nF or 0.1µF. Wrong, this is a 15pF component. An 0.1µF capacitor would be marked 104! So remember that capacitors marked with digits between 1 and 99 are indicating picofarads. Just another way of confusing us old-timers!"

1.3GHZ CONICAL AND PARABOLIC REFLECTORS

MANY YEARS AGO, I noticed in *TT* (still in *ART7* pp316-7) that for the UHF and microwave operator the ultimate in high-gain antennas has for long been the parabolic dish reflector, the larger the better. But for the home constructor a true paraboloid is not an easy shape to come to terms with. The main difficulty is that the paraboloid is a doubly-curved surface: if constructed from flat sheets of material, part of the material needs to be either stretched or compressed or both.

An effective alternative was brought to attention by Fred Brown, W6HPH (then also G5AWI). He showed in a 1966 issue of the *VHF'er* and later in *TT* that conical reflectors, constructed very easily from flat sheets of material (hardware cloth in his case) could provide an extremely useful substitute. A conical reflector can give considerably more gain than would a corner reflector antenna yet it is just as easy to build.

A shallow cone has the advantage of being a singly-curved surface and can be made from flat circular sheet by removing or overlapping a segment of the material. Performance depends on the fact it is not really vital for the surface of a parabolic reflector to be a true paraboloid. W6HPH pointed out that it is usually accepted that there can be departures of up to one-sixteenth of the wavelength at any point on the surface without suffering any significant deterioration of gain and directivity.

While one-sixteenth of a microwavelength may not sound much, in practice it permits quite drastic changes in the overall shape. Up to a certain size, in terms of wavelength, it can be two shallow cones, one inside the other: **Fig 3**. A two-cone reflector can be satisfactory up to a diameter of 13.86-wavelengths in certain conditions. This means that for 1296MHz one could build a reflector of some 10ft diameter, or even 31.5ft at 432MHz without having to worry about double-curved surfaces, and yet obtain virtually as much gain and directivity as with a true paraboloid.

A single conical reflector is satisfactory up to 3.46-wavelengths. W6HPH provided details of a 1296MHz single conical reflector antennas with a gain of about 16dB: **Fig 4**. He claimed this could be constructed in a few hours for a cost (in 1966) of about $1.50. The cone has a radius of 17in. Both the cone and the small 4.5in square reflector for the folded dipole element were made from 0.5in mesh hardware cloth.

I was reminded of W6HPH's suggestions by an article 'High-Performance Antenna for 24cm' by John Cronk, GW3MEO (*Electronics World + Wireless World*, August 1995, pp 699-700). He introduced his design as having fewer critical dimensions than most other configurations, and capable of being easily customised. It comprises a lightweight parabolic-shaped plane reflector which is illuminated with a horizontally polarised dipole and reflector feed.

Gain is given as about 15dBd (ie about 17dBi) representing a power increase of almost 32 times. Bandwidth is more than ample even for amateur-television. Wind resistance is lower than for expanded aluminium mesh.

The mesh reflector was fashioned from a 3ft by 2ft sheet of wire mesh called Handy mesh obtained from a local hardware store. The mesh consists of half-inch squares formed by 22swg tinned wire. The sheet was cut in half to form a strip 60in long with the overlapped section strengthened by binding some of the coincident wires with 22swg tinned copper wire and then soldering. The mesh is then fixed to an aluminium square former which is shaped as a parabola.

For full details on building GW3MEO's antenna see the original article in *EW + WW*. The design includes a balun feed etc and is considerably more complex than the W6HPH design. But it seems worthwhile to show how he obtains a parabola profile, without resorting to mathematics, by using a pin and string: **Fig 5**.

GW3MEO explains this as follows: "First draw line AB, and then at its centre draw line PFX, at right angles to AB. Next either draw line Xy parallel to AB, or use a long rule or tape parallel to AB, this must be marked off with regular divisions - X1, X2 etc. Now fix one end of a piece of string at point F using a pin. Take the string around another pin at P1, and then up to the point X1, and mark this length with a knot. Now plot the curve by moving the knot to X2, and keeping the string at right angles to XY, prick a mark at P2, and so on, until half the curve is marked out. Repeat for the other half

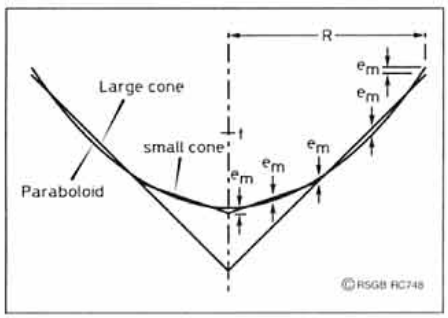


Fig 3: Principle of the polyconic reflector showing the small departures (m) from the true paraboloid.

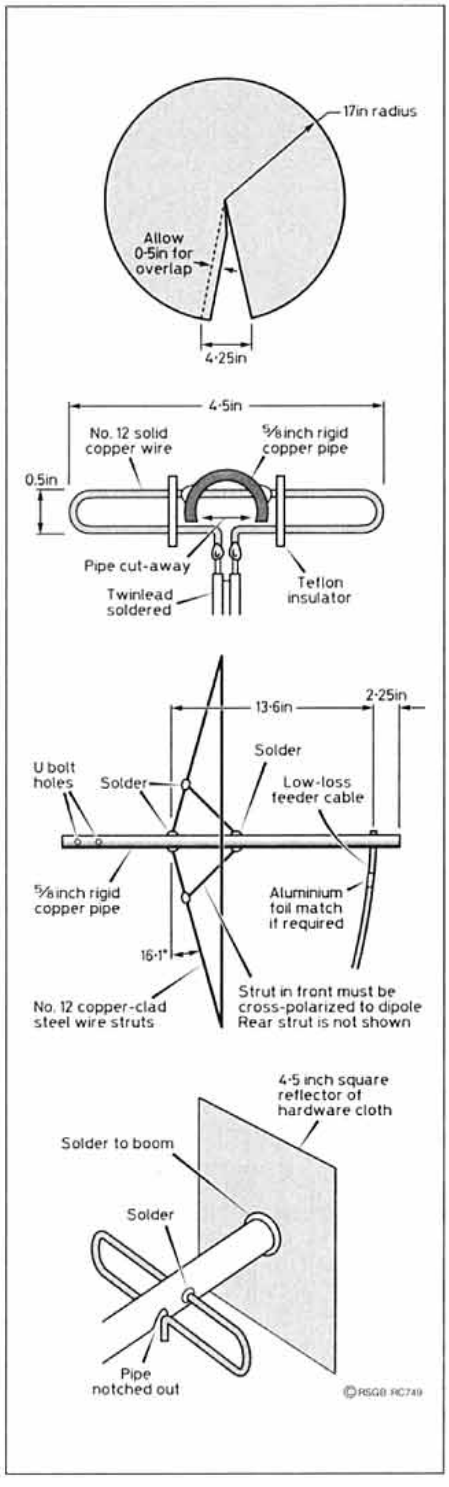


Fig 4: Details of the 1296MHz single conical reflector antenna as designed by W6HPH providing about 16dB gain.

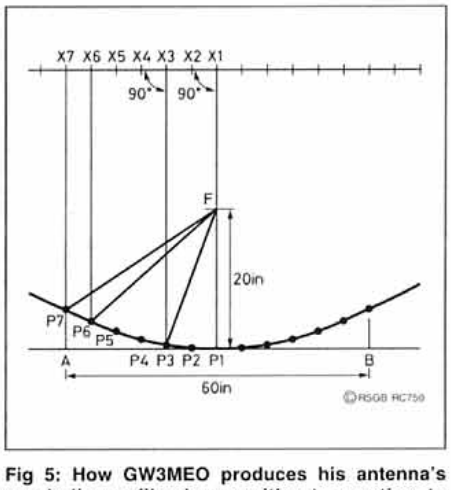


Fig 5: How GW3MEO produces his antenna's parabolic profile drawn without resorting to mathematics by using a pin and string.

of the curve. Draw a line smoothly through the pin pricks to show the shape of the reflector surface."

The curve is later transferred to a homemade bending device using hardwood blocks and a vice to avoid crumpling the tubular reflector former which comprises 60in of 0.5in square aluminium tube stock, as commonly used for TV yagi antenna booms: **Fig 6**.

Since this is a planar reflector with a parabolic profile, the problem of the double curve is avoided. GW3MEO gives the acceptable tolerance of one-tenth of a wavelength (2.5cm at 1.3GHz), a looser tolerance than W6HPH's one-sixteenth wavelength. It would be interesting to compare the two designs in terms of performance, cost and time of construction.

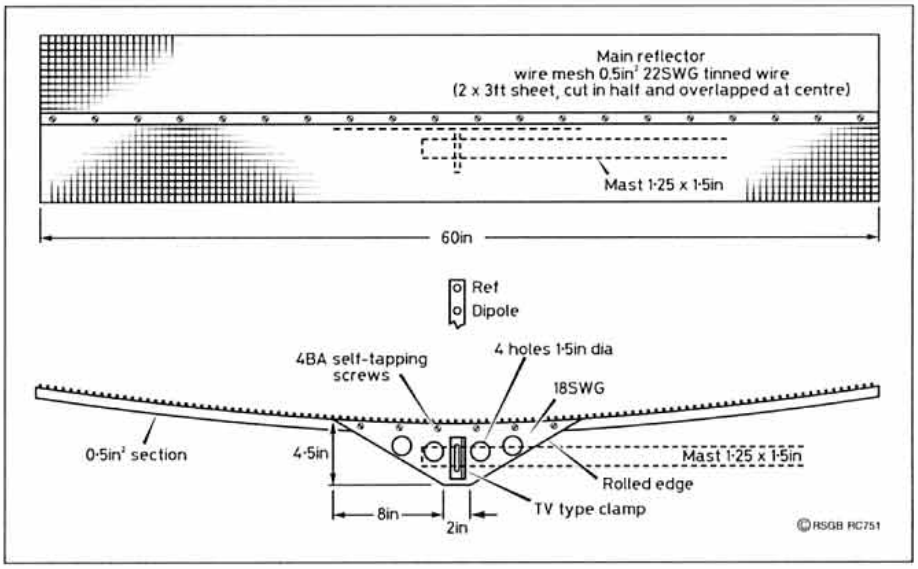


Fig 6: Reflector detail of the GW3MEO antenna. Mesh is a commercially-available type comprising half-inch squares formed from 22SWG tinned wire.

HIGH EFFICIENCY MOSFET POWER AMPLIFIERS

AN ARTICLE 'High efficiency power amplifiers for 13.56MHz ISM and HF communications' by Ken Dierberger, Frederick H Raab, Bobby McDonald and Lee Max (*RF Design*, May 1995, pp28, 30, 32 and 34-36) describes the design of a 400 watt class-C amplifier and a 250 watt class-D amplifier using recently introduced power MOSFET devices from Advanced Power Technology (APT). Both amplifiers provide high-gain and high efficiency for the 13.56MHz industrial, scientific and medical (ISM) applications but, it is claimed, may also be used for HF communications. The class D amplifier is specified as providing 250 watts or more output over 1.8 to 13.56MHz and the values of frequency-dependent components are given for 1.8, 3.5, 7, 10 and 12MHz. It should be appreciated that Class C and D amplifiers cannot be used for SSB unless, for example, in conjunction with cartesian-loop techniques (see *TT*, June 1994, p54). It would also probably be necessary for amateur applications (ie CW) to use additional harmonic filtering.

The introductory note states: "The boom in RF equipment operating in the UHF region has overshadowed the growth in lower frequency ISM systems. As a result, ISM applications have had to use high-cost RF power devices that are optimised for higher frequencies or use devices that are intended mainly for switching power supply requirements at lower frequencies. These latter devices, although low cost, are packaged in a standard common-drain configuration, requiring insulated mounting with added shunt capacitance, and which have significant inductance in the source connection, which combine to limit RF performance.

"The APT devices used in the amplifiers described here are provided in a common-source configuration, eliminating the need for an insulator between case and heat sink. The additional internal Be0 insulator required to achieve this configuration adds some thermal resistance, but less than would be added by the usual mounting insulator. The isolated die also permits the interchange of gate and drain leads, making 'left-hand' and 'right-hand' devices possible".

The 400 watt class C amplifier (**Fig 7**) has a 19dB gain with 4-5-wattsdrive; it operates from a 100Vline with an efficiency of some 75%. It uses ARF442/ARF443 300V RF power MOSFET devices in TO-247 plastic packages.

The more complex Class D switching amplifier, designed by Frederick Raab (who holds an amateur licence) uses ARF440/ARF441 devices in push-pull, driven to act as switch generating square-wave voltage. This design has a much larger component count, including two Schmitt trigger/limiter ICs, four MOSFET drivers, as well as the ARF440/ARF441 MOSFET power devices.

It is claimed that "the use of devices that are both lower in cost than VHF-capable RF power MOSFETs, and provided in standard plastic package, results in designs that can be manufactured at costs that are comparable to vacuum tube techniques". For more information contact Ken Dierberger, Applications Engineering Manager, Advanced Power Technology Inc, 405 SW Columbia Street, Bend, OR 97702, USA.

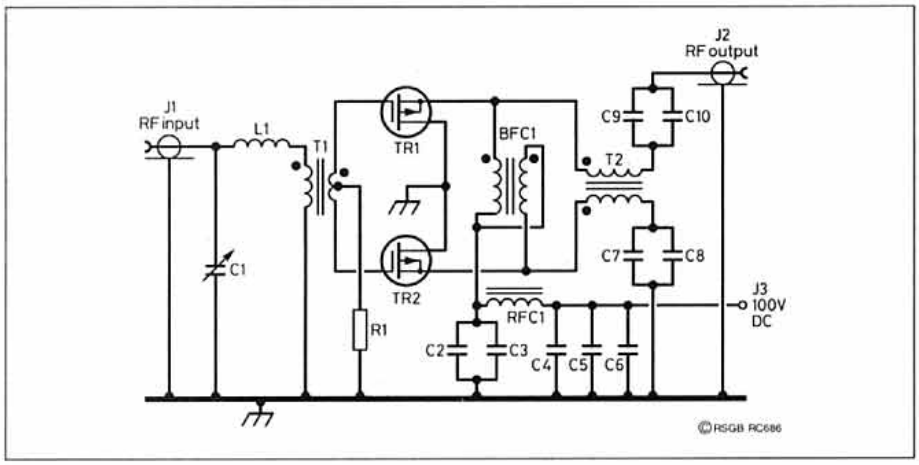


Fig 7: The 400 watt class-C amplifier suitable for 13.56MHz ISM systems but which could be adapted for CW use on HF bands up to the 14MHz band, using the relatively low-cost power MOSFETs introduced by Advanced Power Technology Inc. Component information: C1 75-480pF mica compression trimmer. C2 to C8 0.01µF 200V (CK06). C9 0.1µF 100V (CK06). C10 10µF 100v electrolytic. R1 10K, 5%, ¼W carbon. TR1, TR2 ARF442, ARF443. L1 0.5µH (7 turns, No 18 AWG, int dia 0.438-in. BFC1 Balanced DC feed choke, 7 turns, No22 stranded PTE insulated twisted pair on Indiana general F624-19-Q1 toroid, permeability 125. RFC1 2 turns No 18 stranded PTFE on a Fair-rite 2677006301 bead (µ 2000. T1 4:1 (z) conventional transformer, 2:1 turns, 22 stranded on a Fair-Rite 2843000202 balun core, µ= 850. T2 1:1 (z) transmission line transformer, 4 turns (approx 22in) of mini 50-ohm PTFE coax, OD 0.095in on a two-hole core made from two Fair-Rite 2643102002 cores, µ = 850. PCB 0.062in G10 epoxy glass.

ANTENNA SYSTEM EFFICIENCY

LEW MCCOY, W1ICP, in 'Antenna Efficiency - What is it?' (*CQ*, April 1995, pp 14, 17, 18) reminds us that antenna efficiency is not a question of gain, radiation patters or directivity but is nevertheless an important factor that is too often overlooked.

He stresses that the most efficient antenna, which can radiate about 97% of the power fed to it, is the basic half-wave resonant dipole. Compare this with some mobile and aircraft antennas which at about 2MHz may radiate only some 10mW for every 100 watts of transmitter power.

W1ICP is primarily concerned with the RF ohmic losses in antenna elements, but it should not be forgotten that wasted power may also be a feature of the ATU matching network and the transmission line (feeder). As a simple illustration, he points out that a beam antenna with a 3dBd gain but an efficiency of about 50%. This will radiate in the favoured direction only the same power as a

dipole with an efficiency of near 100% and considerably less power in other directions (although the directivity of the beam may still be advantageous for reception and in vertical angle of radiation).

But why should a beam tend to be less efficient than a half-wave dipole? W1ICP notes that the power that is fed into the antenna is spent or dissipated in two ways. The power used up in the RF ohmic resistance is spent in heating up the wire in the antenna, or the traps, bad connections, ground losses, etc. Only the remaining power is spent in the "radiation resistance" of the antenna - in other words, launched into space. Whereas the radiation resistance of a half-wave dipole at a height of a half-wavelength above ground is approximately 73Ω, a close-spaced Yagi array will have a much lower radiation resistance (which is why some form of matching is required between a coax feeder and the driven element). Thus in a Yagi antenna the ratio between radiation resistance and RF ohmic resistance will normally be lower than for a dipole. To quote W1ICP:

"Let's look at beams. We must first consider the impedance. Many newcomers get hung up when they assume that the impedance of all beams is of the order of 50Ω. This is because the antenna is fed with 50Ω cable and produces a match of nearly 1:1 SWR. But remember that nearly all Yagi-type beams have some sort of 'matching' device in order to transform the real impedance up to 50Ω... A monoband three-element beam using close-spaced elements, say one-tenth spacing, will have the rather low overall impedance of about 4 to 5Ω. . .

"A beam with 5-10Ω impedance is certainly going to have ohmic losses as an important factor . . . telescoping element connections, possible boom losses the matching network itself, and so on. With a 10Ω impedance made up of, say, 5Ω radiation-resistance and 5Ω RF ohmic resistance, then we are looking at 50% efficiency."

W1ICP stresses that aluminium elements are good conductors but, depending on the atmosphere, can get corroded and 'scummy'. If this happens, ohmic losses can rocket, and performance and efficiency can go to pot. *TT* (July and September 1993) included notes on fighting antenna corrosion with specific reference to electrolytic action between dissimilar metals and the 'fretting corrosion' that occurs whenever there is a small repetitive or cyclical motion at a metal-to-metal joint or seam, in the presence of moisture.

W1ICP lives in an area that has one of the few remaining really clean atmospheres - 6400ft up in the Rockies - yet he still had joint corrosion of the aluminium elements of his log-periodic type antenna. The elements and joints had developed a scum covering which certainly would increase ohmic losses. He advises: "If your beam has been up a long time, take it down and clean and polish all connections. It will pay off. There is no magic in antennas - just good common sense."

Salty and industrial atmospheres can result very quickly in deterioration of sliding joints in antenna elements. Moisture ingress into coaxial feeder cables and baluns significantly increases losses and lower overall efficiency. Loading coils used with electrically short elements need to be of excellent high-Q construction if they are not to seriously reduce efficiency.

The need for extreme precautions to reduce losses in small transmitting 'magnetic-loop' antennas is well recognised, but serious doubts remain as to the overall efficiency of small loop systems since the losses in the matching networks are seldom taken into account.

A few years ago, Tony Henk, G4XVF, in a two-part article 'Loop Antennas - Facts not Fiction' (*RadCom*, September, October 1991) showed clearly that the overall efficiency of small transmitting loop antennas, in terms of the amount of power actually radiated compared with the output power of the transmitter, is usually quite low, with more energy being lost in the matching components, including the capacitors, than in the actual loop element.

The radiation resistance of a 1.8MHz mobile whip, like that of a small loop antenna, will be only a small fraction of an ohm and there will usually be significant ground losses in using the vehicle as a ground plane. Again, high-Q construction of the loading coil is necessary, although the overall efficiency will be very low.

W1ICP notes that, on the other hand, quad-type (wire) elements with one-wave or longer elements have relatively high impedance, largely comprising radiation resistance, re-

sulting in efficiencies in the order of 90% or more; a significant advantage over the typical tri-band Yagi.

For many years, I have used at G3VA a long-wire antenna (of indeterminate length, initially about 42m, partly indoors) fed against quarter-wave counterpoises to overcome the problem of the long earth lead to an upstairs shack. While this performed satisfactorily, I recently attached and brought back into the shack sufficient wire to form an irregular narrow loop fed from a couple of balanced pi-network tuners (one for 14 to 28MHz, the other covering 3.5 and 7MHz). This overcomes the question of the ground losses of unbalanced antennas and seems to work at least as well as and probably rather better than the long-wire version.

BACKGROUND TO COUPLED-RESONATOR ANTENNAS

TT, JUNE 1995, pp67-69 described the construction of multiband antennas using several closely-coupled dipole elements each cut for a particular band based on a detailed article by Gary Breed, K9AY, in *RF Design* (November 1994).

I noted that similar ideas had been patented and used some years ago for combined Band I/Band III television antennas and added: "Without entering too deeply into any arguments about patents, we should all be grateful to K9AY for bringing this system more fully into the public domain..... and for providing practical details of an antenna for the 10, 18 and 24MHz bands."

Shortly after publication I received a letter from K9AY who is the Editor of *RF Design* explaining the background to his designs and to his patent application.

He wrote: "One of the most remarkable insights gained while investigating this type of antenna is how few people know about it. It has both advantages and drawbacks, as does any multiband technique, but if you don't know it's there, you can't give it consideration!

"The main purpose of this letter is to clarify what portion of my work I consider original. I make no claim to have 'discovered' the principle of one conductor imposing its resonance on another.

"This concept was discovered in the 1940s, and has appeared in many products, including the TV receiving antennas noted by G0LMC. The *RF Design* article was not meant to describe my patent application, but rather to introduce the couple-resonator principle to the readers. By using the simplest examples of two and three frequency antenna configurations, I meant only to illustrate the principle on a territorial level, not to suggest that I was the sole originator of that work.

"I also intentionally avoided using the term 'sleeve' or 'open sleeve' to describe this type of antenna, although these terms have been used by others. Past antenna developments using these names are clearly members of the coupled-resonator antenna family. But I wanted to emphasise the generality of the concept and chose to use a more broadly descriptive label.

"The work I have done that has been accepted as original is the mathematical characterisation of the principle. I have derived the equation given in the *RF Design* article, which establishes the required spacing distance between the driven conductor and an additional coupled-resonator.

"To recap, the basic relationship is:

$$\frac{\text{Log (d)}}{\text{Log(D / 4)}} = 0.54 \quad \text{or} \quad d = 10^{[0.54 \log(D/4)]}$$

where d is the required spacing in wavelengths at the coupled-resonator frequency, and D is the element diameter (assuming elements of equal diameter) also in wavelengths at the coupled-resonator frequency. This relationship is the situation where the impedance seen at the coupled-resonator frequency is equal to that of a dipole in free space (approximately 72Ω). It ignores the effect of the impedance that the driven dipole has at this frequency. I have developed a correction factor for obtaining other impedances, and another factor for small frequency differences, where the impedance of the driven element becomes a significant contributor. The driven element also has a significant effect when it is 3/2-wave resonant.

"These factors are noted in the *RF Design* article. My patent application covers a family of antenna elements obtained by using the design equation.

"Finally, readers attempting to duplicate my 10/18/24MHz example antenna must remember that the required spacing is a function of conductor diameter - the 2in (5.07cm) spacing is valid only for No 12 AWG wire! Use the design equation or an antenna modelling program to determine spacings for other wire sizes.

"I am pleased to have received many constructive comments from antenna experts, and lots of interest from the amateur community. Although I didn't discover this antenna type, I'll gladly take credit for 'uncovering' it once again, and adding to our understanding of its behaviour! Thanks again for introducing it to *RadCom* readers." ♦

MORE ON METAL-OXIDE VARISTORS

IN *TT* (October 1984, p63) attention was drawn to N2EMT's warning that care is needed when using metal-oxide varistors (MOVs or VDRs) to remove spikes from mains supplies. He specifically warned against using MOVs of insufficient voltage rating and recommended a voltage rating of some 1.5 times the nominal mains voltage. This would imply the use on 240V mains of MOVs rated at 360V AC, which seems rather excessive; 275V AC MOVs are generally used to remove spikes from UK mains supplies.

N2EMI pointed out that if an MOV turns on and stays on, the least hazardous outcome would be a blown fuse. But there was the possibility that an overheated MOV package could either burst into flames and/or expel hot material, possibly igniting nearby components or materials.

David Cutter, G3UNA, of David Cutter Engineering writes: "I designed a small 275 MOV into the power supply circuit of a hot drinks vending machine as part of a 'bomb proof' design to prevent spikes getting into the microprocessor circuits: these machines are located in the most electrically noisy places anyone could imagine.

"In my first production batch of 150, I had four failures and these were all catastrophic, ie the MOV exploded, depositing metal film onto nearby components. I thought I'd taken enough precautions regarding series resistance upstream of the MOV by putting it after a PTC and a 28mH (yes mH) double inductor.

"Now, since I moved the MOV further downstream after another smaller PTC used to protect the mains transformer (a BS safety requirement) I have had no failures in a couple of thousand installations. The revised arrangement (**Fig 8**) offers a better choice from a suppression point of view, but was not done originally because the PTC was then built into the transformer.

"The lesson is: if you want to use small (ie cheap) MOVs at close to the supply voltage, make sure they have plenty of resistance between them and the mains; in my case about 24Ω in the complete return circuit using a 20-joule MOV (7mm diameter). It is possible to use a fireproof (ceramic ie concrete look-alike) resistor if you do not have other circuit elements that add up, as in my case.

"Incidentally, no further failures occurred in the original batch of 150!"

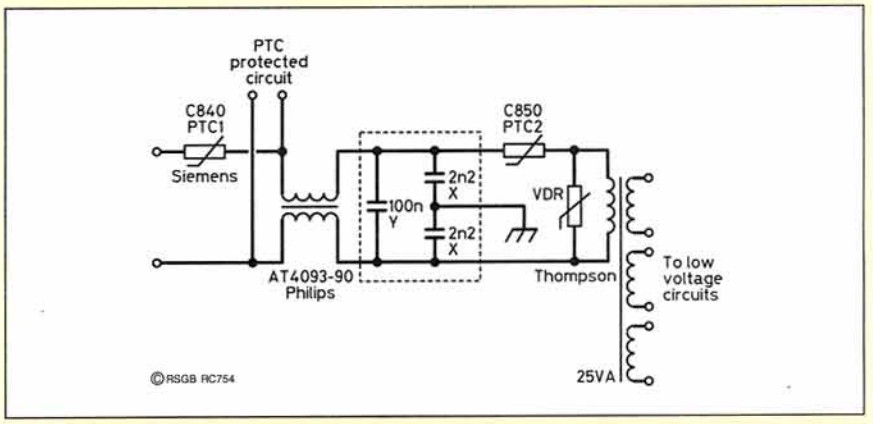


Fig 8: G3UNA's arrangement to increase safety factor when using MOVs with a voltage rating near that of the supply mains.

VARIABLE IF SELECTIVITY UNIT, SEPT 95

COMPONENTS UNDER THE heading 'Capacitors', ie C7, C8, C9 and C10 and the RFC under 'Inductors' in the components list should be deleted. The values for C7, C8, C9 and C10, lower down the list, are correct. Semiconductors TR1, TR2 are MFE201 and not MFE20 as shown.

A R Thomson, GM3AHR

2 METRE SSB/CW TRANSCEIVER, APRIL 1993

IN MODULES 3 AND 4, IN the components list the inductors L1, L2, L3 are listed as 0.23uH Toko S18 series (Cirkit Pt No 35-10503). These inductors have 5 ½ turns and are green! However, the picture on page 36, *RadCom* April 1993, shows these inductors to be yellow. The yellow inductors are 0.18uH Toko S18 series (Cirkit Pt No 35-10403), 4 ½ turns. According to the capacitance values of the resonant circuits I would expect the 0.23uH (green) inductors to be the right ones (module 3: fc= 133MHz, Ct = 33pF 8.2pF = 6.56pF L = 0.22uH; module 4: fc= 144MHz, Ct = 33pF 6.4pF = 5.36pF L = 0.23uH).

Module 4: Why is C12 (4.7pF) different from C6, C10 (6.4pF)? Is that a printing error?

Module 10: I think there is an error in the schematic of Fig 10: To provide a proper load to the transistor 2N4427 TC4 should be connected between L3 and TC3 and not between TC3 and RF output.

Thomas Bohl, F5SWE

Technical Update

FIRSTLY, I WILL deal with your question regarding the Tokyo inductors. I agree the 0.23uH green inductors, for the given associated tuned circuit capacitors, look the best choice for both the 133MHz and 144MHz driver circuits. However this statement would be correct if there were no stray circuit board capacitance to consider, which at VHF can very much alter the resonant frequency of tuned circuits. Although both the green and the 0.18uH yellow inductors functioned well, when installed on their respective circuit boards, I found in practice that at the desired resonant frequencies, some of the tuning cores of the green inductors were positioned at their adjustment limits, where as with the all yellow inductors the tuning cores are well within their adjustment limits. Incidentally, at the time of publication I thought that *RadCom* would only publish black and white pictures of the transceiver circuit boards, so I did not think it important to mention the inductor colours!

Regarding capacitor C4. I agree with you, this should be 6.4pF, the same value as C6 and C10. I can only assume that this is a text error.

Regarding the Power Amplifier, there is a diagram error therefore you are correct again. L3 and TC3 are in series, and TC4 is connected between the junction of L3 and TC3 and chassis ground as shown in enclosed diagram. Whilst still on the subject, to obtain some thermal tracking the diode D1 should be positioned against the heat sink of transistor TR1, also apply some heat sink compound to the joint.

To date I have been very pleased with the Transceiver performance, however I find the VFO requires about 40 minutes warm up before it comes sufficiently stable to use. When I get time, I hope to carry out some slight modifications to speed up this warm up time. I intend to install a 100R resistor in parallel with a 10nF capacitor, between I8 and chassis ground of module 2. Hopefully this will stabilise the quiescent current through transistor TR4.

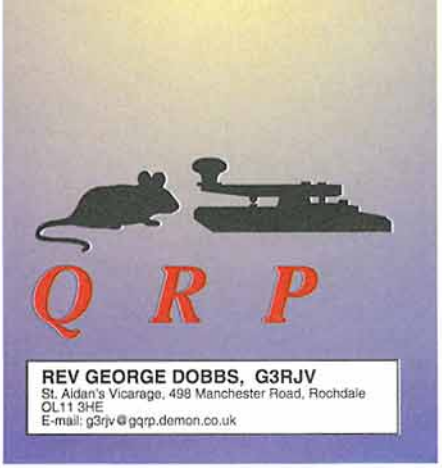
Bernie Pallet, G3VML

NOVICE NOTEBOOK, SEPT 95

THERE ARE ERRORS on the 'Pineham receiver' circuit and component layout diagrams. At IC1 (NE602) there should be a 10nF capacitor between pin 4 and R2, and pin 5 and R3 respectively. These capacitors can be seen on the photograph. At IC2 the output is on pin 5 and the positive DC supply is fed to pin 6 (C8). C8 and C10 are 100uF as shown in the diagram.

The receiver works very well once these problems are fixed. If you have any hum on the signal increase C8 to 400uF or more.

Ron Roberts, G3TAR.



REV GEORGE DOBBS, G3RJV
St. Aidan's Vicarage, 498 Manchester Road, Rochdale OL11 3HE
E-mail: g3rjv@gqrp.demon.co.uk

THE DIGITAL TRX 942 is a new synthesised QRP transceiver just beginning to appear in the Western European market. It seems to represent a fine example of Eastern European enterprise in that each transceiver is handmade by a group of five people, who before the political changes in Poland worked for an RF Company.

The TRX 942 is a Z80 driven, multiband, multimode, transceiver with a first IF of 42MHz, a second IF of 9MHz capable of running CW, SSB, FM and AM. The FM and AM facilities have a 455kHz third IF. The transceiver has continuous receive facilities from 20kHz to 30MHz and about 4W output on all amateur bands within this range. It also offers 50MHz and 144-150MHz in all modes but only running about 200mW out on transmit.

The transceiver has RIT and XIT and 'real' SPLIT in that it is possible, for example, to transmit at 144MHz and receive at 28MHz or vice-versa. It also includes a 1750Hz tone burst for repeater working. A built-in electronic keyer has a speed control from 3 - 90WPM in one word per minute steps and includes 12 memories.

The TRX 942 weighs about 2.6kg and the current consumption is 500mA on receive and 2A on transmit. The case has been described as looking like a 1970s CB rig! It has a turned aluminium tuning knob, LED readout for frequency and keyer speed and membrane type keypads. Later versions should offer greater transmitter outputs on 50MHz and 144MHz.

Peter Zenker, DL2FI, the QRP columnist for *Funk Amateur*, has had some operating experience with a TRX 942 and writes: "Comparing the Index Labs QRP Plus and the 942, the 942 has the better transmitter for SSB (one of the best dynamic compressors I have ever used) and it is more flexible. The 942 receiver is not as good as the QRP Plus in terms of IP3 but it 'sounds clearer' and the audio noise level is lower."

There is an importer in Germany and the price is 1700 DM (around £750). A kit is also available but this is a very advanced constructional project. Details can be obtained from Rittau Funkanlagen, Euckenweg 13, 90471 Nurnberg, Germany.

WHAT DO QRP OPS USE?

JOHN DAVIS, G0KCA, has recently conducted small-scale research into the equipment and antennas used by QRP operators by analysing his QRP QSL cards. He used information obtained from the cards of 300 members of the G QRP Club.

One operator in three was using home-made equipment, 27% were using American equipment (of this, 87% was made by TenTec) and 40% used Japanese equipment. The antennas were dominated by the half-wave dipole and the G5RV antenna: about 20% of each. The next most popular antenna, at 11%, was the long wire. Only 6% used any form of commercial beam antenna. There were 17 other types of antenna used, ranging from the W3EDP to loaded whips.

Since the results were drawn from QSL cards gained through QSOs rather than a survey, they seem to show it is possible to be very active on the HF bands with simple equipment and antennas. A viable amateur radio station can be home built and operated using simple wire antennas.

NORTHERN QRP EVENT

MOST DEDICATED QRP operators know that there are two specialist QRP events in the amateur radio calendar. The Yeovil QRP Convention in May caters for those in the south of England while the Rochdale QRP Convention serves those in the north. And the recent revival of the 'MacSprat' convention has now provided an event for Scottish QRPers.

The Rochdale Mini-Convention is on Saturday, 14 October 1995 at St Aidan's Church Hall, Manchester Road, Sudden, Rochdale. The hall is located on the A644 Manchester Road about three minutes away from Junction 20 on the M62. The doors open at 10am with an admission price of £1. A 2 metre talk-in station is provided on S22 from 9am. Food and drink is available all day, including the now famous pie and peas lunch.

The event is a real amateur radio convention rather than a radio rally. There are lectures throughout the day, a large social area and those attending are invited to bring home-built equipment to show to fellow amateurs. There are less traders than at many radio events but these traders only sell surplus items, components and kits, together with a bring and buy stand. Many people have described it as a 'real' amateur radio event.

Incidentally, the next Yeovil QRP Convention is on 19 May, 1996.

HOME-BREW & OLD-TIME EQUIPMENT CONTEST

EACH YEAR THE German AGCW Group sponsor a novel contest for home-built equipment and old-time equipment (more than 25 years old). Old or home-built transmitters can be supplemented with commercial receivers and vice-versa, but the best points go to the genuine articles!

DATE:

The third Sunday in November (19 November 1995).

TIME AND FREQUENCIES:

1300 - 1500 UTC on 7010 - 7040kHz
1500 - 1700 UTC on 3510 - 3560kHz

MODE:

Single operator CW, maximum input 100 watts.
Use of keyboards and automatic readers is definitely not allowed!

CALL:

'CQ HOT'

CATEGORIES:

A: TX and RX home-brew or older than 25 years.
B: TX or RX home-brew or older than 25 years.
C: QRP TX, not more than 10 watts input or 5 watts output and home-brew or older than 25 years.

CONTROL NUMBER:

Consists of report / serial number / category ie 579/001/A.

POINTS:

A working A, A working C, C working C = 3 points
B working A, B working C = 2 points
B working B = 1 point

LOG:

The log has to contain a specification concerning the home-brew or old-time components of the station.

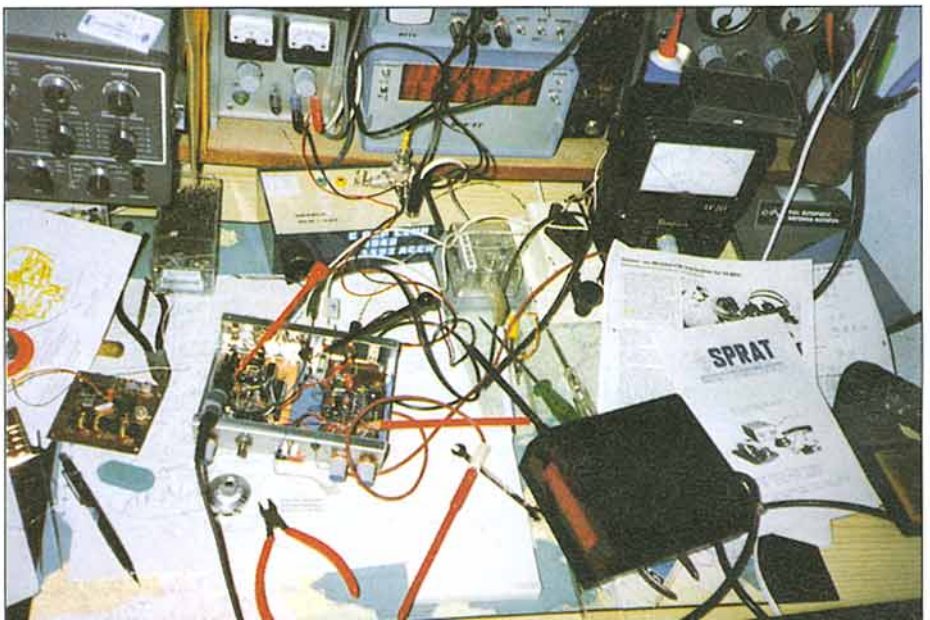
CLOSING DATE:

15 December 1995

LOGS TO:

Dr Hartmut Weber, DJ7ST, Schlesierweg 13, D-38228, Salzgitter, Germany. ♦

The workbench of Guido Giannini, HB9BQB, is a typical QRP operator's shack. The open case shows a home-built 14MHz QRP Transceiver.



EMC

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

TRADITIONALLY, THE Friedrichshafen Ham Radio Exhibition is an event where amateurs from all over the world meet to enjoy the atmosphere of the largest radio rally in Europe as well as to hold meetings, either local, inter-society or at the IARU level. This year, members of the German national society, DARC, - who are interested in EMC, requested a meeting with members of the RSGB EMC Committee with a view to a closer working relationship and to learn about each other's approaches to problems experienced.

The two societies have differing ways of approaching amateurs' EMC problems, mainly because of how the societies are structured. The DARC's EMC work appears to operate more on a regional level, whereas RSGB EMC activities are organised centrally from the EMC Committee with devolved responsibility through the EMC Co-ordinators. For many years, the RSGB had an active RFI Committee which became the EMC Committee but DARC has only recently considered this approach.

It was noted that EMC has been more tightly regulated in Germany for many years, in areas such as compulsory RFI emission limits for computers. The main areas of concern are the same in both countries however, particularly the adequacy of European RF immunity standards and the ever increasing number of sources of RFI. The meeting was both constructive and informative and the DARC requested a closer interchange of ideas and exchange of documentation.

Saturday saw the annual meeting of the IARU Region 1 EMC Working Group with 12 countries being represented including South Africa. Manfred Dudde, DL5KCZ, who is the *rapporteur* for the ETSI (European Telecommunication Standards Institute) RES 09 Working Group, gave a report on minor changes to the 'EMC Standard for Commercially Available Amateur Radio Equipment'.

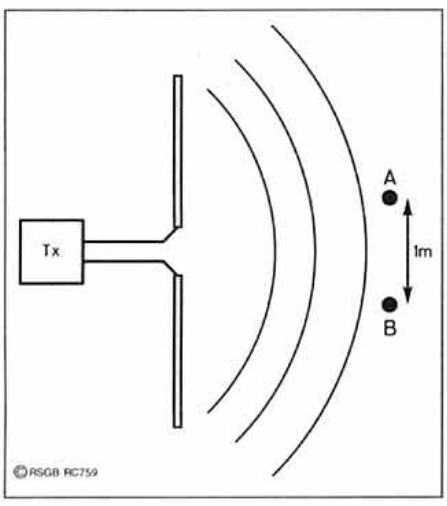


Fig 1: RF field strength produced by a transmitting aerial.

Jacques Rajade, F5AJ, outlined work carried out in the USA by K0FBF on field strength measurements taken in the domestic environment using various types of HF transmitting aerials.

The subject of emission limits from computers was also discussed. From 1 Jan 1996, all computers placed on the market in the EU will have to meet EN 55022. It is hoped that they will have to meet the EN 55022 Class B emission limits but, as explained in June's *EMC* Column, these offer little protection to amateur VHF reception. Unfortunately, there is a possibility that some computers may be permitted which only meet the less demanding Class A limits. These would have to carry a label stating that they may cause radio interference. It has been said that, there are very few complaints to the RA about emissions from equipment which meets EN 55022 Class B and that, consequently, there is a case for relaxing the limits!

Christian Verholt, OZ8CY, Chairman of the IARU EMC Working Group asked that all member societies should encourage their members to complain to their relevant authorities (the RA in the UK) about any interference to amateur reception caused by CE marked computers.

The European Commission is reported to have advised national administrations to be lenient in the first two years after the implementation of the EMC Directive. Enforcement is expected to be 'complaint driven' and in the UK this would be via Trading Standards Officers. If any product bearing the 'CE' mark is found to be substantially outside the limits for emissions or immunity, a complaint should be made. The EMC WG Chairman advised that if national societies have access to appropriate facilities, suspect equipment should be pre-tested before a formal complaint is registered.

Kits and conformity to the EMC Directive were also discussed. A member of the committee which originally drafted the 1989 EMC Directive stated that exclusion for 'self built' amateur radio equipment was intended to apply to anything which a radio amateur builds. At present there seem to be differing interpretations of the EMC Directive in the different EU countries. UK legislation appeared to be out of line with the rest of the EU in respect of EMC requirements for kits. However, following questions by Dr-Ing Diethard Hansen, HB9CVQ, to the German BAPT, it appears that the UK EMC Regulations in respect of kits are the correct interpretation of the EMC Directive as published. It seems that kit manufacturers will have to assemble their kits and ensure that they are compliant with the EMC Directive.

Other areas discussed were RF immunity of cardiac pacemakers, RF powered lighting and the proposed ADSL (Asymmetric Digital Subscriber Loop) system. ADSL would allow transmission of digital data up to 10Mbit/sec on existing twisted pair telephone cables. In some countries ADSL could be used to allow telephone subscribers to order and receive video films via the telephone system. Emissions of RFI from ADSL lines in the lower HF bands could have implications for radio amateurs and short wave listeners, especially if overhead telephone lines are used.

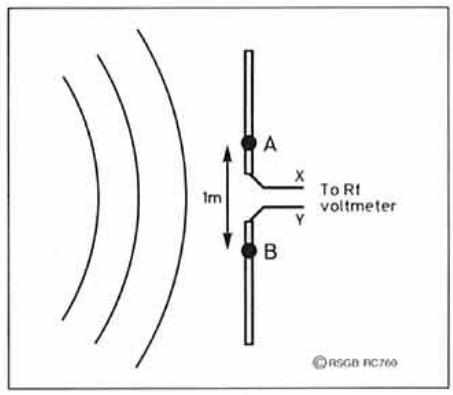


Fig 2: Measurement of E-field strength using a short dipole.

The next EMC WG meeting will be held at the IARU Region 1 Conference in Sept/Oct 1996.

FIELD STRENGTH - WHAT DOES IT MEAN?

RF IMMUNITY STANDARDS specify certain RF field strengths in volts per metre but what does this mean and how can it be measured? **Fig 1** shows two points A and B a certain distance from a transmitting aerial. If the field strength is 1V/m and A and B are one metre apart, then there is one volt RMS between them. To measure the voltage which exists between two points in space, it is possible to use a dipole receiving aerial correctly orientated relative to the field as shown in **Fig 2**. If the dipole is short compared to a half wavelength, the voltage which appears between X and Y at the feed point is equal to the voltage between A and B which are the centre points of each element. If each element is one metre long then A and B are 1m apart and there is 1V between A and B in a 1V/m field. This would be valid at any frequency up to at least 30MHz. To measure the potential difference between X and Y with an electrically short dipole, it is necessary to use an RF voltmeter with a high input impedance if a flat frequency response is required.

At the frequency where the dipole is a half wavelength long, around 70MHz in this example, it is resonant and behaves somewhat differently. The voltage between X and Y is equal to the field strength in V/m multiplied by the wavelength in metres and divided by pi. At 70MHz, a 1V/m field would produce an output of 1.27V with no load. This output voltage comes from a source impedance of around 72Ω which is much lower than in the case of a short dipole.

In some cases, various types of cable can act as unintentional receiving aerials. This effect is likely to be most severe if the cables are a resonant length. For example, if the loudspeaker cables of a neighbour's hi-fi system are each 2.4m long, they could form a half wavelength dipole which resonates at around 28MHz. If they happen to be aligned for maximum pickup with the hi-fi amplifier at the centre, then in a 1V/m field, the amplifier

CONTINUED ON PAGE 84

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CONTINUED FROM P81

would see a 3.4V source of RF from a 72Ω source impedance connected between its left and right speaker output sockets. In the case of an alarm system, if there are two PIR sensors 21 metres apart with cables leading directly to a control panel at the centre, then in a 1V/m field at 7MHz, the control panel sees a 13.6V source of RF connected between the cables to its two sensors.

MAGNETIC FIELD COMPONENT

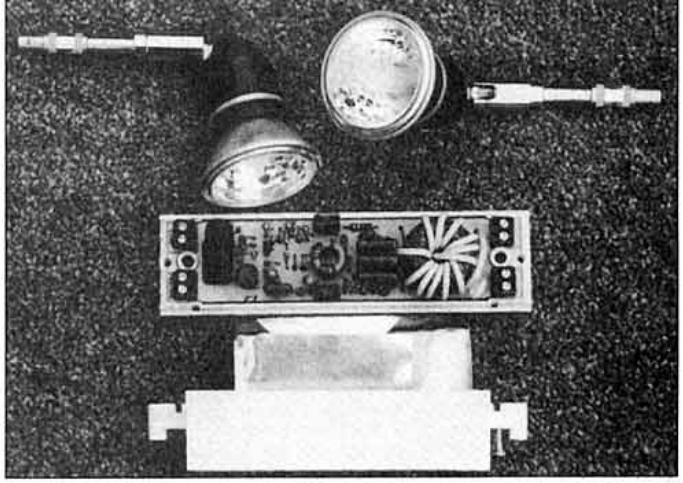
A radio wave not only has an electric (E-field) component, but also a magnetic (H-field) component. In the far field, which is further than about one sixth of a wavelength from the transmitting aerial, an E-field strength of 1V/m corresponds to an H-field strength of 2.65mA/m (milli Amps per metre). This is because the ratio E/H is constant at 377Ω so if the H-field is measured, it is possible to calculate the E-field and vice versa. For making HF field strength measurements in the vicinity of an amateur station, the use of a magnetic loop receiving aerial has some advantages over a short dipole. This is because the readings obtained with a loop are less affected by the proximity of ground and conductive objects than those made with a short dipole. An EMC Committee member has designed and constructed an amateur HF field strength meter using a screened loop and it is intended to publish details in the future.

WHY 3 VOLTS/METRE?

The figure 3V/m is widely quoted as the immunity level which will be required for all electronic equipment for which there is no product-specific standard. This is likely to be a major improvement on the present situation where consumer electronic products are not required to meet any RF immunity standard in the UK. However, the level is not based on field strengths which may occur in the vicinity of an amateur radio station. The Generic Immunity Standard EN 50082 includes RF immunity tests at field strengths of 3 V/m (carrier) with 80% AM from 80-1000MHz. From 150kHz to 100MHz, there is a test for immunity to conducted RF coupled onto mains cables, interconnecting cables, etc. The conducted immunity test injects 3V of RF with 80% AM and is based on the assumption that a 3V/m RF field could cause 3V of RF to be picked up on an interconnecting cable. As mentioned above, the actual RF voltage picked up on a cable could be 3 to 10 times as much if the cable happens to be a resonant length on one of the HF amateur bands.

The 3V/m radiated immunity level corresponds to Severity Level Class 2 from Appendix A of IEC 801-3: 1984 (BS 6667: Part 3: 1985). This standard was primarily concerned with immunity of industrial process control equipment to signals from hand-held transceivers. Appendix A gives details of the field strength which a typical hand-held transceiver can generate at a given distance. The formula given predicts a typical field strength of 3V/m from a 3.5W VHF or UHF hand-held at a distance of 1m but this is based on an inefficient aerial with a gain of -12.8dBd.

In other cases, with an efficient aerial - such as mobile transmitters used by emergency services, PMR or radio amateurs - higher field strengths may be produced at greater distances. For example, a 50W VHF mobile transceiver with a 3dBd gain aerial has an ERP of 100W which gives a field strength of 7V/m at a distance of 10m.



An 'electronic transformer' and low voltage halogen spotlights.

As reported in December 1994's *EMC* Column, IEC Committee SC77B has prepared a draft document on the Electromagnetic Environment. This was to have been issued as a standard IEC 1000-2-5, but will now be issued as a technical report instead. This document lists many sources of RF in various environments, and in the residential (urban) environment it states that field strengths of up to 10V/m may be expected at a distance of 20m from an amateur radio transmitter.

LOW VOLTAGE LIGHTING

SMALL 12V HALOGEN spotlights are used in some display lighting and other commercial applications, although they are occasionally found in the domestic environment. Some types use a conventional mains transformer but this can be relatively large and heavy as each lamp typically uses 50 watts. Other low voltage lighting systems use 'electronic transformers' - such as the one shown in the photograph - which can operate two 12V 50W lamps. It is a simple switch-mode power supply operating at around 40kHz which allows a small, lightweight ferrite cored transformer to be used. The lamps can run directly from the 12V 40kHz AC output via screened cables to reduce RFI.

As with any switch-mode power supply, there is an RFI filter at the mains input but some of the switching waveform and its harmonics are fed back into the mains supply. Although a single electronic transformer may meet the conducted emission requirements of EN 55014, some installations use multiple electronic transformers which obviously increases the total amount of RFI.

We have also received a report from a member who installed several SELV Lighting electronic transformers in his house but removed them due to the amount of RFI which they produced on the HF amateur bands.

TELEPHONE IMMUNITY

NEIL WHITING, G4BRK, has provided some useful information on RF immunity of telephones at 144MHz. On 2 metres, Neil uses up to 60W of SSB into a 9 element beam about 9m above ground level. The beam points upwards at about 10° to reduce the field strength in the nearby houses. One neighbour about 50m away had problems with RF breakthrough on a Morphy Richards TX136 telephone which made the phone unusable whichever way the beam was pointing. Fitting ferrite cores to the phone cable only produced a marginal improvement so Neil contacted Morphy Richards who were aware of the problem and were helpful. They took the phone back and fitted a filter free of charge but unfortunately, this did not improve the immunity at 144MHz.

Neil wanted a new RF immune telephone for his own house so he tried his local branch of Argos. The first model he bought, a Mybelle 'Pastel 673' at £14.99 had poor RF immunity so he exchanged it for another, a Betacom Vogue at £19.50 which he found to have excellent RF immunity. At 144MHz with 60W into a dipole, Neil reports no RF breakthrough unless the phone is within one metre of the aerial which suggests that the VHF immunity is in the region of 50V/m!

COURSE FOR COMPLAINTS

WHEN EMC COMMITTEE members complain to manufacturers about electronic products with poor RF immunity or excessive RF emissions, we often get the "no-one else has complained" response. It seems that radio amateurs do not complain to manufacturers often enough about EMC matters, or perhaps they only complain by telephone and no record is kept. The following hints are from an experienced EMC Committee complainer.

Before you start, be sure to have full details of the make and exact model number of the equipment in question. If you write without phoning first, your letter may never reach the right person, so start by phoning the company. Ask to speak to someone who can deal with a technical enquiry, or better still, someone who is responsible for EMC. You may be kept holding on for a long time or you may be passed around half a dozen different departments but don't give up and above all, keep cool! A polite but firm approach is recommended. You may have difficulty getting past the customer service staff if they do not understand the technical issues involved. They may take the view that if you didn't transmit, there wouldn't be a problem or that your receiver is too sensitive! You will probably be told that the product met all necessary standards at the time of manufacture.

When you do get through to the right person, explain the problem, ask them whether they have heard of it before and, if so, whether they can offer a solution. The next step is to follow up your call with a typed letter or a fax to the person you spoke to. It should confirm what was discussed, and should remind them of any assistance they offered you, otherwise they might forget! If your complaint is disregarded, ask the company whether they are a Quality Assured Firm under BS/EN/ISO 9001, 9002, 9003 or BS 5750. If they are, they should operate an adequate procedure for dealing with complaints. ♦

RADCOM NEWS FEATURE

Amateur Radio in Education: ICARE '95

by Richard Horton, G3XWH*, and Hilary Claytonsmith, G4JKS**

AT THE FIRST ever World Conference on Amateur Radio in Education, which took place near London between 12 and 15 July 1995, a new international organisation was founded - ICARE - the International Council for Amateur Radio in Education. In the foundation statement, the aims of ICARE were stated as 'offering a forum to teachers and students world-wide for the exchange and support of educational projects and methods using Amateur Radio'.

The conference was hosted by the UK organisation STELAR and sponsored by Trio-Kenwood UK Ltd and the Radio Society of Great Britain.

The Conference

DELEGATES FROM THE UK, USA, Canada, France, Germany (former east and west), Spain, Denmark, Poland and South Africa were present and gave presentations on educational aspects of amateur radio in their respective countries. The keynote speech was delivered by John Keeling of the Radiocommunications Agency. Countries whose delegates were unable to attend because of previous commitments included Austria, Norway, Kenya, Italy and Australia. Russia's delegate provided a detailed paper but could not attend personally.

One aim of the Conference was to provide an opportunity for teachers from all over the world to learn from each other. The aim was certainly met as delegates learned how schools are linked in Spain using teleconferencing, how a mobile shack travels around schools in Germany demonstrating amateur radio, and how balloon projects are used to full effect in France as well as Germany. Balloon projects consist of four main elements: the platform (data sensors, receiver, transmitter and control system), the flying transport system, back-up and control teams, and follow-up activities with amateur radio stations in schools.

American schools use amateur radio as a basis for physics work - some 47 pupils in one case - and Canadian schools use shortwave listening to enliven language, geography, technology and science lessons. South Africa runs YARIA (Youth for Amateur Radio In Africa), which aims to allow the youth of Africa to communicate by setting up amateur radio stations in schools, colleges and youth clubs.

*7 Carlton Rd, Harrogate, N Yorks HG2 8DD.
**115 Marshalswick Ln, St Albans, Herts AL1 4UU.

Photo: G3OUF

Photo: G4JKS

Some of the ICARE '95 delegates in the Kenwood 'shack'.

ICARE Committee Elected

AT THE ICARE '95 Conference, a Council Committee was elected to take forward the aims of ICARE both within the member countries and to encourage the participation of other nations in this co-operation between education and amateur radio technology.

This committee consists of: Chairman: Richard Horton, G3XWH (UK); Meetings Secretary: Hilary Claytonsmith, G4JKS (UK); Treasurer: Tony Reumerman, ZS6AOG (South Africa); PRO / Communications Officer: Mike Conley, AA6AE (USA); Development Co-ordinator: Neil Carleton (Canada); Projects Officers: Ingo Goltz, DL1BLV (Germany) and Wolfgang Lipps, DL4OAD (Germany).

The first international project was declared to be an initiative to develop Slow Scan Television-based systems in schools. Co-ordination was to be achieved via the *AMRED* (AMateur Radio in EDucation) magazine, electronic links and future international meetings of the country co-ordinators of affiliated groups.

One of the aims of ICARE is to bring together all those involved in using amateur radio in education. It promotes good teaching practices across the curriculum including products and services for educators, publications, exhibitions, educational projects, and programs and video collections. To find out more, write to ICARE: 7 Carlton Road, Harrogate, N Yorks HG2 8DD, or Internet: g3xwh@amsat.org, packet: G3XWH@GB7CYM, fax: 01423 871027. ♦

Above: John Jansen, OZ2JJ, a delegate from Denmark, addresses the ICARE '95 conference. Left: John Keeling of the RA delivers the keynote speech at ICARE '95.

CONTEST CLASSIFIED

All rules should be read in conjunction with the General Rules published in *Contest Classified*

VHF RESULTS

432MHZ FIXED AND AFFILIATED SOCIETIES 1995

Compared with last year's contest the number of entries in the multi-operator section more than doubled, in the single operator section was four fewer and the number of Affiliated Society entries was up by three. Conditions were described generally as being "poor", "flat" and at best "normal". However, many stations worked DX in excess of 400km, and stations in 28 different Locator squares in DL, F, G, GI, GM, GU, GW, HB9, ON and PA appeared in the contest logs.

Treating the contest as a training exercise for their members, most of whom do not regularly operate on 70cm, certainly paid off for the South Birmingham Radio Society, who were the Zone B leading multi-operator station and Affiliated Society. The adjudication had to be particularly thorough in order to separate several closely scoring stations, with the result that many stations lost points. Only seven Single Op stations in the top 22 retained the whole of their claimed score. Once again there were no entries from listeners, but several Novice licensees participated and Frank Laanen, PE1EWR, submitted an overseas entry.

Mike Ellis, G4UDE, won the Single Operator Fixed Station section ahead of Eric Gedvilas, G8XVJ, while the Multi-Op section was won by Sutton and Cheam RS, G3WHK, with Clifton ARS, G0UJK, runners-up. The winners of this year's Affiliated Societies section were Harwell ARS, who were closely followed by Sutton and Cheam RS. Congratulations to all certificate winners(*).

SINGLE OPERATOR FIXED STATION SECTION

Pos	Callsign	Zone	Pts	QSO	LOC	Ant	Pwr	Best DX	Km
1 *	G4UDE	B	838	108	IO82	2x20	400	DL4KG	730
2 *	G8XVJ	A	789	115	IO83	21	400	DL4KG	708
3 *	G3NNG	D	678	112	IO91	21	150	DG1KJG	616
4 *	G6HKM	C	457	79	JO01	23	100	DG1KJG	484
5	G3XDY	C	425	49	JO02	21	250	HB9AMH/P	693
6	G4ZTR	C	322	54	JO01	4x21	25	HB9AMH/P	697
7	G3YSX	C	299	68	IO91	21	100	G8DQK	295
8 *	G3MEH	C	290	71	IO91	20o20	25	PA3FPS	370
9	G0ODQ	D	287	62	IO91	21	100	PA3FPS	369
10 *	PE1EWR		273	26	JO11	21	30	HB9AMH/P	517
11	G0GCI	C	271	49	JO01	2x21	120	DL5KCI	411
12	G8JXV	C	242	55	IO91	88	120	G1SWH	315
13	G0TRB	B	227	53	IO92	19	10	G6YXT	275
14	G8MNY	C	222	60	IO91	19	400	G3GNR	291
15	G4JZF	B	206	52	IO82	21	40	G6YXT	262
16	G3UKV	B	204	37	IO82	17	80	GM0USI/P	378
17	G3NAS	B	198	50	IO92	13	40	G8APB	230
18	G3JJZ	C	184	50	JO01	19	25	PA3FPS	355
19	G3RHH	B	180	40	IO82	21	25	G0RRC	228
20	G4DWF	C	158	29	JO02	19	100	GW4WVO	322
21	G6IQM	B	147	42	IO92	?	100	GM0USI/P	450
22	G0RRC	C	135	30	JO02	21	10	GW4WVO	305
23 *	GW1ATZ	E	131	19	IO83	12	10	G0UJK	286
24	G3FIJ	C	127	23	JO01	19	15	GW4WVO	291
25	G0BRV	C	125	40	JO01	19	25	G8DQK	286
26	G4TVR	B	119	32	IO92	15	25	G0GCI	208
27	G4NKC	B	116	28	IO82	24	30	G0GCI	247
28	G0SHC	B	105	24	JO02	48	6	G4UDE	224
29	G1WAC	B	101	37	IO92	15	25	G4ZTR	194
30	G7AZP	D	66	12	IO90	16	10	G8XVJ	294
31	G1NRM	C	60	30	IO91	18	100	G4UDE	235
32	2E1DJM	B	58	20	IO82	14	3	G0UJK	220
33	G0UYE	B	33	15	IO82	19	25	G3PIA	130
34	G3SBV	C	32	20	IO91	8	25	G4JZF	184
35	G8UGL	B	30	11	IO82	17	10	G6HKM	219
36	G0MWO	C	28	23	IO91	48	25	G0GCI	66
37	2E1AIU	C	18	8	JO01	19	1	G6RAF	116
38	2E0AIJ	C	10	10	IO91	co-lin	3	G0GZQ	28

MULTI OPERATOR FIXED STATION SECTION

Pos	Callsign	Zone	Pts	QSO	LOC	Ant	Pwr	Best DX	Km
1 *	G3WHK	C	507	97	IO91	24	100	DL4KG	512
2 *	G0UJK	C	441	96	JO01	17	60	PA3FPS	337
3 *	G3OHM	B	396	83	IO92	24	300	DL4KG	644
4	G0GZQ	C	387	83	IO91	30	25	GM0USI/P	581
5	G3NTS	C	341	79	IO91	21	400	PA3FPS	357
6 *	G3PIA	D	309	61	IO91	4x21	25	DL4KG	588
7	G3GHN	C	305	75	JO01	44	200	G4XOL	283
8 *	GW4WVO	E	261	40	IO81	2x8	25	G4DWF	321
9	G7BKH	C	164	47	JO01	18	35	PA3FPS	337
10	G8CUL	D	157	49	IO91	46	10	G1SWH	242
11	G0TXL	C	86	34	IO91	7	10	G8XVJ	276
12	G1XYZ	C	41	12	JO02	2x19	10	G4UDE	241

AFFILIATED SOCIETIES SECTION

Pos	A.F.S.	Zone					Team			Total
1 *	Harwell ARS	D	G3NNG	678	G3PIA	309	G8CUL	157		1144
2 *	Sutton & Cheam RS	C	G3WHK	507	G0GZQ	387	G0TXL	86		980
3	Clifton ARS "A"	C	G0UJK	441	G3GHN	305	G7BKH	164		910
4	Martlesham DX CG	C	G3XDY	425	G4DWF	158	G0RRC	148		731
5	Aylesbury Vale RS	D	G0ODQ	287	G3MEH	290				577
6	Reigate ARTS	C	G3YSX	299	G8JXV	242				541
7	Bromley ARS	C	G8MNY	222	G3JJZ	184	G0BRV	125		531
8	Colchester RA	C	G4ZTR	322	G3FIJ	127	2E1AIU	18		467
9 *	S. Birmingham RS	B	G3OHM	396						396
10	Telford & D ARS	B	G3UKV	204	G4NKC	116	2E1DJM	58		378
11	Ariel Radio Group	C	G3NTS	341						341
12	West Kent ARS	C	G0GCI	271						271
13 *	BBC Wenvoe ARS	E	GW4WVO	261						261
14	Wythall Radio Club	B	G4TVR	119	G1WAC	101				220
15	RS Bloxwich	B	G4JZF	208						208
16	Lichfield ARS	B	G3NAS	198						198
17	Kings Lynn ARC	B	G1XYZ	41	G0SHC	105				146
18	Clifton ARS "B"	C	G3SBV	32	G0MWO	28				60

SWL - NO ENTRIES

1ST 144MHZ BACKPACKERS 1995

What a terrific response to this first event! Entries were significantly up on last year and it seems that the format is just about what everyone wants. Although conditions were not particularly inspiring, with many stations commenting on the lack of activity from Europe, at least the weather was kind which made accessing those more exposed high spots and operating rather more comfortable. As G0LBO/P operating from the Cumbrian hills commented, "Only two pairs of trousers and a goretex bivvy bag required!" Activity levels, and hence QRM levels, were generally high, but G0JLF/P had the right idea by tuning the band and working the louder 24hr stations. As he commented in his highly descriptive report, " I tuned around and knocked off all the strongest ones whilst I could - no point in trying to find a clear space to call CQ. I had to wait to battle through some of the pile-ups, but the contact rate wasn't too bad for the first hour". GW7TQR/P amassed a tremendous number of QSOs at a rate that even many of the 24hr stations would have been proud to achieve. The greatest increase in entries has been in the 3W Single Operator Section. Although G7AFE/P won the section operating from the summit of Shining Tor, Derbyshire, particular congratulations should go to GI7JYK/P who as runner-up achieved a tremendous score from such a isolated part of the UK and all with such low power! Congratulations go to the winners of each of the sections and to the runners-up.

David Johnson, G4DHF

10W SINGLE OPERATOR

Pos	Call	Pts	QSO	Mult	Loc	Ant	Best DX	km
1*	G3IZD/P	58236	75	69	84KD	10Y	G4RUL/P	434
2*	G0SOO/P	31374	77	63	91SE	9Y	GI7JJK/P	?
3	GW8ZRE/P	26412	66	62	83JA	7Y	GM0ULK/P	437
4	G7GUC/P	25500	73	60	82QJ	5ZL	F6ETI/P	497
5	G0GCI/P	22260	58	53	01ED	13Y	GM4ZAP/P	528
6	G7KOL/P	13524	39	47	92LO	4Y	GM0ULK/P	492

10W MULTI-OPERATOR

Pos	Call	Pts	QSO	Mult	Loc	Ant	Best DX	km
1*	GW7TQR/P	83424	145	79	81KW	2x17Y	DF2VJ 766	
2*	G8PNN/P	75320	92	70	95CK	2x17Y	GJ4ZUK/P	691
3	G8NWM/P	49400	92	65	92TR	2x9 Y	DF2VJ 634	
4	GW6EOL/P	39872	83	64	81FP	17Y	GM0ULK/P	578
5	G7HHK/P	29680	57	57	94II	16ZL	GU3EJL	600
6	G4MHC/P	20829	81	53	82TA	9Y	G8AVN/P	382
7	G4FUR/P	6235	51	29	91VG	6Y	G8TIC/P	360

3W SINGLE OPERATOR

Pos	Call	Pts	QSO	Mult	Loc	Ant	Best DX	km
1*	G7AFE/P	42048	101	64	83XG	8Y	GJ4ZUK/P	450
2*	GI7JYK/P	33099	51	59	74DT	9Y	G6SRC/P	586
3	GW0DRM/P	31860	84	59	82KW	9Y	GI7JYK/P	366
4	G0LBO/P	31212	80	54	84KI	9Y	GJ4ZUK/P	574
5	G0GRI/P	30561	78	61	81QG	9Y	G8PNN/P	466
6	G4IDF/P	29888	81	64	82TC	8Y	GM0ULK/P	537
7	G8JAY/P	26780	70	65	91AW	17Y	GM0ULK/P	556
8	G0JLF/P	21888	52	57	91IH	9Y	GM0ULK/P	621
9	G7OZE/P	16536	58	52	93FB	7ZL	GM0ULK/P	436
10	G0BAF/P	15500	49	50	90TV	HB9CV	GM4ZAP/P	519
11	G7LQD/P	15476	54	53	83PF	9Y	GM0ULK/P	413
12	G3YCH/P	15312	40	48	80CO	8Y	G0EMG/P	475
13	G4RUL/P	14720	45	46	00CD	9Y	GM0ULK/P	704
14	G0UCQ/P	14040	61	45	83PN	9Y	G0MSA/P	395
15	G0HIK/P	12427	41	43	80FP	13Y	G7ANV/P	525
16	G0HDV/P	11891	34	47	84OO	9Y	G6CTU/P	414
17	G1JDM/P	11638	50	46	90RV	9Y	G4ADV/P	297
18	G0VTK/P	10535	45	43	93KA	8Y	GM0ULK/P	444
19	G7OMO/P	7315	46	35	81UB	HALO	G0ENG/P	388

3W MULTI-OPERATOR

Pos	Call	Pts	QSO	Mult	Loc	Ant	Best DX	km
1*	G0HAC/P	21692	56	58	83XH	9Y	GJ4ZUK/P	454
2*	G6TTL/P	13684	33	44	01OI	14Y	GM4ZAP/P	549
3	GW0SYG/P	8928	41	32	71LU	10Y	F6ETI/P	456

* Certificate winners

144MHZ SSB CUMULATIVE CONTEST 1995

The first SSB cumulative contest attracted a good entry of eager competitors. Most entrants seemed to enjoy this new contest. However, some entrants complained that they missed the first session 'due to lack of advertising'. Well, the rules were printed in the February *Radio Communication* and the contest was publicised in the VHF Contests Calendar in *Contest Classified* from January onwards. Some people must read *RadCom* as the level of activity was good with the leading stations in the high-power section making around 100 QSOs in two hours. Congratulations to G0GAG and G4PIQ for winning the 25W and 400W sections respectively, and to the runners-up in each section.

Ian Pawson, G0FCT

SECTION 1, UP TO 25W

Pos	Call	Loc	Pwr4/4 QSO		Pts12/4 QSO		Pts20/4 QSO		PtsNorm	Total
1 *	G0GAG	93JD	12	0	0	78	1000	52	1000	2000
2 *	G4SSD	80FI	25	46	100	28	315	25	309	1315
3	G8ZRE	83NE	25	38	662	33	301	24	479	1141
4	G0NYL	93QN	25	25	376	25	276	24	556	932
5	G1TWS	01HO	25	30	465	31	359	30	444	909
6	G0GCI	01ED	10	26	303	27	280	29	517	820
7	G8HGN	01FO	3	21	331	22	237	19	385	716
8	G7OCI	91XT	25	31	381	29	295	17	281	676
9	G3FIJ	01KV	10	0	0	21	322	19	337	658
10	G7AZP	80AS	25	0	0	24	257	21	396	653
11*	PE1EWR	11SL	25	0	0	12	270	11	378	648
12	G0ADH	91KO	25	19	245	22	232	21	351	596
13	G7SQU	91VV	25	21	245	27	226	16	167	471
14*	GI0OUM	74CN	20	0	0	2	37	2	63	100

SECTION 2, UP TO 400W

Pos	Call	Loc	Pwr4/4 QSO		Pts12/4 QSO		Pts20/4 QSO		PtsNorm	Total
1 *	G4PIQ	01MU	400	0	0	133	1000	120	1000	2000
2 *	G4UDE	82KT	400	94	100	88	581	0	0	1581
3	G4RKV	01OI	400	67	771	77	683	67	529	1454
4	G0GXT	81RU	400	89	743	102	557	88	651	1394
5 *	GW0PZT	72PT	100	64	736	41	337	16	124	1073
6	G1SWH	83QO	300	0	0	79	535	65	382	917
7	G8ESB	94IG	150	15	190	57	265	43	264	529
8	G0VVE	91SG	400	0	0	38	247	42	213	460
9	G0UWS	80FJ	200	33	271	22	120	0	0	392
10	GW4VVX	81JP	250	37	221	25	128	20	65	349
11	G0IBZ	02KA	100	0	0	23	96	19	83	179

* Certificate winners
Check-log: GJ4ZUK/P

VHF RULES

AMENDMENT

Entrants taking part in the following contests should send their entries to P O Box 29, Bridgend, CF35 5YA, and not to the address previously published. The contests are: 1.3 / 2.3GHz Fixed contest (29 October), and RSGB 144MHz / Marconi Memorial contest (4 / 5 November).

VHF CONTESTS CALENDAR

28 Sep	144MHz CW Cumulatives (May 95)
3 Oct	1.3/2.3 Cumulative (June 95)
7/8 Oct	432-24GHz (Jun 95)
11 Oct	432MHz Cumulative (Jun 95)
13 Oct	144MHz CW Cumulative (May 95)
18 Oct	1.3/2.3GHz Cumulative (Jun 95)
26 Oct	432MHz Cumulative (Jun 95)
29 Oct	1.3/2.3GHz Fixed/SWL (June 95)
30 Oct	144MHz CW Cumulative (May 95)
2 Nov	1.3/2.3 GHz Cumulative (June 95)
4/5 Nov	144CW 6-hr (June 95)
4/5 Nov	144CW 24-hr (July 95)
10 Nov	432MHz Cumulative (June 95)
16 Nov	1.3/2.3 GHz Cumulative (June 95)
27 Nov	432MHz Cumulative (June 95)
3 Dec	144 AFS/ Fixed /SWL (July 95)
4 Dec	1.3/2.3 GHz Cumulative (June 95)
12 Dec	432MHz Cumulative (June 95)
26-29 Dec	70/144/432 Fixed/Portable (Aug 95)

ARDF RULES

ERIC MOLLART MEMORIAL TROPHY (TOPBAND)

Date: 28 October 1995.

Map: 175 (Reading and Windsor)

Assembly: 1900 for start at 1920.

Location: Lane End, car park opposite village hall, NGR 807918.

Competitors requiring tea should notify Trevor Gage, tel: 01494 881842, not later than 21 October.

HF RESULTS

CORRECTION

In the Affiliated Societies CW Contest results (Club Listings) printed on page 83 of the July *RadCom*, the incorrect name was printed for the club in 45th position. It should have read the 'Dragon Amateur Radio Club', and not the Red Dragon CG, which is a completely different group. Apologies to both.

HF RESULTS

COMMONWEALTH CONTEST 1995

Opinion is about equally divided over whether conditions were better or worse than in 1994 or about the same: they were certainly not good! More than one entrant commented on the similarity to 1985; and G2QT noted optimistically that 1986 was better. At least the number of entries was gratifyingly up on last year; but regrettably, for the third year running, no-one entered the Receiving Section.

The winner, not for the first time, is John Sluymer, VE3EJ, who contacted a total of 487 stations from his aerial farm (which includes a 3-element beam for 40m at 150ft), fed with 1kW. Close on his heels came Barry Simpson, VK2BJ, who used a modest 100W to a choice selection of lower sky-wires. Usually among the leaders, Nigel Hoyow, 6Y5HN, used a TS-120S / SB-201 combination and various antennas at 50 - 55ft to come third, from his 2000ft high QTH, and with the advantage of being able to work strings of G stations (though not on 15 / 10m) just managed to out-distance Dave Lawley, G4BUO, to whom the Col Thomas Rose Bowl returns after a few years' lapse. The winner of the G3PJT medal, introduced last year, is Ivor Stafford, VK3XB, whose rise from 77th to 32nd place in the last four years has been done with very restricted indoor antennas, at the bottom of the sunspot cycle.

The total number of participants (over 630) was about the same as in 1994 but there were twice as many on 15m and 10m. Nearly 60 call areas were active (25 produced entries): C5, G (including GD, GI, GJ, GM, GU, GW), GB (HQ), S7, VE1, 2, 3, 4, 5, 6, 7, 9, VE3 (HQ), VK1, 2, 3, 4, 5, 6, 7, 8, 9N, VK4 (HQ), VO1, VP2E, VQ9, VR2 / VS6, VU, VY2, Z2, ZB2, /ZL, ZL1, 2, 3, 4, 9, ZS1, 4, 5, 6, 9, 3B8, 3DA, 4S, 5B, 5X, 5Z, 6Y, 7P, 8P, 9H, 9J, 9L, 9M2, 9V1 and 9Y4. About 14% of G stations who were active sent in logs, and the same percentage of VEs, but VKs excelled with 44% of participants entering. Some entrants / call areas were notably absent, but the re-appearance of ZS stations was very welcome, and we must hope that the log from ZS6ME will be the precursor of a wider entry from South Africa next year. The entry of Bill Maxson is noteworthy: he operated as G0/N4AR using the station of the late and much-lamented Al Slater, G3FXB; he could not be expected to match the performance of that master.

Some comments received with logs: "Conditions must get better" GW3HGJ; "Certainly enjoyed my first BERU contest " ZS6ME; "Good family feeling, familiar calls year after year" ZL4OK; "Where has the Commonwealth gone? - only worked seven countries" VK2AYD; "VEs and VKs did a great job" ZL1MH; "I believe that I may have been the only XYL operator to have put in a log regularly" VK3KS; "All G stations worked (15m) on backscatter!" 9H1EL; "Fewer prefixes, many missing" G3BPM; "Hard work with wire antennas in sunspot minimum" G4KDL; "Anyone who got 599 from me really was S9 - and there weren't very many" VE3VHB; "Still the best of the HF contests" ZL1HV; "Looking forward to BERU again next year!" VE3HX.

G2HLU

MULTI-BAND ENTRIES

Posn	Call	80	40	20	15	10	Total
1 +	VE3EJ	832	1405	2167	677	50	5131
2 *	VK2BJ	663	1709	1700	678	248	4998
3 *	6Y5HN	585	1089	1639	480	175	3968
4 ++	G4BUO	618	1151	1577	450	100	3896
5 *	ZL4OK	530	1259	1027	537	300	3653
6 *	ZL1MH	450	952	1075	677	285	3439
7 *	9J2BO	277	849	1184	833	262	3405
8 *	VK4EMM	380	1285	993	508	223	3389
9	G0IVZ	453	1039	1250	300	50	3092
10	G4ODV	352	885	1411	275	50	2973
11	VK2AYD	315	807	1251	438	150	2961
12	G3TBK	346	698	1402	298	98	2842
13	G3PJT	178	1012	1025	300	100	2615
14 *	VE7UZ	285	678	964	530	150	2607
15	G3OZF	320	612	1294	300	75	2601
16	G0/N4AR	175	786	1361	148	73	2543
17	VE3VHB	340	549	1289	255	-	2433
18	VK2BQQ	332	1069	737	198	-	2336
19	G2QT	203	487	1199	200	25	2114
20	VK4ICU	270	530	845	400	-	2045
21 =	GM3POI	75	173	1565	200	-	2013
21 =	VE3ST	338	655	945	75	-	2013
23	VK4XW	263	633	887	200	25	2008
24	G0ORH	72	235	1386	273	-	1966
25	G3XTT	123	641	821	273	98	1956
26	VK2EL	50	892	824	125	50	1941
27	ZL1HV	355	627	865	-	-	1847
28	VE3JKZ	285	550	728	250	-	1808
29	G3IGW	200	694	672	150	50	1766
30	G3JYP	123	346	997	148	25	1639
31 *	VK3ZC	320	618	592	123	-	1653
32	VK3XB	48	557	796	250	-	1651
33 *	VK5AGX	200	341	1078	-	-	1619
34 *	VE6BF	75	525	716	225	50	1591
35 *	9V1YC	73	377	1954	75	-	1579
36	VK4OD	245	532	692	25	-	1494
37	VK4BQL	215	453	670	125	25	1488
38	VK2DID	130	425	728	198	-	1481
39	VE6WQ	75	330	769	248	50	1472
40 *	ZS6ME	-	188	730	532	-	1450
41	GW3HGJ	100	373	850	100	25	1448
42	VE3DZZ	75	440	925	-	-	1440
43	VK4LV	100	254	684	147	123	1308
44 *	VE1EP	303	439	523	23	-	1288
45	G2AFV	75	200	955	48	-	1278
46	G3GLL	98	175	777	175	47	1262
47 *	VK6HA	-	105	598	525	25	1253
48	VE1BN	123	439	644	-	-	1206
49 *	VU2PTT	-	-	779	322	25	1126
50	G3KSH	25	222	628	123	50	1048
51	G3UFY	75	260	693	-	-	1028
52	G3VDL	73	200	538	173	25	1009
53	VK4UR	-	-	645	173	168	986
54	G5MY	23	300	526	73	48	970
55 *	VE4JB	25	345	585	-	-	955
56	VK3AGW	25	403	450	25	50	953
57	G3DEF	-	250	553	125	-	928
58	G2HLU	75	100	670	75	-	920
59	G3BPM	123	123	665	-	-	911
60	G3GC	73	143	539	98	48	901
61	G0IDE	50	225	510	73	-	858
62	VE1LS	122	293	385	-	-	800
63	G3KNU	25	125	551	75	-	776
64	G3NAN	23	123	473	123	-	742
65	G3ESF	-	193	533	-	-	726

7MHZ DX CW CONTEST 1995

It is good to see so many DX logs for this contest. All continents were represented, with the exception of South America - in fact only about six South American stations were worked in total. There was a marked difference in the logs submitted by stations using a beam or directional antenna, and those with dipole or other wire antennas. The top stations were able to work DX for the whole duration of the contest whilst with wire antennas DX stations were worked during specific periods. A Restricted section is to be introduced next year, which will mean that 'ordinary' stations will not be competing directly with the big boys. Computer logging has become the norm for UK entrants, but I would suggest that when you do use computer logging, whichever program you use, *must* be up to date. Most entrants including the leaders had difficulty with ex-USSR prefixes and in fact underscored their logs. Some DX entrants were obviously unsure of the rules and many logs had to be rescored using County Codes as multipliers instead of G prefixes. Difficulty was experienced with USA stations who were operating outside their original call area. Some stations signed '/4' or wherever they happened to be, but others did not and this caused confusion. As the various US call areas are also multipliers for UK stations this may have to be addressed for future contests.

Equipment used by leading UK stations:

G3VHB: FT1000 + Titan, Cushcraft 402CD at 85 feet;
G3TXF: TS930 + Alpha 86, Cushcraft 402CD at 75 feet;
GM3POI: FT1000 + 2 x 572B, Inverted Vee at 86 feet;
G0IVZ: Omni + Amp, Cushcraft 402CD at 70 feet;
G4ODV: FT747 + Amp, 3 sloping dipoles at 50 feet;
G3TBK: FT1000 + Amp, 3 sloping dipoles, two with directors.

UK SECTION

Pos	Call	QSOs	Mults	Points
1	G3VHB	860	84	855,624
2	G3TXF	807	90	848,610
3	GM3POI	781	90	747,450
4	G0IVZ*	624	87	575,505
5	G4ODV	621	79	544,800
6	G3TBK	649	75	523,875
7	G3XTT	606	75	475,875
8	G3HEJ	568	77	449,680
9	G4BUO	525	78	422,760
10	G3VYI	475	71	352,515
11	G3UFY	503	60	317,400
12	G3IGW	475	61	303,780
13	GM4TMS	483	60	266,385
	(Ops GM0KAE, GM4DGT)			
14	G3KNU	439	63	265,860
15	G2QT	377	59	237,770
16	G4TLS	409	59	231,600
17	G4IQM	417	54	220,590
18	G0RGH/P	359	62	211,420
	(Ops G0DVJ, G4EYE, G0STW)			
19	G4IFB	292	55	155,375
20	G3ZEM	310	58	153,120
21	G0IDE	299	52	136,500
22	G0GWA/P	321	52	136,240
23	G0ORH	239	58	130,210
24	G0LII	289	51	110,415
25	G3BPM	211	54	93,960
26	G3ZDO	213	48	92,880
27	G2RSA	229	43	81,055
28	G3MPB	241	45	74,025
29	G3GLL	175	50	74,000
30	G3YEC	220	46	73,830
31	G3LIK	205	47	73,085
32	G2AFV	200	45	64,630
33	G5MY	165	47	63,920
34	G0JQN	166	41	59,620
35	GM0AZC	178	41	47,970
36	G3GMS	167	41	41,820
37	G4KDL	148	40	39,400
38	G3RSD	159	38	38,760
39	GM3CFS	145	37	30,895
40	G3GMM	111	37	27,565
41	G3VNG	121	36	27,180
42	G4FDC	66	22	7,700
43	G3KTT	44	22	6,160
44	GW3SB	28	15	2,250
45	G3ILO	16	12	1,080
46	G3ZGC	8	6	240

* perfect log

DX LISTING

Pos	Call	Points
1	N4AR	46,125
2	VK4EMM	33,480
3	CS3T	30,975
4	VK2KM	28,800
5	EA6ZY	27,440
6	VK6VZ	21,120
7	N6ZZ	18,600
8	W4XD	17,220
9	EI4HM*	16,716
10	JA6GCE	16,120
11	HA0HV	15,867
12	VK4CJB	15,390
13	K4UK	15,210
14	VE3HX	14,820
15	UT5UGR	13,650
16	UT2II	13,505
17	HA3OV	13,260
18	HA8RC	13,165
19	VE3JKZ	13,125
20	DJ3XK	12,540
21	LY2BN	12,708
22	HA8FK	12,388
23	DL3BRA	11,894
24	4X1VF	11,845
25	SP1AEN	11,400
26	ON4AMC	11,200
27	SP3VKO	9,933
28	K3ZO	9,790
29	JH7XGN	9,660
30	SP4GDC	9,486
31	OK2TBC	9,146
32	OH6RC	9,075
33	UY2ZZ	8,855
34	OK2BWJ	8,580
35	LZ2VL	8,096
36	LA1IE	7,800
37	OK1KT	7,744
38	SP2WDW	7,595

Posn	Call	80	40	20	15	10	Total
66	G3MPB	23	221	381	100	-	725
67	G2BLA	25	75	515	73	25	713
68	VE7FJE	43	147	203	282	-	675
69	VK3KS	-	90	587	-	-	667
70	G4CZB	75	75	440	75	-	665
71	G3CSR	-	-	563	100	-	663
72	G3KAA	-	73	408	100	-	581
73	G3WRR	25	75	375	50	25	550
74	GM3CIX	-	75	434	-	-	509
75	VK3IY	268	233	-	-	-	501
76	G3VW	48	123	240	25	-	436
77	G3VNG	73	48	258	25	-	404
78	VA3TEE	-	25	343	-	-	368
79	GW3SB	25	50	263	-	-	338
80	VK3AMD	-	-	255	-	-	255
81	G4ZYF	-	50	187	-	-	237
82	G3ILO	-	25	173	-	-	198
83	G8QZ	-	25	150	-	-	175

SINGLE BAND ENTRIES

	3.5MHz	
1 *	ZL2AGY	780
	7MHz	
1 *	VK2APK	1913
2	VK2ETM	1010
3 *	G3VYI	470
	14MHz	
1 *	ZB2EO	1914
2 *	GM3WOJ	1157
3	VK4TT	1142
4	VK3MR	1078
5	VE3HX	953
6	VK6AJ	848
7	VK2VM	754
8	G3NKS	625
9	G3KSK	349
10	G3JKY	347
11	G4KDL	235
12	G3ZGC	185
	21MHz	
1 *	9H1EL	862
2 *	G3DYY	400
	28MHz	
1 *	G0AEV	98

\+ BERU Rose Bowl
++ Col Thomas Rose Bowl
* Certificate winners

Checklogs are gratefully acknowledged from: G3GMM, G3MXJ, G3RSD, G3WP, G4ZME, GB5CC (HQ, op GW3YDX), VA3RAC (HQ, op VE3NXB), VE3EK, VE3HX, VI4WIA (HQ, op VK4XA), VK2VM.

There were no entries for the Receiving Section.

Pos	Call	Points
39	SP5GKN	7,595
40	UA9OLT	7,590
41	PA0SOL	7,500
42	HA7SQ	7,440
43	UR7QM	7,285
44	LZ6F	7,140
45	PA3AMA	7,050
46	VE3ST	7,030
47	W9HE	7,020
48	AB4PW	6,660
49	DL5KUD	6,525
50	DL5BWE/P	6,440
51	VE3NXB	6,390
52	UR5UW	5,832
53	OK1DMS	5,824
54	YU7SF	5,740
55	4Z4TA	5,616
56	VK4XW	5,400
57	UA4PUW	5,670
58	EA7GB	5,340
59	PA3BEJ	5,320
60	HA3OU	5,200
61	JH3WKE	5,100
=	VE3HMD	5,100
63	JK1OPL	4,960
64	SV2BOH	4,700
65	VK3XB	4,680
66	OK1ARD	4,375
67	SP9QJ	4,255
68	SP2UKB	4,000
69	SP8FHJ	3,816
70	SP6DMJ	3,720
71	PA0ADT	3,480
72	LA3UG	3,400
73	RX3AGQ	3,344
74	EA4GPP	3,108
75	OM3TUM	2,880
=	K3WWP/QRP	2,880
77	DL6JRA	2,820
78	PA2JCG	2,600
79	PA0PLN	2,200
80	LZ1PM	2,090
81	DL8ZWG	1,980
82	SM0ARR	1,648
83	PA3CRC	1,600
84	RA0FU	375
85	SP5NHI	245
86	JL3SBE	15

* 1st European.

SWL SECTION

1	ONL-383	11,060

Checklogs received from: PA3BTH, DL7VMM, SM6NM, DL3ARX, N7RO and SP7FGA.

HF CONTESTS CALENDAR

28 Sep	2nd QRS Cumulative (Aug 95)
1 Oct	21/28 SSB (Jun 95)
1 Oct	ON Contest (SSB) (Sep 95, p24)
6 Oct	2nd QRS Cumulative (Aug 95)
7 Oct	EU Sprint SSB (Oct 95, p24)
7/8 Oct	Iberoamericano Phone (Oct 95, p24)
8 Oct	ON Contest (CW) (Sep 95, p24)
11-13 Oct	YL Anniversary Party CW (Oct 95, p24)
14 Oct	EU Sprint CW (Oct 95, p24)
14/15 Oct	VK/ZL Oceania CW (Oct 95, p23)
15 Oct	21/28 CW (Jun 95)
25-27 Oct	YL Anniversary Party SSB
28/29 Oct	CQ WW DX SSB (Oct 95, p24)
11 Nov	Club Calls Contest
18/19 Nov	2nd 1.8MHz CW Contest
25/26 Nov	CQ WW DX CW

Members' Advertisements

RSGB Members wishing to place an advertisement in this section must use the official form incorporated on the label carrier of Radio Communication. This will prove membership and must be for the current month. No acknowledgment will be sent. Ads not clearly worded, or which do not comply with these conditions will be returned. If an ad is cancelled no refund will be due. An advertisement longer than 60 words will be charged pro rata. Trade or business ads, even from members, will not be accepted. Traders who wish to use this facility must send a signed declaration that the items for sale are part of, or intended for, their own personal amateur station. The RSGB reserves the right to refuse ads, and accepts no responsibility for errors or omissions, or for the quality of goods for sale or exchange. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain. Please note that because this is a subsidised service to members, no correspondence can be entered into. Licensed members are asked to use their callsign and QTHR, provided their address in the current edition of the RSGB Amateur Callbook is correct. RS members will have to provide their name and address or telephone number. Please include your town and phone number in the free boxes provided to assist readers. Advertisements will be placed in the first available edition of *RadCom*. The closing date for copy is six weeks prior to publication date.

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

ALPHA 89 HF amplifier by ETO, vgc. Two years old; £2250 ono. Kenwood DM-800 grid dip meter; £40. Mirage MP1 2KW HF SWR bridge; £50. Peter G3ZSS. 01932 863552 (Surrey).

COLLINS S-line 75S-3 Rx 325-3 Tx 30L1 lienar 312B control 516F PSU 240/115V transformer; £850 no split. Collins KWM2A &PM2; £450 call G4SOH, QTHR 01491 838735 (Oxon), eves.

FT202R xtals; £2/pair. Advance counter, £30. Venner counter; £25. Marantz tuner/amp (110V); £50. Diablo -+15V 8A PSU; £10. Wireless intercom (baby alarm?); £18. BBC/Tech software RTTY setup; £150. Compaq XT/PC (must collect); £120. EXP-420 printer; £95. Pye bundle (inc Linear & Londex Relay); £30 FRG7700M & ATU; £325. Much more! Messages; 0161 477 5303 for items, but SAE please for detailed lists. G0OZK, QTHR (Stockport).

IC781 very good condx, original owner; £2200. Home brew 6M PA pair 4CX250S including PSU; £250. Buyers collect ono. G4BWP. 01638 552080 (Newmarket).

ICOM IC-V200T VHF FM 25W 39 channel tcvr 4M band complete with an 1/2 wave antenna bxd with man also in pristine condx, mic operating instruction included; £200. No offers. Roy, G4ZIH. 0181 473 8245 (Lewisham)

JRC 2000 HF linear; £2000. TS-950SDX £1900. TRC JST135DX £750. FL-2100Z linear £550. 2x 88el 70cm Jaybeams £30 each. G500A rotator £160 Western 40ft tower. £250 all rigs in mint condx, Pakratt PK232 £100. 01395 273311 (Exmouth)

KENWOOD TS440 with power supply PS50 & aerial tuner AT440 and Kenpro squeeze key all little used & vgc going QRT. offers. G2BFI. 01934 812640. (Weston S Mare).

PYE P5000 Hi-band FM handheld, charger, batteries; £35. Pye Olympic Hi-band FM mic, handbook, looks new; £35. Storno FM mobile Hi-band complete, man; £20. Hitachi 19in colour monitor; £90. HP85B computer, handbooks interfaces, programs; £50. Xerox photocopier, paper trays, toner gwo; £95. Motorola MT700 handportable Hi-band FM battery manual; £35. Colour Dot-Matrix printer; £35. Wide carriage Dot-Matrix printer; £30. 01651 882283 (Aberdeen).

SHACK clearance TS680S SP 430 PS 430; £750, will split. FT290 MII charger & mobile bracket cover clip on amplifier; £360. Tokyo transverter 2M to HF; £168 all above as new, bxd all with user mans & mics & leads, buyers inspect &collect. 01484 423282 (Huddersfield).

STRUMECH 60ft tower, ham 2 rotator,create 4el HF beam; £300 takes all; Yaesu FT101E, nice; £250. Drake T4XC with power, clean; £225. BC221; £20. RF27 units; £40, might swap early gear. G4ERU. No 5 Luther Road, Winton, Bournemouth. 01202 510400.

TS930S mint; £850. Brand new Hy gain TH3 MK4; £280. Kent keyer; £40 Bencher key, £40. G-600 Rc rotator as new; £230. ATU new; £130. MFJ 1.5KW ATU; £200. DRAE 24 amp PSU; £70. Also 2M rig K/wood TM241-E new Kantronics TNE; £110. TET Yag; £50. Daiwa coax switches, masts couplers filters vintage radio dummy load baluns info. Jack 01446 747223 (Cardiff).

VALVES new, several available each type. At £1.00 each; EB91, ECC40/81, ECC82/84, ECL80, EF80/85, EF89/91, EF92/93/94/95, EF183/184. Also at £3.00 each; 807 5Y3GT, 6CH6, 6F33, 6V6G/GT, 12BH7, A2900, E88CC, E180F, E182CC, ECC83, ECC88, ECL82, ECL86, EF86, EZ40/41, EZ80/81. SAE with enquiries for others, add £2.00 postage. Cheques to: K Bailey 40 Seymour Close, Selly Park, Birmingham B29 7JD. Callers welcome - please phone first. 0121 472 3688.

YAESU 1.6-30MHz transceivers FT-101EX; £165. FT-101E; £165. FV-101 VFO; £35. Microwave modules transverters MMT 144/28; £50. MMT432/28; £10 (faulty). Mutek SLNA 145 preamp (new); £10. Tonna 2M 16el Yagi; £30. 70cm 21el; £20, or exchange 23cm Yagis. Tokyo Hy-power HL160V 2M linear plus preamp 3/10W in 180W out little used; £175. All above £500. Buyer collect. G4ERX, QTHR. 0161 9764692 after 6pm.

YAESU FT101ZD FM (III), CW filter, DC converter; £475. FV901DM scanning VFO; £160. FTV901R transverter 70cm/2m/4m/6m; £400. SP901P spkr (patch); £45. YO901P multiscore (PAN) £200. FC902 antenna tuner; £90. YR901/YK901/YVM1-RTTY/CW reader, screen, monitor; £200. YD148 desk mic; £15. FRG7 communications receiver; £100. FT227R 2M FM mobile; £100. 2x2m 5.8 magmounts; £10 ea. Bremi 13.8V/3amp power supply; £10. Codar ATS; £40. Codar PR30; £20. RS2828 0181 850 4848 or 0831 757645 (London, SE9).

YAESU FT747GX FM board, CW filter + mic, Revex P300 30 PSU both excellent condx; £550. G0EOX. 01457 873892 (Oldham).

YAESU FT757GX used 6 months only with transverter, bxd ever since, as new condx; £575. Yaesu FTV700 6M transverter v good condx; £275. Yaesu FC902 ATU as new; £150. Valves, two 6JS6C & one 12BY7A new unused and bxd; £25. 01294 213831 (Irvine).

YAESU WARC equipment. FL2100Z linear 1200W 1st class condx; £475. FT101ZD FM/CW/SSB Tx/Rx with extended coverage good condx; £375. FC902 ATU; £100. SP901P spkr/phone patch unit £25. Howes 80M D/C Rx factory built with cabinet; £12. Hi-mound HK703 Morse key, as new; £15. John, anytime. 01525 872207 (Toddington, Beds).

1 **METRE** satellite dish on polar mount; £25. Yaesu FT767 2M 6M 70cm + HF; £1250. Yaesu FRDX400 Rx + Sommerkamp FLDX500 Tx 80 to 10M; £300. Yaesu FT200; £120. Tonna 9XY 2M crossed; £55, bxd (new). IBM XT + 20Mb HD + 3.5in + 5.25in + CGA monitor; £150. 386 SX 33 + VGA + CD Rom + sound blaster + 3.5in + 5.5in + 120Mb HD; £475. ATU; £120. Alvin 01372 277945 (Ashtead, Surrey).

ESCAPE the UK winter! Javea, Spain. Unsurpassed views, tranquil spacious guest's apartment in villa with pool. Nov-Jan inc; £750. 01754 610331 (Skegness).

1913 Horophone, very rare, offers invited. Wearite stereo reel to reel tape deck, as used in Ferrograph, unused; £80. Legend memory board for PC takes up to 8Mb of 30 pin simms; £70. Acuccard internal UPS for PC or compatible, new; £25. 7/8 whip & mobile mount for 144MHz, unused; £20. Telequipment D33 dual beam scope, gwo; £35. Philips green composite video monitors with sound, gwo; £25 ea. Sinclair Spectrum +2 & Commodore C64 C/W PSUs, cassette, joystick etc. Both for £30. Large quantity of new transistors & valves, SAE or call, includes RF types eg BLY90, BLY89A, BLY53AP, QQV03-20 all cheap. Simon, G8POO, QTHR. 01434 633913 (Hexham).

20 Years RadComs 1970 - 1989; £20. Very heavy. Several Ham Radio Today free to purchaser. Alan G3YNN, 01424 893078 (Battle, E Sussex).

30FT Alumast, Three triangular 10Ft sections, tilt over base. Easily transported on roof rack. G4KGK not QTHR. 01344 53108 (Bracknell).

386 PC 40MB hard disk, 1.4FDD, colour VGA monitor, 1 meg of memory (expandable) with radio software, EG S6TV RTTY; £240. Apple II, MON, FDD; £30. 01562 730983 (Stourbridge).

AEA PK12 100K memory only used for one month; £100 ono or exchange for 2m FM. G1YCM, QTHR. 0161 370 4442 (Manchester).

AKD 6001 tcvr, 6M 25W, new CNDX, circuit, mic, PWR lead & original box; £95. Colin. G4MQK, QTHR. 01603 456329 (Norwich).

ALINCO DJIF-E 2M handheld CTCSS tone pad keying wide range spare battery case ERC, bxd; £150. Peter G0BAG. 01705 412187 (Rowlands Castle).

AMATEUR builder ages! Valves components testers radios must go. Lowe HF-225 as new; £250 ono. Lists on request or viewing. 01572 767235 (Oakham, Rutland).

AMSTRAD PC5086 IBM PC. 640K RAM, twin 3.5 drives, colour monitor; £200 ono. Keypad for HF225 Rx; £20. G4EDR, QTHR. 01723 515675 (Filey).

AOR2002 Desktop scanning receiver 25-550 800-1300MHz, very good condx; £225. 01736 757721, price includes carriage by courier. (Hayle).

BRAND new leather case PFX/PF85; £10 Icom IC701 HF tcvr + PSU; £285. Tait VHF lo band base offers. Pye F401 4M base xtals 70.260; £40. IC245E 2M mobile FM/SSB; £180. Icom RM3 remote controller; £25. 01354 741168 (March, Cambs).

COLLINS collectors - mint 51J4 Rx 0.5MHz to 30.5MHz in 30 bands. 3 mechanical filters, in cabinet buyers collect; £400. G3VXZ. 01628 27350 (Maidenhead).

COMPLETE HF station comprising FT101ZD (6-band, no FM), with FAN, DC-DC converter, CW narrow filter. YO901 monitor scope, FV901 scanning VFO, FC901 ATU, SP901 spkr, YP150 Wattmeter, YD148 desk mic, FF501 low-pass filter, YH55 h/phones, Yaesu hand mic, ERA MKII microreader. Slight audio fault on FV901, otherwise immaculate, with original leads, mans, bxs; £750 ono. No split. Prefer buyer inspects/collects. G4JSN, QTHR. 01432 266858 (Hereford).

DETACHED 2-bed bungalow, GCH, garage, very good order, village location, near Holywell, North Wales. Easy access to coastal resorts, mountains, Chester and Manchester. 750ft ASL, excellent take of across NE Wales, N England, N Midlands. Antennas for 70cm, 2m 6m and HF, negotiable. Ample garden space. Photos available. Reasonable offers considered. Derek GW0UDJ. 01352 781311 (Holywell).

DRAKE R8e immaculate condx, 150Kh-30MHz AM/CW/SSB/FM 500Hz narrow-CW & synchromes AM detector, bxd with mans shareware and Datong AT370 outdoor active antenna; £850 ono. CIA spy radio Tx/Rx/PSU fully operational three compact bricks 1950s vintage and valves throughout offers? Yaesu FT790R 70cm portable multi mode with new case batteries and antenna; £275. ono. Trio TS120S 100W HF mobile; £300. 0956 544202 (NW London).

DRAKE TR7 & remote VFO PS7 PSU Drake desk mic all filters + AUX 7 TR7. Extended receive; £650 ono. Recent professional checkout. G4ZCG 01772 735589 (Preston).

DRAKE TR7 NB 300Hz 1.8Hz filters manual PS7 astatic mic; £750. RV75; £80. Workshop manual; £15, bxd. Bill, QTHR. 01823 680778 (Hemyock, Devon).

EDDYSTONE receiver 1990 lockbox 25-500MHz mans; £300. Marconi Sig Gen TF144H/4 10KHz 72MHz; £25. Marconi Sig Gen TF2002B 10Khz 88MHz; £75. Racal 217D receiver 1-30MHz; £250. Hy-gain 3-ele beam 10/15/20 metres; £85. Novex colour monitor pal RGB; £45 all items carriage extra, except the antenna which should be collected G4EBL, QTHR. 0121 7774901 (Birmingham).

FOR sale FT530 new quick charger NC-42 FT-23 + charger Drak TR-7 best offer for the TR-7 call G0UUT. 0181 386 4503 (Borehamwood).

FRGY £150 Heathkit scope 10-18U. Solarton CD 1016; £30 ea. Advance audio/gen type J; £15. V/voltmeter tech; £15. 4-speed t/tables £5 ea. Dennis G0IPT. 0181 883 3474 (London).

FT 101 serviced with new valves & aligned. Complete. Shire mic, manual,; £250 ovno. G0VWB, QTHR - G7SQA. 01303 278537 (Kent).

FT101B 1.8-30MHz 260W PEP, G3LLL processor, mic, AC/DC leads; £190. Oscilloscope faulty; £25. RadCom 1960-90, SWM 1960-9, others. Offers. G3ETY,QTHR. 01706 522091 (Rochdale).

FT101E; £250. FV101B VFO; £70. FTV250 144MHz inverter; £105. All with mans & bxd. G3PNF, NOT QTHR. 01278 684 652 (Bridgwater).

FT290 MK I; £225. NB30R 2M linear; £35. 15A power supply; £25. MFJ1278B multi mode terminal unit; £250. Kenwood KW201 Rx; £80. Realistic DX390 Rx; £80. All vgc. G0LUB. 01664 69067 (Melton Mowbray).

FT736R multimode with 2M, 70cm. Fitted with 6M module & narrow CW filter. Excellent condx; £1100 ono. G8KVP maybe not QTHR. 01984 640217 (Minehead).

FT747GX ideal mobile or portable rig; £450. G3ZLS 9-5pm. 01392 413 479 (Exeter).

FT840 100W HF general coverage transmit & receive. Narrow CW filter. Up/down mic, bxd as new. £575. 01202 525740 (Bournemouth).

FT902DM new transformer no digital readout; £350. FT780 as new; £310 ono. Tono 2m linear all mode 100W; £100 ono. New unwrapped SMC vertical 18 and 24; £150 ono. Realistic hyperscan 25-520MHz 760-1300MHz as new; £200 ono. Hansen FS-7 SWR & power meter 2m & 70cm; £40 ono. AKD absorption wavemeter VHF/UHF; £18. Vic 20 complete as new with AMT-1; £80 ono. All bxd with mans, collect or postage. John, G4KJV, QTHR. 01249 720456 (Chippenham).

HALLI CRAFTERS skyrider 23 communications receiver, 39 model, very clean. Needs good home, modest offers invited. Andrew Emmerson, G8PTH, QTHR. 01604 844130 (Northampton).

IBM PS2E-50 system unit & keyboard with track point mouse. 486SLC50 120Mb HDD 4mb RAM 3.5in FDD 4x type 2 PCMIA slots £450 ono. Graham (G4FUJ). 01242 518776 (Cheltenham).

ICOM 70cm all-mode tcvr IC-490 A/E 10W output immaculate condx; in original box with man; £300. Lyndon, GW0LTH, QTHR. 01495 221655 (Blackwood).

ICOM 70cm handheld tcvr. 433-950MHz. Model P4ET with clock palm size. Manual, battery, charger, PWR 5W. As new, bxd; list; £345. Bargain; £205. Ted G0RBA, QTHR. 01606 592207 (Winsford Cheshire).

ICOM 720A Tx/Rx SSB AM FM with gen coverage, Rx in excellent condx with matching 20A power supply fist & desk mics; £450.

0181 868 6815 (Pinner).

ICOM 735 bxd; £650 ono. Yaesu 480R tcvr £250. 100W linear £100. 2M HF Salor Marine rcvr; £50. Electronic compass; £80. Marine hand held crystalled; £30. FT736R modules, 6M 10M 70cm offers or will sell the FT736R all working. 01892 770638 (Hartfield).

ICOM 751A, never been used; £725. Ring Dr Adair. 01624 622342 (Newtown).

ICOM AH3 auto-ATU similar smartuner dedicated Icom rigs only, unused condx; £275. Harry, G4ZJB, reg QTH 0114 2746464 (Sheffield).

ICOM IC-R1 scanner 1-1300MHz with mains charger, spare battery holder, instructions, mobile mount & cable, bxd; £220. G4KCN, QTHR. 01582 426158 (Harpenden, Herts).

ICOM IC505 6M multi-mode; £250. IC720A 100W HF; £350. Icom SM5 base microphone; £10. Canon LBP8-A1 laser printer; £100. Shinwa CP80 dot matrix printer; £20. SEM tranematch; £30. NEC pinwriter P2+ 24 pin inc. Sheet feeder; £75 POCOM AFR-100 multi mode digital decoder inc. Monitor; £30. IOM FM DNT; £25. PACCOM TNC-220 inc HF modem; £50. G4MEM, QTHR. 01242 242336.

ICOM IC725 all band HF tcvr general coverage received. Immaculate condx, little used. Extras fitted include narrow CW filter, FM/AM unit with mic, man original packaging; £550. Mutek TVVF 144a high performance 2M transverter 10W output fully serviced by Mutek. Advance OS240 dual-beam oscilloscope; £80. Wireless World March 69 to September 82 - offers? Tim G4YBU. 0181 393 9691 (Epsom).

ICOM ICR72 FM AM U/L SSB 240V 12V; £595. BBC Electron computer plus one accessory, gives cartridge slots printer joystick, ports, tape recorder, word processor, games,chess etc. 100 BBC programms; £55. Acorn JP101 printer; £55. One owner as new, bxd. Dennis, QTHR. 01263 513169 (Nr Cromer).

ICOM R7000 receiver vgc; £600. Kenwood HF TS940S vgc; £995. G0MUH. 01282 38306 (Burnley, Lancs).

ICOM R72E rcvr, fitted FM board, unmarked condx. Todays price over £800, will accept £475 for quick sale. G4FAB, QTHR. 01942 820854 (Wigan).

JRC JST125 top quality HF tcvr, with general coverage; £575. Ten Tec Argosy II with PSU; £295. Heathkit HW8 rebuilt needs alignment; £40. Eddystone EB35 MK II rcvr, with VHF; £75. ETM8C memory keyer; £75. Adonis AM503 mic; £45. Howes 20M kits; £40. Stolle rotator; £30. Standard 2M FM tcvr; £95. Catronics CT100 RTTY. Terminal unit; £15. Prefer buyer collect. G0MHQ, QTHR. 01733 230088 (Peterborough).

KAMV3 multi mode HF/VHF plus Lan-link software mans; £175. Panasonic KXP2180 Dot Matrix colour printer; £45. Casio LDC colour television 2in; £35 all pristine. 01773 810010 (Selston, Notts).

KENWOOD 440S auto ATU, narrow band filters YN88SN/CN for SSB/CW, I.C 10, mans, bxd vgc; £790. Yaesu 209R VHF Tx/Rx with PSUs for mains + car use; £150. 01449 612355 (Stowmarket).

KENWOOD 680S HF in box; £600. Kenwood AT230 tuner; £120. Kenwood PS430 power supply; £120. Kenwood LF30A filter; £10. Icom IC251 2M; £400. All above silent key sale. 01983 525968 (Isle of Wight).

KENWOOD TH741E dual band with tri-band option. Wide band receive and Celluar modifications, bxd & in excellent condx; £450 ono. 0956 202918 (Epping).

KENWOOD TH7441E 70cm mobile Cushcraft 1/4 wave magmount. All little used, one year old; £275 ono. Peter G4TFH. 01438 880565 (Stevenage).

KENWOOD TH78E hand held; £370. 2M 5 element beam; £20. G3PYP, QTHR. 01225 708816 (Melksham).

KENWOOD TR-751E 2M multi mode. Boxed with mobile bracket, mic, mans, vgc; £430. Howes HC266 2 to 6 tvtr; £50. Buyer collect. Tony G6VDA. 0121 624 7449 (Birmingham).

KENWOOD TR751E 2M multi-mode as new complete bxd only used as base-station owner going for multiband rig; £450. G0UPU, QTHR. 01242 603431 (Cheltenham).

KENWOOD TR751E 2m; £485. TR851E 70cm; £495. Icom IC745 HF; £825. Elevator G500A unused; £240. Original cartons handbooks. Diamond DP-CP5 five band antenna; £100. Rotator G400; £120. Malcolm 01895 676919 (Ruislip).

KENWOOD TS-530SP with narrow CW filter, this radio is in 100% pristine condx, you would think it is brand new, bxd with instructions, suitable for collectors. Telephone for more details; £500 ovno. 01434 647842 (Huddersfield).

KENWOOD TS140S HF tcvr, mic, man, bxd; £540. G3ZJF. 01727 811851 (St Albans).

KENWOOD TS950 excellent condx; £1995. Kenwood TM231E 2M FM good condx; £145. AOR 8000 scanner excellent condx; £325. Ask for Peter. 01392 811430 (Exeter).

KENWOOD TS950SD 18K filter SP 950; £2,000. MC85; £75. TL922; £750. Tokyo HC 2000 ATU; £250. TR751E 2M M/M; £450. PS430; £100. SP430; £25. Diamond SX 400; £50. Tokyo HC 160V 2M amp 150W; £150. G1LBE, Dave. 01922 414796 and 0850 099244 (W Midlands).

KW107 £80. Datong FL-2; £50. DL-100 dummy load; £35. Hi-d balun (1:1); £12. Eddystone EC10 (faulty BFO switch); £50. TE-18 GDO; £30. Heathkit AF OSC AG-9U; £15. HW101 (no PSU) offers. Prefer buyer collects. 01242 230225 (Cheltenham).

KW200A £130. KW1000 linear; £190. G5RI, QTHR. 01434 603100 (Hexham).

LINEAR SB201 by Heathkit 80M to 10M WARC covered on bands, 1200W input vgc; £275. Datong speech processor; £45. GAP challenger DX-N vertical antenna, review RadCom December 1991 80M to 10M complete with Earth post, radials & guys £95. Butternut HF5B Butterfly beam, 10M to 20M including WARC; £95. Both antennae still in use. G3KWK. 01527 541502 (Redditch).

LOUDENBOOMER linear amplifier 400W o/p little used, excellent condx; £185 cash. No time wasters, owner emigrating. Contact Dudley, G0JIU. 01526 352123 (Lincolnshire).

LOWE HF150; £250. Yaesu FRG9600; £250. Sony IC7600; £100. All in good condx. G4NFL, QTHR. 01782 680763 (Stoke-on-Trent).

MAGAZINE and components sale, Everyday in Electronics, Practical Wireless, back-dated magazines for sale, also several radio components. 0181 451 1611 (London).

MAGNETIC loop aerial by Capco complete ready to use new QTH forces sale not QTHR; £150 ono. 0181 575 7984 (Greenford).

MICROWAVE modules 28/144MHz transverter mint condx; £125 ono. Apple 2 8bit computer twin floppy comms software; £75. Yaesu FT790 MKI; £250 ono with charger, new case FT101Z mint condx; £300 ono. PC-XT/AT case with PSUs; £20. 0956 544202 (NW London).

MOVING house 'Hunter' 600W HF linear amp, 80-10M include WARC. New Feb 95, little used, box, man; £750. MFJ-989C 3KW ATU, top quality Versatuner V. Built-in dummy load, fully metered. New June 95, box, man; £295. FT990DC, optional filters. New June 95 box, etc; £1395. Yaesu SP6 extn spkr, mint, bxd; £95. Daiwa RS-40XII 32/40A PSU, bxd as new; £120. Tennamast w/mtd tele-tilt mast. Twin winches, auto latches, height with stub-mast 40ft; £225. Buyer helps dismantle/collects. FT5200 2m/70cm FM dual-bander, 50/35W, remote head. New June 95, box, man; £475. Diamond X300 2m/70cms co-linear, 6.5/9 dbd gain, vgc, original packing; £80. Kent s/paddle brass key, as new, bxd; £40. Kenwood SP50B extnspkrs (2), as new, bxd, each; £15. Radio Works G5RV plus. 40 ohm matching section, current balun. 1KW plus. Superb performer; £40. 35ft mast, formed from 2 x 20ft h/duty alloy scaffolding tubes. Includes brackets, ground socket, guys. Buy as seen, help dismantle and take away, bargain; £50. Yaesu YH77 lightweight 'phones, as new, bxd; £14. G0EOL, QTHR. 01606 554857 (Winsford, Cheshire).

OSCILLOSCOPE 20MHz dual trace model OS-620 absolutely brand new. Project not pursued. £150. G4ZBO. 01539 721632 (Kendal).

PACKET radio modem for Spectrum include Spectrum +2 and software also games, joystick, full Tx/Rx, mint condx; £85. 01273 503958 (Brighton).

PYE type F27AM fixed station VHF Am. Service man included, any reasonable offer accepted. G4OZD. 0116 2680888 (Leicester).

QST 1932-1979 £1.50 ea £800 the lot. WW 1964-82 £1.50 ea £300 the lot RadCom 1964-65, 1967, 1972-73, 1975, 1977-78, 1983, 1987-89 SWM 1976-82 all £15 pa many odd RadCom, QST, SWM, WW etc 1930s-80s Amstrad computing mags (CPC) SAE for lists. Hi-Fi News June 63-Sept 73 offers? Monthly proceedings Institute Radio Engineers (USA) Oct 31 - Dec 63 plus some yearbooks, special reports. Three issues missing sensible offers please! All above plus carriage. G4IQM. (Crawley).

RADCOMS 1980 to 1994 very good condx. Offers for complete set. G4IZB, QTHR. (Sandhurst Berks). 0344 774731 (Sandhurst, Berks).

RE-ADVERTISED due to time wasters, TS530S narrow CW filter MC50 desk mic, FC902 ATU both like new condx; £475 or will split. 01179 642867 (Bristol).

SHACK clearance Racal RA17L; £110. Racal RA177Z; £690. Transtel teleprinter AH11Y ASCII Baudot; £15 al above in gwo & condx. 01684 295189 (Tewkesbury).

SILENT key (G3PAL) equipment in v good/excellent condx. Kenwood TS140S, bxd, plus mobile mounting bracket; £550. Yaesu FT200 tcvr, bxd; £100. Manson EP925 13.8V 3A PSU; £80. MFJ 949C gen cov. receiver; £75. Yaesu YD148 desk mic; £15. 01823 277363 (Taunton).

SILENT key G4VNJ remaining items all £5 plus postage. Bremi pwr supply 13.8V 3A. Realistic external spkr Azden external spkr auto antenna rotator. AC/DC converter 6-9-12V 1A Philmore transmission analyzer FSM55 2 Japanese morse keys. Keys free for postage and packing. G0GPO, QTHR. 01227 711261 (Canterbury).

SILENT key sale. TS930S, CW-filters, MC60, mic; £800. TS820, SP280, VFO520; £250. FT200 PSU/LS/mic; £200. Yaesu FL2100B; £375. SSM 28-144MHz transverter; £30. KW EZEE match; £25. Datong FL1 filter; £25. Datong UC1 HF-bands up-converter; £40. Datong speech clipper; £25. SASE for lists including books to G3DSC or G3OOU QTHR. 0181 699 5732 (London) or 01737 552170 (Coulsdon).

SPECTRUM analyser adaptor, 250MHz Thurlby-Thandar TSA-250 £290. Lake 160M QRP-tcvr £90. SEM. QRM eliminator £75. All mint, no telephone. Write to Noel EI4DZ, QTHR.

STORNO 4000 handheld tcvrs SU20 SU22 CW charger & spare battery; £40 each or £70 the pair. Antenna rotator with 30m of cable; £85. Beckman 3020 digital multimeter; £65. NEC CP6 dot matrix printer; £45. Les. G4DBX. QTHR. 01270 522369 (Crewe).

TEN-TEC Century 6-band HF tcvr & man, vgc super CW only rig 20W; £230. G4NNJ. 01594 844048 (Lydney).

TENAMAST tiltover tower 40ft expanded 24ft retracted tilts to 5ft good condx; £350. Buyer collects, GM0PEX, QTHR. 01360 310725 (Glasgow Area).

TH45E 70cm 2m h/held case DC & dry/batt adapters, charger; £150. IC2GE 2m FM h/held (7W with DC adapter) charger, SP/mic, DC adapter; £150. All ex/condx. Buyer inspects & collects or pays carr. QTHR 01827 57742 (Tamworth).

TH78E 2M/70cm hand held Tx/Rx spkr, mic CTCSS, NiCads, charger, box & man; £300. Terry, G4OXD. 01462 435248 (Hitchin).

TOWER Altron H557 57ft 4 section telescopic tiltover, 22ft retracted, basepost mounting, 6 years old £600. Optional GP00SDX rotator; £250. BLX93B 10W 1GHz several on PCBs at £2. FT221R; £290. G3TTC, QTHR. 01926 490897 (Warwick).

TRIO R1000 HF Rx AMNAR, USB, LSB & CW; £225. G-comm series II, 13.8V, 12 amp PSU; £45. 01509 843793 (Loughborough).

TRIO TS520 HF tcvr. 10-80M (no WARC), good condx, box/man; £260. G0UON. 01303 268710 (Hythe, Kent).

TRIO TS830S HF tcvr + MC35S mic + AT230 ATU; £525. Tet 2 ele mini-beam 10/15/20M; £35. Daiwa DK210 keyer/hi-mound MK703 twin paddle key; £40. Daiwa AF606K Rx filter; £25. ICL dumb terminal; £25. All items in good working order. G4WOT, Graham. 01306 740195 (Dorking).

TS120V tcvr, 80-10M. 10W O/P good condx. HBK. £375 ono. Paul King G2RSA, QTHR 01952 261923 (Telford).

TS430S PS430 AT230 SP430; £650. 01594 832494 (Coleford), please phone after 6pm.

TS830S mint, bxd, both mans, MC355 mic; £500. Loudenboomer 400W HF linear, mint, new valves, all instructions; £375. John G4ILA. 0161 477 6702 (Stockport).

VERSATOWER 80ft with accessories; £800 ono. Brian 01489 892455 (Fareham).

VERSATOWER P40 (16M20 heavy duty series), half of post available, 4 years old, immaculate + head unit & heavy duty Emoto rotator + 2 winches; £600. 01955 602328.

VERSATOWER P40 dismantled complete with winch head unit and ground post - bottom section slightly damaged hence only; £50. G4MPQ. QTHR. 01503 240432 (Liskeard).

WATKINS-JOHNSON HF1000 rcvr the ultimate professional HF Rx with DSP controlled filtering & numerous other leading edge features. No other Rx like it. Mint condx, bxd, man. Offers. 01252 844248 (Reading).

WORKSHOP clear out. Bird thruline model 43; £150. Kenwood TM-231E; £175. 2m portable; £75. Rotator G-400RC; £200. Elevator KR-500; £175. Jaybeam antennas LR1/2m; £25. Tri bander YR3; £50. 2xSynth rcvrs 118-136AM; £200ea. Power supply EP-925; £75. Plus many other components. Buyer collects. Richard, 01256 56728 (Basingstoke).

YAESU 70cm FTH-7005 handheld. Scans 220-550MHz Rx. Features like FT-73R tcvr; £125. Also new extra NiCad pack FBN-11H; £50. 01329 663918 (Fareham).

YAESU 736R; £1049. 23cm 28El. G3JVL loop Yagi; £39. DJ580E, spare bat pak; £279. HL13OU 70cm amp 120W; £325. 01705 786773 (Portsmouth).

YAESU FL2100B linear, 1.2KW, recent overhall, valves, vgc, bxd; £350. Heathkit HW100 100wRF 3.5-30MHz, PSU needs alignment; £100. swap KW2000A-B.

YAESU FRG7700 with memory vgc, man (scruffy); £225. FR A7700 active antenna; £40. Trio JR310 amateur bands rcvr man; £65. 01934 843507 (Winscombe).

YAESU FT-101ZD tcvr, FV-101DM digital memory VFO, FC-902 antenna tuner; SP-901 spkr; FRG-7 communications receiver. All excellent condx. What offers? 01628 25010 (Maidenhead).

YAESU FT-470 dualband handheld with NiCad, charger, DC car adapter, handheld mic, case, mans; £280. G0OGW. 01604 708112 (Northampton).

YAESU FT-7B, Kenwood AT230, ATU, BNOS 12amp PSU Kent brass key; £580 or exchange for 2M hand held with cash adjustment. 01495 757221 (Pontypool).

YAESU FT-840 mint condx,with Fm board; £550. Kamplus with Pactor, RTTY, plus latest Kagold software; £250. Malcolm, G4TJK. 01256 766558.

YAESU FT-990 AC mint condx; £1,400. Kenwood TM-251E as new; £2400. Bencher key (chrome); £70. Yaesu FT-840 as new, £550. Kamplus & latest Kagold software; £225. Tiny-2 TNC; £70. Daiwa cross-needle SWR/power meter 50MHz-144MHz; £40. Brand new Cobbwebb aerial 20M-10M all bands; £115. Call Malcolm, G4TJK. 01256 766558 (Hook, Hants).

YAESU FT101EE superb unmodified condx. 160-10m. Spare PA valves. Still with original man, receipts & packaging. AC/DC leads (DC unused) ideal first HF rig. £300 ono. 2m multimode Trio TR9000 good cond 10W. Scanning etc mobile mounting brkt, man; £275 ono. G0VPX, QTHR. 01903 774613 (Sussex).

YAESU FT101ZD WARC new spare valves. £375 ono. 240V variac; £10. 01278 423698 (Somerset).

YAESU FT102 Rx/Tx hand held mic, gwo, man, bxd, must go shack space limited; £295. G0JVX, QTHR. 01773 602066 (Alfreton).

YAESU FT76R, CTCSS fitted, soft case, dry cell box; £180. Yaesu FT290R, mobile bracket soft case, strap; £200. Microwave modules 30W linear and pre-amp VHF; £50. Baycom modem plust Tait 2CH. Radio built into one box with status led's control knobs; £120. Please ring after 7pm; 01952 596147 (Telford).

YAESU FT203R bxd, leather case; £80. SEM tranzmatch with Ezitone; £65. Kenwood MC50 mic; £20 wanted Kewood MC60A/80/85 mic, GM7POK. 01576 470388 (Lockerbie).

YAESU FT290 MKII 2M multi mode complete with Yaesu accessories, hand mic rubber duck NiCad pack charger 25W linear P/U for low power; £350. G0ELH. QTHR 01256 473508 (Basingstoke).

YAESU FT690 MK2 - very good condx, bxd; £200. G0CGZ. 01472 827829 (South Humberside).

YAESU FT73R 70cm handie, DC converter, NiCad case; £175. Dymar Lynx converted 2M mobile, toneburst fitted; £75. Kenwood 9130 2M multi mode; £300 wanted 4m FM and Yaesu FT690R phone after 7pm. 01952 596147 (Telford).

YAESU FT757GX FC757AT FP757HD super quality must sell; £600, with mic. Mr Lalley. 01255 870034 (Essex).

YAESU FT757II; £500. Icom IC251 with Mutek F/end both vgc with mic & mans; £400. Mathew, G0GXV. 0374 786 216 (London).

MEMBERS' ADVERTISEMENTS

YAESU FT77 HF tcvr Fm fitted. FP700 p/supply FC700 tuner FV707DM memory unit FTV707 transverter 2M fitted G.whip, Hirshman rotator indoor use only, all above in immac condx; £650. 0117 975 6988 (Bristol).

YAESU FT77S mobile/base HF tcvr, 10/20W, WARC Fm board, mic, handbook; £320. yaesu FT7B mobile/base HF tcvr 100W, mic, handbook; £270. Spectrum computers 128K/_3 discs; £35. 128K/+2 + spare; £25. Ideal for packet. Carriage extra or collect. Eric G3YUQ. 01234 768120 (Bedford).

YAESU FT780 70cm multi mode 1-10W; £255. FT690R 6M multi mode; £255 both vgc, bxd, mans Trio 9000 2M multi mode works well mans with mobile bracket; £230. Datong ASP speech proc; £50 Datong RF clipper; £20. Collect. G1WPR. QTHR. 01536 761490 (Kettering).

YUPITERU MVT-6000 base/moble scanner, 25-550MHz AM/FM and 800-1300 MHz FM. 100 memories, telescopic whip antenna, mint condx, bxd, man & A/C power unit. Complete £150. postage paid. G4GTR, QTHR. 01629 640475 (Bakewell).

WANTED

ANTIQUE wireless equipment, crystal sets, horn speakers, early valves, pre-war television, spy sets, early military gear; cash and collect: G4ERU, 5, Luther Road, Winton, Bournemouth, BH9 1LH. Tel/Fax; 01202 510400 (Bournemouth).

AP1086 issue 1 (RAF radio stores Ref nos) also AP1186 A-B-C-D-E all sections & APs relating to radio, radar equipment. Would purchase post-war to current magnetrons, klystrons, T/R cells, ignitrons, thyratrons, microwave planar tubes, TWTs & special CV types. Required R1355 10D/13032 IFF-Rx R3002, R3067 R3121 control-unit type 17 or 18 all unmodified excellent price offered. Tel or fax anytime 0171 511 4786 (London).

MANUALS circuits for telequipment oscilloscope S22 and UNAOHM colour bar generator EP874. Mains, transformer for telequipment oscilloscope D66. G3RXG QTHR. 01934 843562 (Somerset).

ANY help please with info on Yaesu 2E / SMC 1015L1 tcvr. Will copy & return or whatever. G3PDL, QTHR or 01472 398080 (Lincoln).

CRANK UP tower 18 to 20M full height. Can be collected in SW England or delivery arranged. 01363 84714 (Devon).

CW filter YG3395C for TS520 & CW filter YK88C for TS 120V. G4AKR, QTHR. 01723 581869 (Scarborough).

DRAKE R4C Rx with Sherwood CW filters with or without T4XC Tx, also Collins 75A-4 Rx. G3TKR, QTHR. 01535 645574 (Keighley).

EDDYSTONE any model any condx. Clarke & Smith. Camper & Nicholson-Gosport, dead or alive. Collection possible. Fax; 01372 454381 or 0374 128170 (Surrey).

ELECTRONIQUES coils transformers & front end modules or receivers using them eg G3PDM, G3RKK, G3HTA RG1RA1, Tony, 01905 641759 (Worcester).

FT107 late model with WARC bands preferably CW filter. Have numerous items of radio equipment for Px or buy. G4FEQ. 01977 552862 (Castleford).

FT290R LCD frequency read-out. G0MJI. 0151 256 9185 (Liverpool).

FT690RII in good condx. Terry G4OXD. 01462 435248 (Hitchin).

GEC BRT400 rcvr. Yaesu FNB70 battery pack for FT70G. Please call Rupert, 01494 783557 (Chesham, Bucks).

HANDBOOK for Collins 30L-1 linear. Will refund all costs incurred. David, 01473 737459 G4RSD. (Ipswich).

HF vertical antenna 10-80M preferred & simple HF antenna tuner for dipole etc. Approx 200W rating. G4JHD, phone eves/weekends. 01703 444266.

HP 8569B spectrum analyzer, HP8970 noise figure meter with 6dB ENR noise source or similar equipment, HP signal generator (IEEE) 1 to 12 GHz - pickup in London or Portsmouth area preferred, cash - or UK cheque in advance. Karl Barth. G0KSW (F5VAE@F6KRK-1), 4 Porte du Bois Robert, F-78000 Versailles, France.

IC1275E Icom 23cm tcvr also Bird UHF/SHF elements. Roy G8PDP. 01252 27933 (Aldershot).

ICOM ICR7000 must be mint condx, unmodified cash waiting. Please phone or write with details QTHR, could collect reasonable distance. 01233 732277 (Nr Ashford, Kent).

INFORMATION on Picolo quenched coherent detector, for QRP development. Also manual for Marconi TF2333 transmission measuring set. All expenses reimbursed. 01293 885701 (Crawley).

KOKUSAI mechanical filter 2.1KC as used in KW2000 or EQUIV. Bob G3JJU. 01256 615831 (Fleet).

KW107 or E-ZEE ATU, lightweight pump up portable mast. Gould OS250B manual would also consider KW monitorscope or Yaesu Y0100. 01604 24486 (Northampton).

NAVICO AMR1000S 2M mobile in good condx, preferable no mods. Alan, G8LTN, QTHR. 01635 869845 (Thatcham).

PLESSEY PR155 MF/HF communications receiver. Can anyone supply module 3, first local oscillator board for this receiver please? Derek, G3KXB. 01227 792340 (Whitstable).

QST back copies from 1947, 1951, 1955, 1976-77, 1979-80, 1982-91. Also Ham Radio, CQ, WHY? Can collect. Dave. 01777 248080 (Retford, Notts).

QUAD leak, Radford etc valve HiFi also Eddystone receivers working or not. Will pay & cash & collect. 01245 381 961 (Chelmsford).

ROTATORS wanted all types of rotators, working or not, in any condx, phone evenings. 01903 816684 (Steyning).

SCRAP Sony/Tek 314 storage scope for spares. Complete set mit Radlabs, McGraw-Hill 1947 in good condx, G4EZM, QTHR. 01253 347176 (Blackpool).

SHINOHARA SR52P meter with 1mA or less movement. Circuit for Hitachi HV62K CCTV camera, Hitachi Videcon type 20PE20, Yaxley band change switches for valve receiver project. Call Simon, G8POO, QTHR. 01434 633913 (Hexham).

SMALL modulation transformer, ideally woden UM1. Auto transformer TI10, as used in Codar AT5). also still building G2DAF equipment so would appreciate any Neosid 0.3in coil formers plus cans & Denco IFT11's. Might even consider buying your entire stock of components (valve ERA). G3WCE, QTHR. 01603 250910 (Norwich).

SPECTRUM analyser in dead or alive condx, also Motorola GP300/P210/HT800 VHF/UHF 2-way radios. Philip, G4ZOW. Tel daytime; 01582 461952 (Harpenden).

TAIT electronics type T318/02 transmitter receiver monitor unit reads forward/reflected power volts etc, can collect. 01354 741168 (March, Cambs).

TANDY minimus 0.3 80hm spkrs, 1 pair required cat. no 40-125oc. Mike, G6ZEL, QTHR.

TRAILER mounted tower needed by Newbury & District Amateur Radio Society. 01635 874006 (Newbury).

URGENTLY required. Plessey 'Panther' electric actuator for 24 volt operation. 75 degree travel. G3MOE, QTHR. 01242 524217 (Cheltenham).

VALVE 8873 or equivalent for heathkit amplifier SB230. G3PHT. 01728 452007 (Suffolk).

VIBROPLEX mechanical bug key, neat condx, good price given. G3VDF, QTHR. 01623 555310 (Sutton in Ashfield, Notts).

WS52 set complete or Tx only. Must be unmodified, buyer will pay cash and collect. GW3LJS 01267 202321 a/time (Carmarthen).

YAESU FC757AT automatic ATU & link cable to connect above to Yaesu FT980, link cable not essential but is required. 01482 830879 (Kingston upon Hull).

YAESU FV-901DM synthesized scanning external VFO. Yaesu FTV901R VHF/UHF transverter (must have 70cm module fitted). Yaesu YO-901 multiscope. All must be in mint condx, bxd with mans. Nigel, G4KZZ. 01723 890786 (Scarborough).

YAESU MMB-11 mobile mounting bracket & FL-2010 linear amplifier. Please telephone G0CTE, QTHR. 0181 688 4563 (Croydon).

EXCHANGE

MORSUM magnificats 1-26 inc binders for any HF rig KW FT101 B/E or similar must have top band no callers thanks. G0EVJ. 01543 251915 (Lichfield).

EVENTS DIARY

CLUB NEWS

DEADLINE - Items for inclusion in the December 1995 issue must be sent to HQ marked "Club News - DIARY", to be received by 23 October latest. If news is received by the published deadline, it should appear in the listing. It is your responsibility to ensure that items are sent DIRECT to HQ in good time. News items should be sent in writing, preferably typed or written legibly, and be signed by the club secretary or the person responsible for publicity.

NOTE: This is primarily a service for clubs affiliated to the RSGB, to whom priority will be given.

AVON

BRISTOL ARC - 5, Discussion on discussions; 12, AGM; 19, Solder night; 26, Bring and buy; November 2, 'Your Multimeter and You'. Details 0117 9654886.

RSGB CITY OF BRISTOL Group - 31, AGM. Details 0117 9672124.

SOUTH BRISTOL ARC - 4, CW practice evening; 11, Club annual skittles match; 18, Judging home construction contest; 25, Talk 'History of WD and HO Wills'; November 1, On the air evening. Details 01275 834282.

THORNBURY & DARC - 4, Building a 50MHz receiver; 11, CW competition; 18, On the air evening; 25, Robotics talk from Reading University. Details 01454 612689.

BEDFORDSHIRE

SHEFFORD & DARS - 12, CQ World-wide planning; 19, Talk on HF aerials by Hugh, G0LGV; 26, Junk sale; November 9, Simple radio receivers. Details 01462 700618.

BERKSHIRE

BRACKNELL ARC - 11, 'Designing with S Parameters'. Details 01344 420577.

NEWBURY & DARS - 25, Talk 'Waves' by Paul Sollom of Douai Abbey. Details 01635 863310.

READING & DARC - 12, Final junk sale of 95; 26, Talk 'Automatic Link Establishment for HF Comms' by Bill Cosins; November 9, Construction contest. Details 01734 698274 (eves).

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 4, Visit to Halton Radio Society; 18, Surplus equipment auction; November 1, Talk 'EMC' by Tim, G8PTP. Details 01296 437720.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 13, Junk sale; 27, Preparations for CQ WW. Details 01954 200072.

CENTRAL

FALKIRK & DARC - 8, Junk sale. Details 01324 861708.

CHESHIRE

MID CHESHIRE ARS - 2, Committee meeting; 4, On the air evening; 12, Calibration night - Bring a rig; 18, On the air evening; 25, Equipment stock review; November 1, On the air evening; 6, Committee evening. Details 01606 592207.

STOCKPORT RS - 11, Talks 'Radio Astronomy' and 'A Home Brew Radio Telescope' by G4ZDO and G4FAS; 25, Talk and Video 'A Radio Journey Through Russia' with G0AMY and G0PWA; November 8, Talk 'Origins, History and Development of Practical Wireless Magazine' by Rob, G3FXD. Details 0161 432 3741.

WARRINGTON ARC - 10, Talk on QRP by G3ZHE; 31, Talk 'Micro-engineering' by David Tolfree; November 11, Talk 'Gee-H Navigation' by G4YFH. Details 01925 762722.

CLEVELAND

EAST CLEVELAND ARC - 6, Talk on radio amateur jargon and abbreviation; 13, Discussion on safety and surprise happenings; 20, Junk sale; 27, Talk on propagation; November 3, Talk 'Experiences of Antenna Construction' by Robert, G7SMB; 10, Talk on Raynet by John, G8YDC. Details 01642 475671.

CLWYD

CONWY VALLEY ARC - 4, Talk 'An Evening with a Camcorder' by Trefor, GW0PZS and Norman, GW0MKP; November 1, Talk 'Effect of Lightning on Aerial Installations' by Ray, GW7CMF. Details 01745 855068.

CORNWALL

CORNISH RAC - 5, Talk by Clive Trotman, GW4YKL. Details 01209 820118.

ST AUSTELL ARC - 2, Interference seminary by Bert, G3VWK; November 6, Talk 'Satellite Technology' by Jim, G8GLI. Details 01726 72951.

DERBYSHIRE

BUXTON RA - 10, Talk 'QRP' by Dave, G0RKT; 24, Pre-AGM; November 14, AGM. Details 01298 25506.

DEVON

APPLEDORE & DARC - 16, Bring and buy sale. Details 01237 476124.

AXE VALE RC - 6, AGM; November 3, Talk 'Measurement of Time' by G3AHX. Details 01297 445518.

TORBAY ARS - 20, 'Radio Kits to Buy and Build' by Tim, G3PCJ. Details 0803 526762.

DORSET

BLACKMORE VALE ARS - 10, Open evening; 24, Visit to Royal Signals Museum; November 14, Talk by a mystery guest. Details 01935 814055.

EAST SUSSEX

SOUTHDOWN ARS - 2, Annual auction; November 6, Talk '100 Years of X Rays and Radiation' by Dr Craig, G3SGR. Details 01825 763022.

ESSEX

BRAINTREE & DARS - 2, 'Home Construction' by Dave, G3PEN; 16, On the air evening. Details 01787 460947.

CHELMSFORD ARS - 3, AGM; November 7, Recycling of previously used equipment sale. Details 01245 256654.

LOUGHTON & DARS - 13, Talk by G0LWF; 27, Talk on military radios by John, G0VEH. Details 0181 500 2811.

GRAMPIAN

ABERDEEN ARS - 6, Junk sale; 13, Demonstration - MFJ- 259 Antenna Analyser; November 3, Junk sale; 10, AGM. Details 01224 628005 (office hours) or 01569 731407 (evenings).

GREATER LONDON

ACTON, BRENTFORD & CHISWICK RC - 17. General discussion. Details 0181 992 3778.

BROMLEY & DARS - 17, Junk sale. Details 0181 777 0420.

COULSDON ATS - 9, Talk 'Videotelephony - From Techniques to Systems' by Timothy, G8JXV; November 13, Talk 'The Prelude to Radar' by Brian, G3GDU. Details 0181 684

CONGRATULATIONS

To the following who our records show as having reached fifty years continuous RSGB membership this month:

Mr G W F Ashford, G2AOZ
Mr T D Jardine, GM2BMJ
Mr L Hardie, GM2FHH
Dr E H P Young, G3ATK
Mr S J Roddan, G3CSC
Mr G Lancefield, G3DWQ
Mr E G Filby, G4AQ
Mr R C Kaye, G6RO
Mr W A Higgins, G8GF
Mr A D Taylor, G8PG
Mr A R A Bunnage, RS20428
Mr F W Adderley, RS9710

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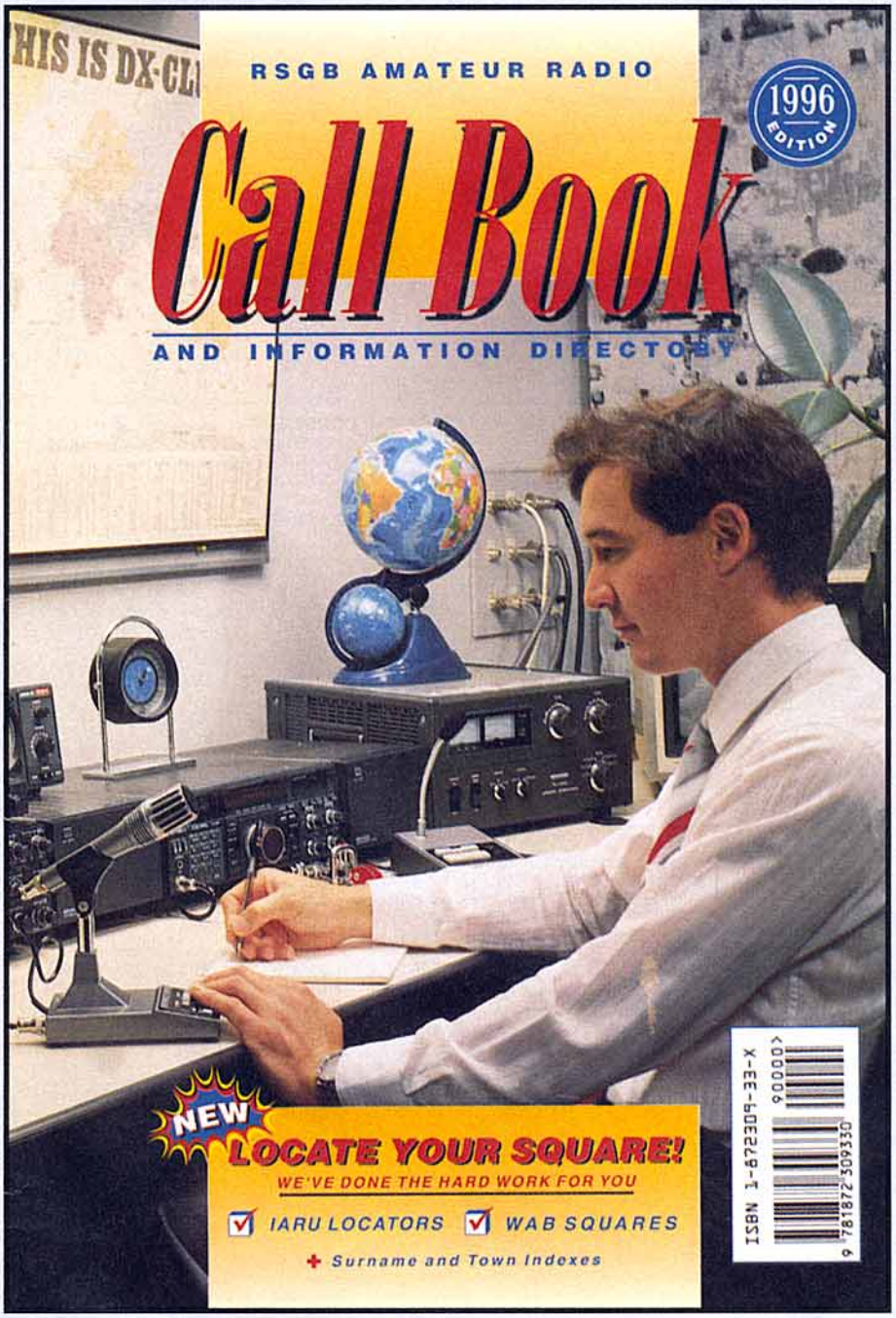

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RSGB's Book Shop — Everything

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Antenna Compendium – Vol 1	(ARRL)	£10.25	£8.72
Antenna Compendium – Vol 2	(ARRL)	£10.25	£8.72
Antenna Compendium – Vol 3	(ARRL)	£13.50	£11.78
Antenna Compendium – Vol 4 - NEW	(ARRL)	£17.07	£14.51
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Reflections: Transmission Lines and Antennas	(ARRL)	£14.99	£12.74
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More about Quad Antennas	(CQ)	£11.88	£10.10
Yagi Antenna Design	(ARRL)	£11.30	£9.60

AWARDS

Islands On The Air Directory (2nd Ed) POST FREE	**(RSGB)**	**£6.90**	**£6.00**
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CALL BOOKS

UK Callbook Information/Directory 1995 (See SOFTWARE for disk version)	**(RSGB)**	**SOLD OUT**	
North American Callbook 1995	(RACI)	£20.00	£17.00
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for the Radio Amateur and SWL

		NON-MEMBERS	MEMBERS
SOFTWARE			
SkyCall Callbook PC Windows Format (4 x 3.5" disks)	**(RSGB)**	**£22.77**	**£19.80**
1995 Super Frequency List (CD-ROM) - NEW	(KLINGENFUSS)	£25.30	£22.00
ARRL Radio Designer - NEW	(ARRL)	£139.90	£118.91
SPECIAL MODES			
The Amateur TV (ATV) Compendium	(BATC)	£5.75	£4.89
An Introduction To Amateur Television	(BATC)	£5.00	£4.25
NOSintro	(DOWERMAIN)	£11.80	£10.03
Am Packet Radio Link Layer Protocol	(ARRL)	£6.50	£5.53
RTTY Awards	(BARTG)	£4.26	£3.62
Slow Scan TV Explained	(BATC)	£6.40	£5.44
Gateway to Packet Radio	(ARRL)	£9.58	£8.04
VHF/UHF			
All About VHF Amateur Radio	(RPI)	£9.50	£8.08
Radio Auroras	**(RSGB)**	**8.99**	**£7.64**
VHF-UHF Manual 4th Edition	**(RSGB)**	**£10.50**	**£8.93**
VHF Contesting Handbook - NEW	**(RSGB)**		**£4.00**
VHF/UHF DX Book	(DIR)	£18.00	£15.30
UHF/ Microwave Experimenters manual	(ARRL)	£15.14	£12.87
UHF/Microwave Projects Manual	(ARRL)	£10.55	£8.97
MEMBERS' SUNDRIES			
Badges: Callsign standard*	**(RSGB)**		**£3.00**
Callsign deluxe*	**(RSGB)**		**£3.50**
Lapel mini	**(RSGB)**		**£1.00**
Lapel standard	**(RSGB)**		**£1.00**
** includes engraving*			

		NON-MEMBERS	MEMBERS
RSGB TIES			
New Style, Navy			**£6.50**
New Style, Dark Red			**£6.50**
Post free			
CAR STICKERS			
RSGB Diamond	**(RSGB)**		**0.84**
I Love Amateur Radio	**(RSGB)**		**0.99**
I'm On The Air	**(RSGB)**		**0.99**
EMC FILTERS			
Packet of 4 Ferrite Rings, FAIR-RITE 43 Material - NEW		£4.00	£3.40
Filter Kit	(AKD)	£51.33	£43.63
Filter 1 – Braid Breaker	(AKD)	£8.50	£7.23
Filter 2 – HPF For FM Band 2	(AKD)	£8.50	£7.23
Filter 3 – HPF & Braid Breaker	(AKD)	£8.50	£7.23
Filter 4 – Notch At 145MHz	(AKD)	£8.50	£7.23
Filter 5 – Notch At 435MHz	(AKD)	£8.50	£7.23
Filter 6 – Notch At 50MHz	(AKD)	£8.50	£7.23
Filter 7 – Notch At 70MHz	(AKD)	£8.50	£7.23
Filter 8 – High Pass 6 Sect	(AKD)	£21.50	£18.28
Filter 10 – 28MHz Notch	(AKD)	£8.50	£7.23
Filter 15 – 21MHz Notch	(AKD)	£8.50	£7.23
Filter 20 – 14MHz Notch	(AKD)	£8.50	£7.23
(Postage each: UK 60p, overseas £1.50)			

ITEMS MAY, FROM TIME TO TIME, SELL OUT. IF THIS IS THE CASE WE ARE HAPPY TO PLACE YOUR ORDER ON OUR 'BACK ORDER FILES' AND WE WILL SUPPLY YOUR GOODS AS SOON AS POSSIBLE.

HOW TO ORDER

PRICES. Retail prices are followed by members' discounted prices. If you are a member, please quote your call sign or RS number when ordering. All prices include VAT (where applicable) and are subject to change without notice. Except where otherwise stated, please add postage as follows.

POST AND PACKING: Please add £1.00 (overseas £1.75) for one item and £2.00 (overseas £3.50) for two items or more. For orders over £40 post and packing is free. Overseas deliveries are by surface mail.

Newsletter and magazine prices include postage. This does not apply to back numbers which incur postage as above. Overseas Airmail and first class UK post prices are available on request.

AVAILABILITY. Goods are available over the counter at RSGB Headquarters 9.15am to 5.15pm, Monday to Friday. However, you are strongly advised to confirm availability of goods by telephone before visiting Headquarters.

PAYMENT. Payment may be made by post, enclosing a cheque or postal order. These should be crossed and made payable to 'Radio Society of Great Britain'. If sending cash please use registered post. We accept Visa and Access (Mastercharge) cards and our telephone number for credit-card orders is 01707 660888. Our Giro account number is 533 5256.

DELIVERY. Goods will be despatched to UK destinations by 2nd class letter post or parcel post, or surface mail to overseas destinations. Please allow 28 days for delivery.

ORDER FROM: **RSGB SALES (CWO)**
Lambda House, Cranborne Road,
Potters Bar, Herts EN6 3JE

PLUS AMEX & DINERS CLUB

24-hour Sales hotline: 01707 660888
Or use our fax: 01707 645105

SPECIAL MARCONI CENTENARY OFFERS

NEW!

MARCONI CHRISTMAS CARDS

We have liaised with the GEC-Marconi company to jointly produce these fantastic Christmas Cards as a special offer to RSGB members. The card features a painting by the well known artist, Denis Knight, of the Needles Hotel, Alum Bay, where Marconi conducted his earliest radio transmissions. The hotel burnt down early this century, so the painting has been commissioned from the few photographs and lithographs which remain of the original building.

These cards measure 236mm (9.25") by 165mm (6.5") and are produced on high quality card at a cost to you of just *16p* each - you will not get such excellent value at this price from anyone else!

Cards sorted into packs:

25 for £4.00, 50 for £8.00,

100 for £15.00, Plus P&P

LIMITED EDITION MARCONI TANKARD

A special Bone China Tankard designed by the RSGB Design Team to commemorate 100 Years of Radio, and the centenary of Marconi's first radio transmissions.

This is a limited edition of just 250, so order yours now to make sure you get one before they all run out.

The tankards have a portrait of Marconi on one side, and the RSGB logo and 1995 on the reverse, with gold banding on the rim, base and handle.

Each tankard is numbered and comes with a special certificate - these will undoubtedly become a collector's item.

Members Price: **£11.95**

TO PLACE YOUR ORDER RING MARCIA OR SABRINA IN THE RSGB SALES OFFICE ON 01707 660888

Radio Society of Great Britain
Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE

0610.

CRAY VALLEY RS - 5, Surplus equipment sale; 19, Quiz night with Darenth Valley RS; November 2, Talk 'Optical Communications re-visited' by G0FDZ. Details 0171 739 5057 (office hours only).

CRYSTAL PALACE & DRC - 21, Talk '50MHz Repeaters' by Ian, G0RDI. Details 0181 699 5732.

EDGWARE & DRS - 14, On the air evening; 28, Talk 'Practical Wireless: A Personal History' by Rob, G3XFD. Details 0181 204 1868.

RADIO SOCIETY OF HARROW - 6, Talk on PMR Conversion. Details 01895 632377 (evenings).

SILVERTHORN RC - 6, On the air evening; 13, Junk sale; 20, On the air evening; November 10, Construction contest. Details 0181 505 1871.

SOUTHGATE ARC - 12, Surplus equipment sale; 26, On the air evening; November 9, G6QM competition and Brains Trust. Details 0181 360 2453.

SUTTON & CHEAM RS - 19, Talk 'OSS Communications' by Brian, G8DIU. Details 0181 644 9945.

WIMBLEDON & DARS - 13, Demo of Plug Soldering; 27, AGM; November 10, GA Mini lecture. Details 0737 351313.

GREATER MANCHESTER

BURY RS - 10, Construction competition; November 14, Surplus equipment sale. Details 0161 762 9308.

ECCLES & DARS - 3, Talk 'JOTA 1994' by G7ELA; November 7, Talk 'Interfacing SCSI Devices' by G6MEI. Details 0161 773 7899.

OLDHAM ARC - 12, Talk on contesting by Martin, G4XUM; 26, Talk on the RSGB by Peter, G4EJP. Details 0161 627 1639.

WIGAN-DOUGLAS VALLEY ARS - The club is currently meeting at the temporary location of The Hesketh Arms, Shevington, Wigan. Details 01924 211397.

GWYNEDD

DRAGON ARC - 2, AGM; 16, Talk 'A Tour of Israel' by Evan Roberts; November 6, Talk by Gwyn Roberts. Details 01248 600963.

HAMPSHIRE

BASINGSTOKE ARC - 4, AGM; 29, Fox hunt; November 6, Presentation on amateur satellites. Details 01256 26050.

HORNDEAN & DARC - 24, AGM. Details 01705 472846.

ITCHEN VALLEY - 13, Talk on amateur TV by Mike, G8LES; 27, Talk 'Broadband ISDN' by Nigel, G7CAW. Details 01703 813827.

THREE COUNTIES ARC - 25, Talk 'Fast Scan Television' by G8MEH; November 8, Talk 'Grey-Lining - HF Propagation' by G4ZEJ. Details 01428 606298.

WINCHESTER ARC - 20, 'An in-depth Talk on Radio' by Frank, G0RZK. Details 01962 860807.

HEREFORD AND WORCESTER

BROMSGROVE ARS - 10, Talk on DX logging; 24, Quiz night; November 14, On the air evening. Details 01527 542266.

DROITWICH ARC - 3, Talk 'Experiences On My Chile Expedition' by John Layton; November 7, RSGB Videos. Details 01905 778794.

VALE OF EVESHAM - 5, Talk 'A Practical Radio Topic - Satellites and 23cm' by Roger, G0UPU. Details 01386 41508.

HERTFORDSHIRE

CHESHUNT & DARC - 4, Talk 'Power Supplies' by Dennis, G3TIK; 18, Construction contest; November 1, Talk on satellite TV by Roger, G4OAA. Details 01992 464795.

DACORUM ARTS - 17, Talk 'Packet Made Easy' by Alan, G0PIN. Details 01582 620507.

HODDESDON RC - 12, Talk 'Better Results from your Camera' by Ken Newman; 26, Talk 'Wine and Beer Making' by Ben Wheeler. Details 01992 460841.

WELWYN - HATFIELD ARC - 2, Junk sale; Talk on packet radio by Ken, G3MSW; November 4, WARC Constructors Open Challenge; 5, Fireworks - Ware Round Table. Details 01920 462241 (eves) or 0181 982 7298 (day).

HUMBERSIDE

GRIMSBY ARS - 12, AGM; 26, Junk sale. Details 01472 825899.

HORNSEA ARC - 11, Talk 'East Yorkshire Railways' by G0DEB; 18, Talk 'SSTV' by G7NNT; 25, Rally preparations; November 1, Talk 'Happy Chickens' by G1IKT. Details 01964 562258.

NORTH FERRIBY ARS - 6, Tenth anniversary dinner; 13, Get together with Hull ARS; 20, Talk 'Portable Packet' by Matthew, G7SFR. Details 01482 656324.

ISLE OF MAN

ISLE OF MAN ARS - 2, Talk 'How to Avoid Trouble' by the island crime prevention officer. Details 01983 294309.

KENT

EAST KENT RS - 6, AGM; November 3, Talk 'Radio Interference' by Trevor, G3XZT. Details 01277 743070.

MAIDSTONE YMCA ARS - 6, 'Repair It' evening; 13, RAE - 'Inductance' by Paul Austin; 20, Talk 'Down on the antenna farm' by Peter, G3ORP; 27, RAE - 'Reactance' by Paul Austin; November 3, Junk sale. Details 01622 729462.

MEDWAY R & TS - 20, Junk sale. Details 01634 710023.

LANCASHIRE

PRESTON ARS - 12, Auction evening; November 9, RSGB video evening. Details 01772 686708.

THORNTON CLEVELEYS ARS - 2, Collection of surplus components for radio amateur relief expedition; 16, AGM; 23, Talk on radio controlled aeroplanes. Details 01253 853554.

LEICESTERSHIRE

LEICESTER RS - 2, On the air evening; 9, On the air evening; 16, Talk 'Beyond AX25 - TCP/IP' by Laurence, G7AYI; 23, On the air evening; November 6, On the air evening; 13, On the air evening. Details 0116 2917250.

LINCOLNSHIRE

SPALDING & DARS - 1, Junk sale. Details 01775 750382.

MERSEYSIDE

LIVERPOOL & DARS - 3, AGM; 10, On the air evening; 17, Talk by G3XSN; 24, QSL Display; 31, Surplus sale; November 7, Oscilloscope demonstration by G8FHD; 14, On the air evening. Details 0151 722 1178.

WIRRAL ARS - 4, AGM. Details 0151 644 6094.

NORFOLK

KINGS LYNN ARC - 5, AGM; 19, Talk on VHF/UHF expeditions by David, G4DHF. Details 01553 765614.

NORFOLK ARC - 4, Talk 'Phase Locked Loops' by Mike, G4EOL; 11, On the air evening; 18, Construction contest; 25, On the air evening. Details 01603 789792.

YARMOUTH RC - 19, Quiz; November 2, Talk 'Locator Systems' by G3YYQ. Details 01493 721173.

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM - 5, On the air evening; 12, Talk 'Locating QRA and WAB Squares' by Paul, G0SPA; 19, Fox hunt. Details 0115 950 1733.

WORKSOP ARS - 17, Junk sale; 31, Talk on packet by G3XTL. Details 01909 487741.

OXFORDSHIRE

OXFORD ARS - 3, AGM. Details 01235 531559.

SHROPSHIRE

SALOP ARS - 12, AGM; 26, Calibration evening with Ken, G8DIR; November 9, Quiz night. Details G7SBD QTHR or @ GB7PMB.

TELFORD & DARS - 4, Station equipment night; 11, Junk sale; 18, Ex WD Gear; 25, QRP operation; November 1, On the air evening. Details 01952 261923.

SOMERSET

TAUNTON & DARS - 6, Talk 'The Somerset Range of Radio Kits' by Tim, G3PCJ. Details 01823 680778.

WEST SOMERSET ARC - 3, 2 metre activity evening; November 7, Oscilloscopes. Details 01984 631470.

YEOVIL ARC - 5, 'The National VHF Postcode Charity Challenge' by G3ZXX; 12, Club visit to RNAS Yeovilton Meteorology Section; 19, Talk 'Sunspot Cycles' by G0DAB; 26, On the air evening. Details 01258 473845.

SOUTH GLAMORGAN

CARDIFF RSGB GROUP - 9, AGM. Details 01222 810368.

SOUTH YORKSHIRE

BARNSLEY & DARC - 16, Talk by Peter Kirby, G0TWW on the RSGB; 23, On the air evening; November 6, Great Northern Hamfest briefing; 13, Hamfest post mortem. Details 0836 748958.

DRONFIELD & DARC - 2, On the air evening; 16, Quiz night; November 6, On the air evening. Details 01246 290250.

SHEFFIELD ARC - 2, Presentation of this year's awards; 3, Raynet meeting; 9, AGM; 16, Meet the new committee; 23, Talk by G7NYD on Relief expeditions by RARE; 24, Swimming; 30, Committee meeting; November 6, Bonfire night; 7, Raynet meeting; 13, Talk by Morris, G7PSR on a mystery subject; 14, Ten pin bowling. Details 0114 244 6282.

STAFFORDSHIRE

CANOCK CHASE ARS - 12, AGM. Details 01543 262495.

SUFFOLK

BURY ST EDMUNDS ARS - 17, Talk 'Bottled Power' by Alan, G3MYA. Details 01284 728418.

FELIXSTOWE & DARS - 2, Packet clinic with Andy, G3ZYP and Adrian, G7TYV; 16, Talk 'Radio Astronomy' by Paul, G4YQC; 30, Fish and chip supper; November 13, Talk by Frank, G3FIJ. Details 01394 273507.

IPSWICH RC - 1, 21/28MHz contest; 4, Talk 'Propagation' by Jim, G3YLA; 18, Talk by Jon, G0DVJ; 25, CW practice evening. Details 01473 212891.

SUDBURY & DRA - 3, Talk on Raynet by Reg, G8VNP; November 7, Talk on ATV and 1296MHz by Barry, G1UGJ. Details 01787 313212 (before 10pm).

SURREY

ECHELFORD EARS - 26, Build a PC by John, G8KHS. Details 01344 843472.

TAYSIDE

DUNDEE ARC - 10, Construction evening; 17, Talks 'How to Solder' by George, GM3EFH; 'Resistors' by Alf, GM4UZP; 'Capacitors' by John, GM3LCP; 24, Construction evening; November 7, Construction evening; 14, Talk 'Oscilloscopes and How to Use Them' by Les, GM0TGG. Details 01382 739179.

TYNE & WEAR

TYNE & WEAR REPEATER GROUP - November 5, Auction. Details 0191 388 2913.

WARWICKSHIRE

MID-WARWICKSHIRE ARS - 24, Members' home brew competition; November 14, Talk 'Packet Explained' by G0FBY. Details 01926 424465.

STRATFORD-UPON-AVON RS - 9, Talk 'Aid International Direct' by Tony Pratt; 23, Talk from RSGB council member david Whalley, G4EIX; November 13, Talk 'A DXpedition' by Vincent, G0MLX. Details 01789 773286.

WEST GLAMORGAN

SWANSEA ARS - 19, Talk by GW3UZS on alternative energy sources. Details 01792 404422.

WEST MIDLANDS

COVENTRY ARS - 6, AGM; 13, On the air evening; 20, Rig test night; 27, On the air evening; November 10, On the air evening. Details 01707 659015.

WEST SUSSEX

HORSHAM ARC - 5, Junk sale. Details 01403 275525 (evenings).

WORTHING & DARC - 11, DIY PCs; 18, Talk 'Playing Aerials' by G3NDJ; 25, AGM. Details 01903 753893.

WEST YORKSHIRE

DENBY DALE & DARS - 4, Talk 'The Day the Gas Cooker Talks Back' by Robert Miles; 18, Aerial clinic; November 1, AGM. Note: Denby Dale & DARS has appointed Malcolm Mckenzie, G8RWN as its new secretary. Details 01484 861782.

HALIFAX & DARS - 17, Talk on 23cm TV by Alan, G3TQA. Details 01422 202306.

KEIGHLEY ARS - 5, On the air evening; 26, Junk sale; November 9, 'Horse Racing at the Cricket Club'. Details 01274 496222.

WILTSHIRE

SWINDON & DARC - 5, Talk 'Graphics Imaging' by Hugh, G1WYP; 19, Talk 'PME and Safety in the Shack' by Peter, G3RZP; November 2, Talk 'Life in Broadcast Radio' by Ian Dyer. Details 01793 822705.

TROWBRIDGE & DARC - 18, Planning application procedures by Gordon Reed. Details 01225 864698.

RALLIES AND EVENTS

This is a list of all rallies, hamfests, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Rally News - DIARY'.

1 OCTOBER

BLACKWOOD & DISTRICT ARS Rally - Oakdale Comprehensive School, near Blackwood, Gwent. Doors open at 10.30am. Admission £1. Features traders, bring and buy, raffles and talk-in on S22. Details Norman, GW0MAW on 01495 227550.

THE GREAT LUMLEY Amateur Radio Rally - Held at the community centre in Great Lumley, near Chester-Le-Street, Co Durham. Doors open at 11.00am, 10.30am for the disabled. Features a wide range of trade stands, bring and buy stand and refreshments. Entrance fee £1 which includes programme. Free admission for children accompanied by an adult. Details G1JQT on 0207 237927.

8 OCTOBER

COMPUTERCATIONS 95 Computer & Radio Rally - Hillhead Campsite, Dartmouth Road, Brixham, Devon. With overnight camping, car boot sale, trade stands, professional flight simulator demonstration, bring and buy, refreshments, unlimited free parking and talk-in on S22. Special event station GB2CPU. Details 01803 522216.

KIDDERMINSTER & DARS Rally - Details G&JTL on 01384 894019.

13-15 OCTOBER

AR CARAVAN & CAMPING CLUB Rally - Elkington, Nr Welford, Northants. Details G4LWA QTHR, tel 01494 531755.

20/21 OCTOBER

LEICESTER AR Exhibition - Easy access from Junc 21 of the M1 with the usual emphasis on amateur radio. All major companies will be in attendance plus a large bring and buy stand run by the Leicester Radio Society. Morse tests will be available on demand but two photographs plus proof of identity will be required. Ample car parking facilities. Talk-in on S22 and SU22. Doors open at 10am, 9.30am for the disabled. Details Frank, G4PDZ on 0116 287 1086.

29 OCTOBER

HORNSEA ARC Rally - Details Duncan, G3TLI on 01964 532588.

4 / 5 NOVEMBER

NORTH WALES Radio/Computer Rally - Aberconwy Conference Centre, Llandudno. Details Barry Mee, GW7EXH on 01745 591704.

5 NOVEMBER

NORTH DEVON RADIO Rally - Details from G8MXI on 01409 241202.

11 NOVEMBER

AMS '95 Computer & Electronics Show - Bingley Hall, Staffordshire Showground, Stafford. Off A518 Stafford-Uttoxeter Road - Signposted from J14 on M6. Bus shuttle from Stafford BR. Doors open from 10am to 4pm. Features amateur radio, computers, multimedia, satellite, electronics, bring and buy. Details 01473 272002.

12 NOVEMBER

THE GREAT NORTHERN Hamfest - Matrodome complex in Barnsley town centre, near to the bus and railway interchange. The venue is less that two miles from the M1, Junc 37, the A61 and A628 roads. Follow the Metrodome signs and (Hamfest) signs. The venue is all one level with excellent disabled facilities. RSGB Morse tests available on demand. The event features all the usual amateur radio traders and computer dealers plus many specialised groups, repeaters groups, packet, TV, large bring and buy and a large restaurant and bar. Talk-in on S22. Doors open at 11am, 10.30am for the disabled. Details from Ernie, G4LUE on 01386 748958.

MARS-STOCKLAND Radio/Computer Rally - Details Norman, G8BHE on 0121 422 9787.

SILENT KEYS

WE REGRET to record the passing of the following radio amateurs:

G0DUD	Mr J T Bury	4.3.95
G0ICO	Mr R S Bareham	16.6.95
G0NVC	Mr D J Stevens	14.6.95
G0SFM	Mr J Jessop	4.7.95
G1TTI	Mr J L Williamson	15.6.95
G2CLN	Mr J Gwynne	27.6.95
G2HCV	Mr Hedges	31.3.95
G3AJY	Mr D W Morris	24.6.95
G3AMM	Mr G Layzell	15.6.95
G3LBG	Mr Willmott	4.6.95
G3MAD	Mr A Wakeley	20.6.95
G3PAL	Mr P A Lincoln	20.6.95
G3RXW	Mr M 'Moss' Barker	23.6.95
GM3SHB	Mr W Blanchard	14.6.95
G3TSN	Mr D Newbould	14.6.95
GM3XVI	Mr H Cant	25.6.95
G4CGT	Mr N Jenkin	24.5.95
G4IPU	Mr E C Lambert	12.6.95
G4JNR	Mr R Mackay	1.6.95
G4OKN	Mr R Thomas	
G4PX	Mr G Belsey	11.7.95
G4VOS	Mr C R Evans	15.7.95
RS92436	Mr Pettit	9.2.95

MICROWAVE ROUND TABLE - BT Laboratories, near Ipswich, Suffolk. The event starts at 10am and will include table sessions, testing facilities and a bring and buy. For BT Labs security requirements all access is by advance booking only. Please send the names of all persons attending if multiple tickets are requested. For tickets send an SASE to Roy, G0RRC, Lykkebo, The Street, Burstall, Ipswich, Suffolk IP8 3DN.

18 NOVEMBER

ROCHDALE & DARS TRADITIONAL Radio Rally - St Aldan's Vicarage, Sudden, Rochdale. With components, loads of 'junk'. Details John, G70A1 on 01706 376204.

19 NOVEMBER

BISHOP AUCKLAND RAC Rally - The Newton Aycliffe Leisure Centre. Doors open 11am, 10.30am for the disabled. Bar and cafe also available. Details from Mike Shield on 01388 766264.

26 NOVEMBER

BRIDGEND & DARC Radio Rally - Bridgend Recreation Centre, Bridgend. Easy access off junction 35 and 36 of the M4. With traders selling complete radio/computer systems plus software, electronic components and second hand equipment. RSGB Morse test on demand but two passport-size photos must be produced. Doors open at 11am, 10.30am for disabled visitors. Admission £1. Details Maurice, GW0JZN on 01656 864579.

WEST MANCHESTER Radio Club's 'Winter' Rally - Horwich Leisure Centre near Bolton. Junc 6 off the M61. Details Albert, G7RZW 01204 62980.

3 DECEMBER

GLASGOW RADIO, ELECTRONICS & COMPUTER Rally - Maryhill Community Centre, just along from junction 17 of the M8. Doors open at 11am, 10.30am for the disabled, until 4.15pm. Admission price is £2 for the disabled, UB40 holders and £2.50 for all other visitors (children under 14 accompanied by a parent get in free of charge). All monies raised from the event will go to the funds of the SDX Cluster Support Group Amateur Radio Club. Details John, GM0OPS on 0141 638 7670.

THAMES VALLEY Electronics Rally - Kempton Park, Racecourse, Sunbury on Thames, Middx. Open 10.30am to 4.30pm (10am - free entry to bring and buy stand). With major manufacturers and retailers, accessory supplies, antenna supplies, bring and buy stall, computers and component retailers and specialist groups. Admission £1.50, OAPs £1, children up to 14 years free. Details 01494 450504.

VERULAM ARC Rally - Watford Leisure Centre, Horseshoe Lane, Garston, Watford, Herts. Off A405 near M1 junction 6 and M25 junction 21a. Open 10am to 4pm. Features trade stands, bring and buy, grand raffle, cafe, licensed bar and free car parking. Details Ian, G0PAU on 01923 222284.

21 JANUARY

OLDHAM AR CLUB MOBILE Rally - Details 0161 652 4164.

4 FEBRUARY

LANCASTRIAN Rally - Details Sue Griffin on 01374 290088.

SOUTH ESSEX ARS Radio Rally - Details David, G4UVJ on 01268 697978.

11 FEBRUARY

CAMBRIDGE & DARC - Details John, G0GKP on 01954 200072.

NORTHERN CROSS Rally - Details 0113 238 3622.

17 MARCH

NOBRECK Amateur Radio, Electronics and Computing Exhibition - Details Peter, G6CGF on 0151 630 5790.

TIVERTON SOUTH RADIO's 10th Rally - Details 5 Butter Leigh Drive, Tiverton, Devon EX16 4PN.

21 APRIL

WHITE ROSE ARS 1996 Rally - Details 0973 189276.

28 APRIL

MERSKE-BY-THE-SEA Radio Rally - Details 01642 475671.

12 MAY

DRAYTON MANOR Radio & Computer Rally - Details Norman, G8BHE 0121 422 9787 (evenings).

30 JUNE

39th LONGLEAT Amateur Radio and Electronics Fair - Details Gordon, G0KGL on 0117 9402950.

14 JULY

SUSSEX Amateur Radio and Computer Fair - Details from Ron, G8VEH on 01903 763978 or 01273 417756.

21 JULY

COLCHESTER Radio and Computer Rally - Details Richard, G7BIV on 01376 571239.

GB CALLS

The list below shows special event stations licensed for operation during this month. The information was taken from the HQ computer. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

OCTOBER

1	GB0FKS	First Keith Scouts
	GB0FWF	First Woodham Ferrers
	GB0GDS	Greenock District Scouts
	GB0PG	Pinkneys Green
	GB125BRC	125 Years British Red Cross
	GB1PFW	Portsmouth Freshers Week
	GB2CDY	Coastal Defence Yarmouth
	GB2CPU	Central Processing Unit
	GB2FTS	First Timperley Scouts
	GB4HG	First Hazel Grove Scouts
	GB4WCH	Weobley Cubs Herefordshire
5	GB0GS	Gloucestershire Scouts
	GB2CDW	Coastal Defence 'W'
	GB2SR	Stelar Radio
6	GB13FRI	Friday the Thirteenth
	GB4DHX	Dunfermline hobbies exhibition
	GB4TS	Thame Scouts
7	GB2APC	Astley Parish Church
	GB2ASG	Atherton Scouts & Guides
9	GB4LSC	Leamington Sea Cadets
10	GB0KET	Kettering District Scouts
11	GB2TAM	Tangmere Air Museum
12	GB4WH	Wall Heath Scouts
13	GB2SMD	St Mary's Droylsden
	GB8BSL	Bentley Scout Link
14	GB2HSJ	Helmsley Scouts Jamboree
	GB2WES	West End Scouts
	GB4FNM	First New Markse Scouts
15	GB1DS	Duffield Scouts
16	GB0USG	Upwey Scouts & Guides
18	GB0BSJ	Bengeo Scout Jamboree
19	GB0FCS	First Chiseldon Scouts
	GB0SRO	Sir Richards Own
	GB2AFS	Alveley First Scouts
	GB2COS	Chester Oldfield Scouts
	GB2FOS	Fair Oak Scouts
	GB2JAM	Jamboree on the Air
	GB2MSR	Manx Scout Radio
	GB4FS	Fleetwood Scouts
	GB4SJS	St James Scouts
20	GB0BDS	Bedford District Scouts
	GB0DSR	Dartmoor Scout Radio
	GB0FBS	First Bilston Scouts
	GB0WG	Whittlesey Scout Group
	GB0WWE	Wakefield Woolley Edge
	GB1CDS	Cromwell District Scouts
	GB1GS	Gloucestershire Scouts
	GB1GWY	Great Whernside Yorkshire
	GB1WWE	Wakefield Wookey Edge
	GB2GCS	Grimsby Cleethorpes Scouts
	GB2GU	Guernsey
	GB2KKS	Kenton & Kingsbury Scouts
	GB2PG	Paul Godley
	GB4KLS	King's Lynn Scouts
	GB4OSF	Oldham Scout Fellowship
	GB50UN	United Nations
	GB6CHE	Cheshire County Scouts
21	GB0BRS	Bristol Scouts
	GB0FSA	Furness Scouts Association
	GB0GDS	Greenwich District Scouts
	GB0SAS	Seventh Allhallows Scouts
	GB0SJS	St John's Scouts
	GB0WS	Whitwick Scouts
	GB1HSG	Hasbury Scout Group
	GB1OSG	Orpington Scout Group
	GB1STR	Saint Richards Scout Group
	GB2CHI	Chichester Scouts
	GB2NSF	Newport Scout Fellowship
	GB2SDS	South Downs Scouts
	GB2SSD	Sixty Seventh Doncaster
	GB4CCS	Captain Cook Scouts
	GB4SBS	Shoreham By Sea Scouts
	GB4SSS	Sixth Stapleford Scouts
	GB4STL	St Leonards
	GB5CG	Fifth Carmarthen Group
	GB5SAS	Stanford-le-Hope Air Scouts
	GB8DR	Eighth Army Desert Rats
	GB8OAK	The Eight Oaks of Seven Oaks
23	GB4SSS	Sixth Stapleford Scouts
	GB8DR	Eighth Army Desert Rats
28	GB5SI	Shetland Isles

RADCOM HELPLINES Helplines FOR MEMBERS

- Mr T P Didcott is hoping to build the **144MHz multimode receiver** described in the **RSGB VHF / UHF Manual fourth edition** (page 4.59), but is having difficulty obtaining the amplifier ICs, the specified filters and some of the diodes and transistors. He would like help from anyone who has tackled this receiver project, or anyone who can help in obtaining these components. If you can help, please write to Mr Didcott at 11 Westfield Crescent, Patcham, Brighton, East Sussex BN1 8JB.

- Daniel and Marie-Claude Lecul, F6ACU and F6BWX, have a 13-year old son, Guillaume, who would like to correspond as a **pen friend** with the son of a radio amateur in the UK. Write to them at 195 Rue des Pres, Guenilles, 88220 Dounoux, France.

- George Kopperl, KA1GS, has a **Precision Admittance Bridge, Type K-1,** made by **Mark Instrument Ltd** of London. Can anyone help with either a copy of the manual or clues to obtaining one? Please write to P O Box 7, North Sandwich, NH 03259, USA.

- Roger Bracey, G4BZI, requires a circuit diagram and manual for a **Yaesu FR-101 DD receiver**. All expenses will be paid. If you can help, write to him QTHR or tel: 01244 351357.

- John Tuppen, VK6XJ, has recently added a GEC BRT-402KN to his collection of valve communications receivers, but now needs a service manual, or circuit diagram at least, for the **GEC BRT-400 / BRT-402** series of receivers.

- John Thwaites, G8PWO, would like to obtain the loan of a manual, or full circuit diagram, or receive any information on the **Gould Advance '10MHz Timer Counter TC20' frequency meter.** If you can help, please write QTHR.

- Mustafa Topukcu, an RSGB member in Lefkosa (Nicosia), Cyprus, would like as much information as possible on the **Airmec Wave Analyser Type 853**. He would also like to receive **simple QRP SSB / DSB HF transceiver** circuits and a **VHF packet modem circuit using TCM3105**. Postage expenses will be paid. Please write to P O Box 257, Lefkosa, via Mersin 10, Turkey, or send an E-mail to: Mustafa.Topukcu@mahirbbs.ege.edu.tr.

- John Wresdell, G3XYF, wants a circuit and any information on the **Sound Air MM 161 2m FM scanning receiver**. It covers 144 - 152MHz and uses crystals. Write to G3XYF QTHR or tel: 01377 254441.

- David Bonfield, G4JXK, requires information on a **Redifon Safari radio telephone type RT106E**, eg handbook, circuit or modification information for 160m. Please ring 01329 220753.

- Les Rix, G3XJW, is involved with the biography of **F J Camm**, who was editor of many popular engineering and wireless magazines which came to be known as **'Camm's Comics'**. If you can help with published or personal written information, or anecdotal reminiscences, of Fred Camm, Les would like to hear from you. Contact him QTHR or tel: 01664 480411.

- J King, G4EMC, would like help in getting a **Nova 225** radio working on 2 metres, including which synthesizer to use, and the coding. If you can help, please write QTHR, tel: 01732 843497, or send a message to G4EMC@GB7ICE or G4EMC@GB7STU.

- Mike Hewitt, G4AYO, needs technical information or a copy of the manual of the **Hy-Gain TH11 antenna**. If you can help, please contact Mike on 0114 2350434 or write QTHR.

- Ken Mildren, G3FVD, needs to borrow or copy manuals or circuit diagrams for a **Keighley DMM model TRM 179** and **Telequipment 'scope model DB33R**. If you can help, please write to G3FVD QTHR or tel: 01208 72487.

- A Price, GW8YJN, requires information on using an **external VDU monitor** with an **Epson PX4+ computer** (which he uses for packet). He has a Tystar monitor. Please send any information to GW8YJN QTHR or tel: 01437 781265.

- Mike Rathbone, G3UZN, requires a circuit diagram / service manual for **frequency shift converter CV.89A / URA - 8A.** His unit is designed for 115V 60Hz and is part of AN / URA - 8B made in the USA about 1970. If you can help, please write to G3UZN QTHR.

RSGB – at Your Service

SOME OF THE RSGB'S TEAM OF VOLUNTEER EXPERTS — AVAILABLE TO HELP YOU

Zonal Council members

Zone A (North of England): Peter Sheppard, G4EJP, 89 St Catherines Drive, Leconfield, Beverley, North Humberside HU17 7NY. Tel: 01964 550397.

Zone B (Midlands): David Whalley, G4EIX, 1 Lees Farm Drive, Madeley, Telford, Shropshire TF7 5SU. Tel: 01952 588878.

Zone C (SE England and East Anglia): Neil Lasher, 29 Sefton Avenue, Mill Hill London NW7 3QB. Tel: 09567 09568.

Zone D (SW England): Julian Gannaway, G3YGF, Dean Hill Barn, East Dean, Salisbury, Wiltshire SP5 1HJ. Tel: 01794 40008.

Zone E (Wales): E Paul Essery, GW3KFE, 287 Heol-y-Coleg, Vaynor, Newtown, Powys SY16 1AR. Tel: 01686 628958.

Zone F (Northern Ireland): Ian Kyle, GI8AYZ, 1 Portulla Drive, Pond Park Road, Lisburn, Co Antrim BT28 3JS.

Zone G (Scotland): Post vacant, in locum until 31/12/95 - Ian Stuart, GM4AUP, 37 Meldrum Mains, Glenmavis, Airdrie, Lanarkshire ML6 0QR. Tel: 01236 765937.

For general advice and details on local clubs, or if you don't know who to contact:

Your **RSGB Liaison Officer** see this page and February *At Your Service*.

Specialists

Antenna Planning: Booklet free to members from RSGB HQ. Planning application refused – RSGB Planning Panel, via RSGB HQ. Planning Advisory Committee Chairman – Geoff Bond, G4GJB, QTHR.

Audio Visual: Library Co-ordinator – David Simmonds, G3JKB, QTHR.

Awards: For contest awards, refer to the appropriate contest committee. For other awards, enquiries and applications go to either the: HF Awards Manager – Fred Handscombe, G4BWP; IOTA (Islands on the Air) Awards Manager – Roger Ballister, G3KMA or VHF (and Microwave) Awards Manager – Ian L Cornes, G4OUT. Trophies Manager – David Simmonds, G3JKB.

Band Plans and operating practices: See the *RSGB Call Book* or April 95 *RadCom* for latest bandplans. For policy, contact the appropriate spectrum manager or committee chairman: HF Committee Chairman – David Evans, G3OUF, QTHR; VHF Committee Chairman – Peter Burden, G3UBX, QTHR; Microwave Committee Chairman – Steve Davies, G4KNZ; HF Manager – Post vacan; VHF Manager – Dave Butler, G4ASR; Microwave Manager – Mike Dixon, G3PFR.

Beacons: HF Beacon Co-ordinator – Prof Martin Harrison, G3USF, QTHR. VHF Beacon Co-ordinator – John Wilson, G3UUT, QTHR. Microwave Beacon Co-ordinator – Graham Murchie, G4FSG, QTHR.

RSGB Contests: First contact the appropriate contest adjudicator (see the contest rules). For policy, contact the respective Committee Chairman: HF Contest Committee – Chris Burbanks, G3SJJ, QTHR VHF Contest Committee – David Johnson, G4DHF, ARDF (direction finding) Committee – Post vacant.

EMC: Advice on solving breakthrough and other electromagnetic compatibility matters: First contact your local EMC Co-ordinators - see April *At Your Service*. Committee Chairman – Robin Page-Jones, G3JWI, QTHR.

Emergency: Emergency Communications Officer – Greg Reilly-Cooper, G0MAM, PO Box 98, Northwich, Cheshire CW9 5SZ.

Exhibition & Rally Committee: Chairman – Norman Miller, G3MVV, QTHR.

History: Society Historian – George Jessop, G6JP, 32 North View, Eastcote, Pinner, Middx HA5 1PE.

IEE: Liaison Officer – Peter Saul, G8EUX, QTHR.

Licensing: LAC Chairman – Julian Gannaway, G3YGF, see Zone D (left).

Membership Liaison: MLC Chairman – Peter Sheppard, G4EJP, see Zone A (left).

Morse: Morse Practice Transmissions Co-ordinator – David Pratt, G4DMP, 11 Moorleigh Close, Kippax, Leeds LS25 7PB. Chief Morse Test Examiner – Roy Clayton, G4SSH, QTHR.

Packet Radio: Datacomms Committee Chairman – Tom Lilley, G1YAA, QTHR.

President: Clive Trotman, GW4YKL, QTHR.

Propagation: Propagation Studies Committee Chairman – Charlie Newton, G2FKZ, QTHR.

QSL Bureau: Outgoing cards – PO Box 1773, Potters Bar, Herts, EN6 3EP. Incoming cards – your QSL sub-manager (see RSGB Call Book or July/Aug *RadCom* for a list). QSL Bureau Liaison Officer – John Hall, G3KVA.

Repeaters: Repeater Management Group Chairman – Geoff Dover, G4AFJ, QTHR.

Spectrum Abuse: Packet – Via Datacomms Committee. Repeaters – Via the Repeater Management group. Other – Via Licensing Advisory Committee. Intruder Watch Co-ordinator – Chris Cummings, G4BOH.

Technical & Publications: Committee Chairman – Dick Biddulph, G8DPS, QTHR.

Training and Education: Committee Chairman – John Case, GW4HWR, QTHR. Radio Amateur's Examination – George Benbow, G3HB, QTHR. Novice RAE – Hilary Claytonsmith, G4JKS, QTHR. Project YEAR Co-ordinator – Phil Mayer, G0KKL, QTHR.

The Society has a large number of volunteer experts available to help and advise members on a wide variety of subjects. Each month we will be focussing on a different section of the volunteer workforce, whilst still giving brief details of the main office-holders. See also the Information Directory section of the *RSGB Call Book*.

RSGB Liaison Officers

Part 1: Counties A – H

AVON (Zone D) – D Collins, G4ZYF, 63 Church Road, Hanham, Bristol BS15 3AF. Tel 0117 9676381.

BEDFORDSHIRE (Zone B) – Geoff Linssen, G0PIZ, 401 Dallow Road, Luton, Beds LU1 1UL. Tel 01582 415576.

BERKSHIRE (Zone D) – Dave Chislett, G4XDU, Hilltops, 2a St Marks Road, Maidenhead, Berks SL6 6DA. Tel Home 0628 25720; Work 0181 540 0600 ext 2086.

BORDERS (Zone G) – Ian Wilson, GM4UPX, 30 Howdenburn Court, Jedburgh, Roxburgh TD8 6JP. Tel 01835 62656.

BUCKINGHAMSHIRE (Zone D) – Ron Ray, G3NCL, Flat 4 Victoria Villas, Gladstone Road, Chesham, Bucks HP5 3AD. Tel 01494 776420.

CAMBRIDGESHIRE (Zone B) – Mr Michael Brooke, G8HXR, 70 Wooton Avenue, Old Fletton, Peterborough PE2 9EG. Tel 01733 340485.

CENTRAL (Zone G) – Post Vacant - refer to Zonal Council Member.

CHESHIRE (Zone A) – Dave Glover, G1VJP, 216 Alder Street, Newton-le-Willows, Merseyside WA12 8HS. Tel 01925 225445.

CLEVELAND (Zone A) – Chris Flanagan, G7NRO, 21 Pentland Ave, Billingham, Cleveland TS23 2PG. Tel 01642 553345.

CLWYD (Zone E) – Peter Higgs, GW4IGF, Oulton, Parkside, Rossett, Wrexham, Clwyd LL12 0BP. Tel 01244 570212.

CORNWALL & ISLES OF SCILLY (Zone D) – Bert Hammett, G3VWK, 'Rosehill', Ladock, Truro TR2 4PQ. Tel 01726 882758.

CO ANTRIM (Zone F) – Belfast: Gordon Curry, GI6ATZ, 4 Rocklands, Annhilt, Hillsborough, Co Down BT26 6NU. Tel 01846 638896. Co Antrim: Albert Henry, GI4CRL, 23 Long Common, Ballymena, Co Antrim BT42 2NU. Tel 026641068.

CO ARMAGH (Zone F) – Raymond Ashe, GI8RLE, 49 Deans Walk, Sleepy Valley, Richhill, Co Armagh BT61 9LD. Tel 01762 870423.

CO DOWN (Zone F) – North: see under Co Antrim, Belfast. South: see under Co Armagh.

CO DURHAM (Zone A) – John Deamer, G4SJY, 28 Brackendale Road, Durham DH1 2AB. Tel 0191 384 8313.

CO FERMANAGH (Zone F) – see under Co Armagh.

CO LONDONDERRY (Zone F) – Post vacant - refer to Zonal Council member.

CO TYRONE (Zone F) – Post vacant - refer to Zonal Council member.

CUMBRIA (Zone A) – Mike Gibbings, G3FDW, 5 Meadowbank Lane, Grange over Sands, Cumbria LA11 6AT. Tel 01539 532433.

DERBYSHIRE (Zone B) – Ken Frankcom, G3OCA, 1 Chesterton Road, Spondon, Derbyshire DE21 7EN. Tel 01332 662818.

DEVON (Zone D) – Mr D Hind, G3VNG, Greengates, 4 Thornyville Villas, Oreston, Plymstock, Plymouth PL9 7LA. Home Tel 01752 401511.

DORSET (Zone D) – Phil Mayer, G0KKL, 16 Haig Avenue, Canford Cliffs, Poole, Dorset BH13 7AJ. Tel 01202 700903.

DUMFRIES & GALLOWAY (Zone G) – Post Vacant - refer to Zonal Council Member.

DYFED (Zone E) – Martin Goodall, GW8ZMU, 91 Uzmaston Road, Haverfordwest, Dyfed SA61 1UA. Tel 01437 764009.

EAST SUSSEX (Zone C) – Jim R Harris, G4DRV, 11 Boscawen Close, Eastbourne, East Sussex, BN23 6HF. Tel 01323 728479.

ESSEX (Zone C) – Malcolm Salmon, G3XVV, 54 Church Road, Rivenhall, Witham, Essex CM8 3PH. Tel 01376 514377.

FIFE (Zone G) – Post Vacant – refer to Zonal Council Member.

GLOUCESTERSHIRE (Zone D) – Post vacant – refer to Zonal Council Member.

GRAMPIAN (Zone G) – Mr Stewart Cooper, GM4AFF, 10 Cliff View, Newtonhill, Stonehaven, Kincardineshire AB3 2GX. Tel 01569 731407.

GREATER LONDON (Zone C) Post vacant – refer to Zonal Council Member.

GREATER MANCHESTER (Zone A) – See under Cheshire.

GUERNSEY & DEPENDENCIES (Zone D) – Brian Ayres, GU1HTY, Rousey, Bailiffs Cross Road, St Andrews, Guernsey, CI. Tel 01481 36104.

GWENT (Zone E) – Peter Dombrowski, GW1NYO, 30 Hillary Road, Newbridge, Newport, Gwent NP1 5DD. Tel 01495 246359.

GWYNEDD (Zone E) – North: Dewi Roberts, GW0ABL, 23 Lon Hedydd, Siglan Farm Estate, Llanfairpwll, Anglesey, Gwynedd LL61 5JY. Tel 01248 713647. South: Gordon Rogers, GW0RJV, Maes Guersyl, Garthmyl, Montagomery, Powys SY15 6RS. Tel Home 01686 640611 Work 01686 630327.

HAMPSHIRE (Zone D) – Ian Bennett G6HNJ, Ravenswood, The Shires, Hedge End, Hampshire SO30 4BA.

HEREFORD & WORCESTER (Zone B) – John Marks, G0OWT, 61 Sebright Road, Wolverley, Kidderminster, Worcs DY11 5UA. Tel 01562 850061.

HERTFORDSHIRE (Zone C) – John Rudd, G7OCI, 23 Grange Gardens, Ware, Hertfordshire, SG12 9NE. Tel 01920 466639.

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October 20 & 21

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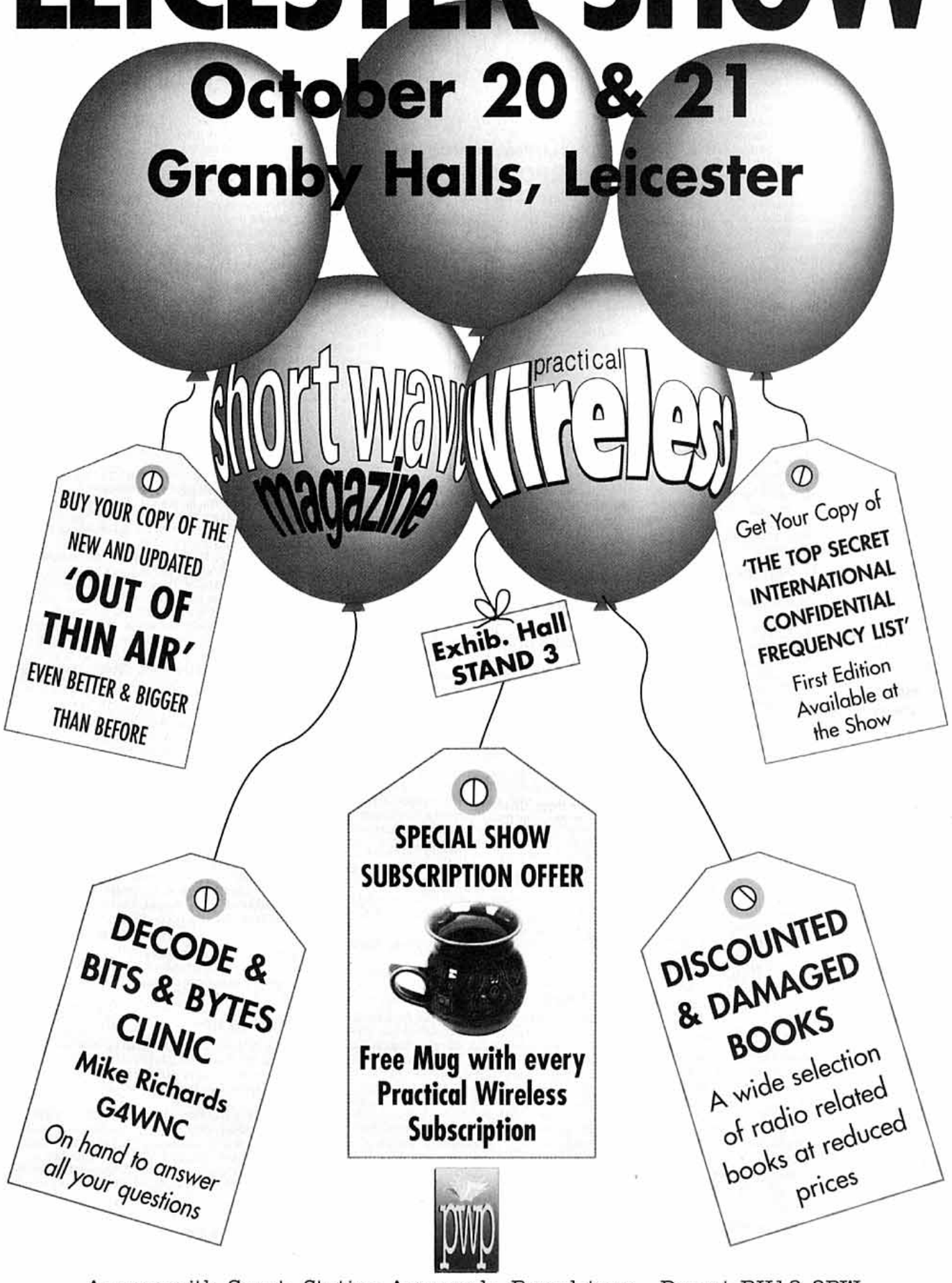

Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW
Telephone: (01202) 659910 Facsimile: (01202) 659950

The LAST WORD

THE MORSE TEST MATCH

Of course there isn't a "genuine technical requirement for a Morse test" (*The Last Word*, August 1995). Although not expressing RSGB policy, the comments of the last consultation exercise on the subject (*RadCom* December 1993) were plain enough: "clearly without a Morse test the likely increase in HF activity would affect HF operators", and again: "for a long time it has been accepted that the Morse test does provide a limiting effect on the number of radio amateurs using the finite resource of the HF amateur bands". Thus the Morse test exists as a means to limit access to the HF bands. What is urgently needed is the evidence to support the theory that HF operations would be seriously affected if unrestricted access was granted to B licensees.

I am not anti-CW. I had the privilege of being trained by a retired Cable and Wireless telegraphist and have been imbued with his enthusiasm for CW ever since. It is a wonderfully effective mode of communication which I use almost exclusively. But I have not come across a rationally-argued case that CW is *the* essential requirement for an A licence. It exists to limit access to the HF bands for reasons that are half-baked at best and prejudiced at worst, and presented without any supporting evidence for the possible adverse affects to HF operations.

If it can be shown that access to the HF bands must be limited, then careful consideration should be given as to how to achieve this without making HF operations difficult, if not impossible, for less able operators. The Morse test is not the way to do it. The RSGB should put its 'thinking cap' on and come up with some well-thought out proposals. But first, get the evidence.

Dr J M Nelson, G4KLA

. . . I am tired of seeing claims by the anti-Morse brigade that Morse is 'outmoded' (*The Last Word*, Aug / Sep). When bands are becoming more and more crowded, what is outmoded about a form of communication which:

a. uses less bandwidth,

b. can be used successfully in very poor conditions,

c. can be read over strong QRM,

d. can be used successfully with very low power and simple equipment,

e. can be used by those who have speech impediments, and

f. is understood world-wide, regardless of language?

Outmoded my foot! Quite apart from that, many of us who enjoy music enjoy Morse for its aesthetic appeal. Well-sent Morse is a pleasure to hear. I realise that it is useless to explain this to an anti-Morse type. It is recorded that someone once asked the jazz pianist Fats Waller, "Mr Waller, what is rhythm?" Fats replied, "Lady, if you have to ask, you ain't got it!" Manifestly, the anti-Morse brigade ain't got it.

John Allison, G0LYY

. . . Once again the question of abolishing the Morse test has raised its ugly head. In my view I consider the powers that be did amateur radio a great dis-service when the class B licence was introduced. It brought into the hobby a bunch of moaners intent on getting rid of the Morse test mainly I suspect because they are incapable of passing the test, as I imagine is the case with David Mann and Brian Moran.

When the amateur licence returned just after the war, everybody knew the Morse was part of the examination and there was never any query. I hope that the authorities insist that the CW test remains for the class A licence, and I for one do not want class B operators on the HF bands merely because they are incompetent in Morse code.

Harold McIntyre, G3FLJ

MEMBERS' ADS REALLY WORK!

I would like to express my gratitude to all those readers who telephoned and sent information and equipment in reply to my wanted ad for VCR97 base and details in a recent edition of *RadCom*.

The response was so overwhelming that I haven't been able to reply individually to everyone, so I hope they will understand and accept this general letter of apology, with my sincere thanks.

Hazel Yates Jones, G7RGI

CUBAN PENPAL

I am a Cuban radio ham, CM2PD, 20 years old, and I would like to correspond with amateurs in the UK or all over the world. I am a CW and QRP enthusiast. I will try and answer all letters from all ages.

Ernesto Pe'rez, Calle 7 No 54, Vista Hermosa, Camaguey - 70300, Cuba.

COMMONWEALTH CORPORATE MEMBER

I have been looking forward with some pride to joining that select group of members who have sixty years of unbroken membership with RSGB. I was BRS2411 and 2AOV in 1936, followed by G3AH in 1937. However, my anticipation is somewhat soured when I read page 9 of *RadCom*, August 1995. It appears that the subscription discounts will apply only to Home Corporate members and not to us lesser breeds who live in Commonwealth or foreign countries. Perhaps someone could explain how sixty years of continuous membership is somehow devalued by the location of one's domicile?

John Wightman, ZL1AH, ex-G3AH

[Marcia Brimson, 2E1DAY, RSGB Marketing Manager, has now confirmed that free life membership will be available to all *those who have completed 60 years of continuous membership, regardless of their membership category. Likewise, the 50% discount for 50 years of continuous membership applies to all members* - Ed*]*

PHILOSOPHICAL THOUGHTS

Further to item on page 13 (*RadCom* August 1995), regarding the activities of the Search for Extra-Terrestrial Intelligence League of New Jersey, USA. Whilst today's amateur communications, computing and electronics equipment out-performs that of the past, the basic laws of science and physics have remained unaltered. However, for the amateur, much could be learned over the twenty years or so of the project.

For radio signals to reach the nearest possible 'civilization' would take around 1630 years to travel the required average distance of 250 parsecs. The parsec is the unit of distance measurement which equals 3.261 light years. The speed of light is 300,000km per second (186,451 miles per second), one light year is 9,460,800,000,000km!

If there is intelligent life 'nearby' I wonder what equipment will be in use in about 3260 years time to receive a reply and who or what will be operating it? Who is to say that other lifeforms would recognize our intelligence?

Mike Shread, GM6TAN

RSGB KEEP-FIT BOOKS?

Congratulations on the new *RadCom Handbook* (6th Edition) which is technically stimulating but, alas, not very user-friendly. Its bulk and weight are such that one needs a week at a health farm, prior to an exploration of its fascinating interior; such a massive tome can never be bedworthy. Respectfully suggest a committee be formed with the judgement of Solomon to bisect this lovechild into two manageable parts for future editions. Division between the frontiers of HF and VHF/UHF could trigger endless squabbles but result in slimmer editions.

W F Hull, G0VKN

Please note that the views expressed in *The Last Word* are not necessarily those of the RSGB. We reserve the right to edit letters for publication. All letters are acknowledged and may be passed to the relevant department or committee.

SPECTRUM REVIEW

There has been a fair deal of ado about the RA's spectrum review document, with appropriate noises from the RSGB. While everyone obviously supports the Society's aim to preserve as much as possible of amateur VHF / UHF / microwave spectrum allocation, I personally rather fear it will prove impossible to prevent some world-wide erosion, especially of the more obviously under-used frequencies. I see an analogy to the 'twenties to 'forties, when amateurs were more and more restricted in HF allocations in response to demands from (allegedly) more important interests. It may not be an effective use of time and money defending the indefensible to the last ditch.

On the other hand, I think that the Society and IARU should consider the question of increased amateur HF allocations now that all sorts of commercial, utility and military bodies are reducing their HF facilities in favour of satellite and other more consistently reliable modes. I for one, and my bit of wire, would almost certainly benefit from some more 'phone band space between 80 and 20m.

Alex 'Sandy' Dick, GM0IRZ

IT CAN BE DONE!

I am one of fourteen people who, following our training at the Barking Radio and Electronics Society, took our City and Guilds Examination in May this year. Of the fourteen entries, we had eleven passes including Max, G0WHW, who is trying to find somewhere to cash the credit he was awarded on one of the papers. Sorry Max!

On behalf of my group I should like to offer our thanks to the club, and in particular our tutor Alan, G0EAG, for his patience and hard work in running a first class course.

John Barwell, G7VBF

. . . After 14 months learning and practice, I passed my Morse test for my A licence. This is all due to Jim, G4YMK, who sent slow Morse for an hour each night, Monday to Friday. Jim never let me down, he was always there.

It was hard work, but I stuck with it and being 61 years old, age did not help. I read that a lot want it 'on a plate' and to finish with CW. They don't want to put the hard work into it, or they don't want the A licence very badly, only if you give it to them. But it is a wonderful feeling when you pass, and it's all thanks to Jim, G4YMK, and Ian, G0WHX, who took me to the test station. Thanks very much.

Ray Pratt, G1WWU (soon G0WWU)

NOT A HAPPY HAM

The RSGB and its window on the world *RadCom* have long been synonymous with the highest standards of precept, performance and presentation, and still reflect the spirit and ideals of radio's early days. However, despite the general excellence of John Hall's work and column, I must take exception to his choice of phrase in *QSL* (*RadCom* September 1995.)

In this country the term 'punter' has a derisory, derogatory and contemptuous connotation. As a member of the radio amateur fraternity I have enjoyed its world-wide, honest, good-humoured fellowship for 57 years. *'Ham'* I have always been, but *'punter'* certainly not. The expression is ill-mannered and redolent of a type of behaviour which, alas, has been creeping up on the air for some time.

W A (Andy) Croxall, G2FRT

[John Hall, G3KVA, replies: "*I have always thought obtaining a QSL card a bit of a gamble! My apologies, however. I would never knowingly hurt anyone's feelings.*"]

BEARING UP

I use a 1910 - 20s Morse key. Its bearing is a long thin tapered pin that goes from one bracket, through the trunnion and into the bracket on the other side. With the tension spring disabled the lever moves with negligible friction.

I therefore question why, almost without exception, modern Morse keys have ball bearings? Are these bearings a fashion accessory like a streamline housing or 'send faster stripes'? Can someone tell us the percentage improvement in sending speed or reduction in the length of time of a QSO that ball bearings confer?

Bruce Carter, GW8AAG

THE LAST WORD . . .

So people continue to be upset by the Tony Hancock 'Radio Ham' sketch (*The Last Word*, September). Could it be that he got too close to the truth?

Steve Thompson, GW8GSQ

CLASSIFIED ADVERTISEMENTS

Classified advertisements 55p per word (VAT incl) minimum 14 words (£7.70). Please write clearly. No responsibility accepted for errors. Latest date for acceptance — 5 weeks before 1st of issue month.

All classified advertisements MUST be prepaid.

NB: CHEQUES SHOULD BE MADE PAYABLE TO RSGB.

Copy and remittance to: **Malcolm Taylor Associates, East Wing, Old Manor House, Hunts Common, Hartley Wintney, Hants, RG27 8AA.**

NB. Members' Ads must be sent to "Members' Ads," RSGB Hq.

FOR SALE

G4TJB QSL Cards printed to your specification, send large SAE for samples and full product list. Unit 6, Worle Industrial Centre, Coker Road, Worle, Weston-super-Mare, BS22 0BX. Tel/Fax: (01934) 512757.

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ADVERTISERS INDEX

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The display advertisement copy date for our November 1995 issue will be
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Advertisers please note that the address for all copy and enquiries is:
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"With the Smart Controller Mic, all the radio functions are in your hand."

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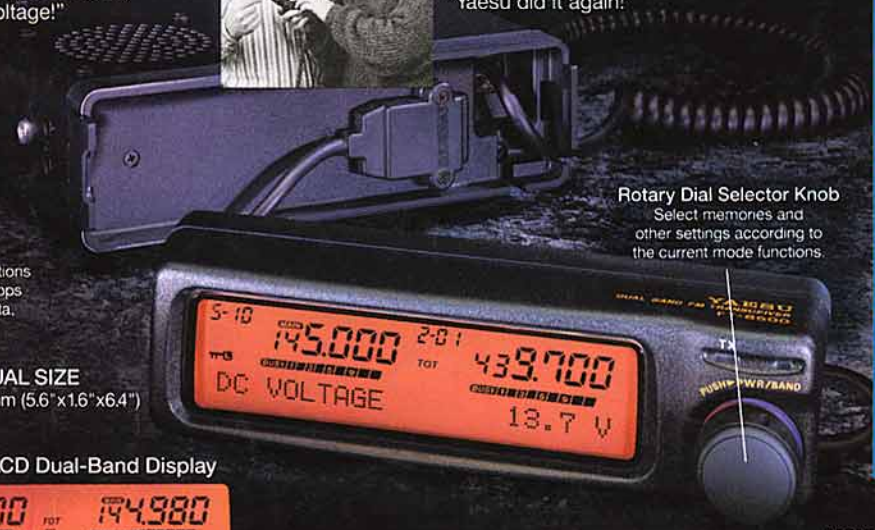

Rotary Dial Selector Knob
Select memories and other settings according to the current mode functions.

ACTUAL SIZE
140x40x160mm (5.6"x1.6"x6.4")

Specifications

- **Frequency Coverage:**
  2m RX: 110-174 MHz
  TX: 144-146 MHz
  70 cm RX: 420-500 MHz
  TX: 430-440 MHz
- Spectra-Analyzer™ w/adjustable signal width, spacing & span markers
- 6-Character Alpha-Numeric Display
- 110 Memories (in 5 memory banks)
- Omni-Glow™ Display
- Digital voltage display
- Selectable 1200/9600 baud
- 3-Level Auto-Mute w/Mute Timer
- V+V, U+U, V+U Dual Receive
- 3 Power Output Levels
  2 m 50/10/5 Watt
  70 cm 35/10/5 Watt
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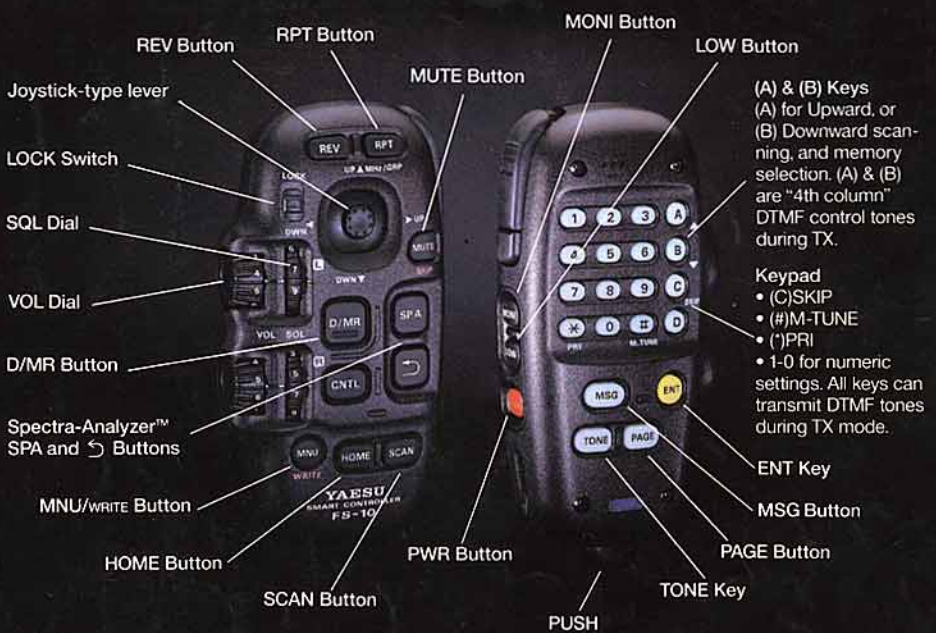
- 9 Memory DTMF Autodialer
- Handy Cloning Feature
- 3 Scanning Modes w/ Clear Scan
- Adjustable LCD Contrast/ Brightness Control
- **Accessories:**
  Consult your local Yaesu dealer.

Omni-Glow™ LCD Dual-Band Display

VHF&VHF, UHF&UHF, VHF&UHF
Select three dual band configurations. Menu loop contains 13 headings and 53 transceiver settings. Shown with custom 6-character alpha-numeric code.

Spectra-Analyzer™ displays station activity above and below the current operating channel. In Memory Recall, display signal strength of programmed channels.

Built-in digital voltage display monitors automobile battery voltage. Menu-Selectable Packet Baud Rate. Choose 1200 or 9600 bps.



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