Radio Communication

The Journal of the Radio Society of Great Britain

July 1991

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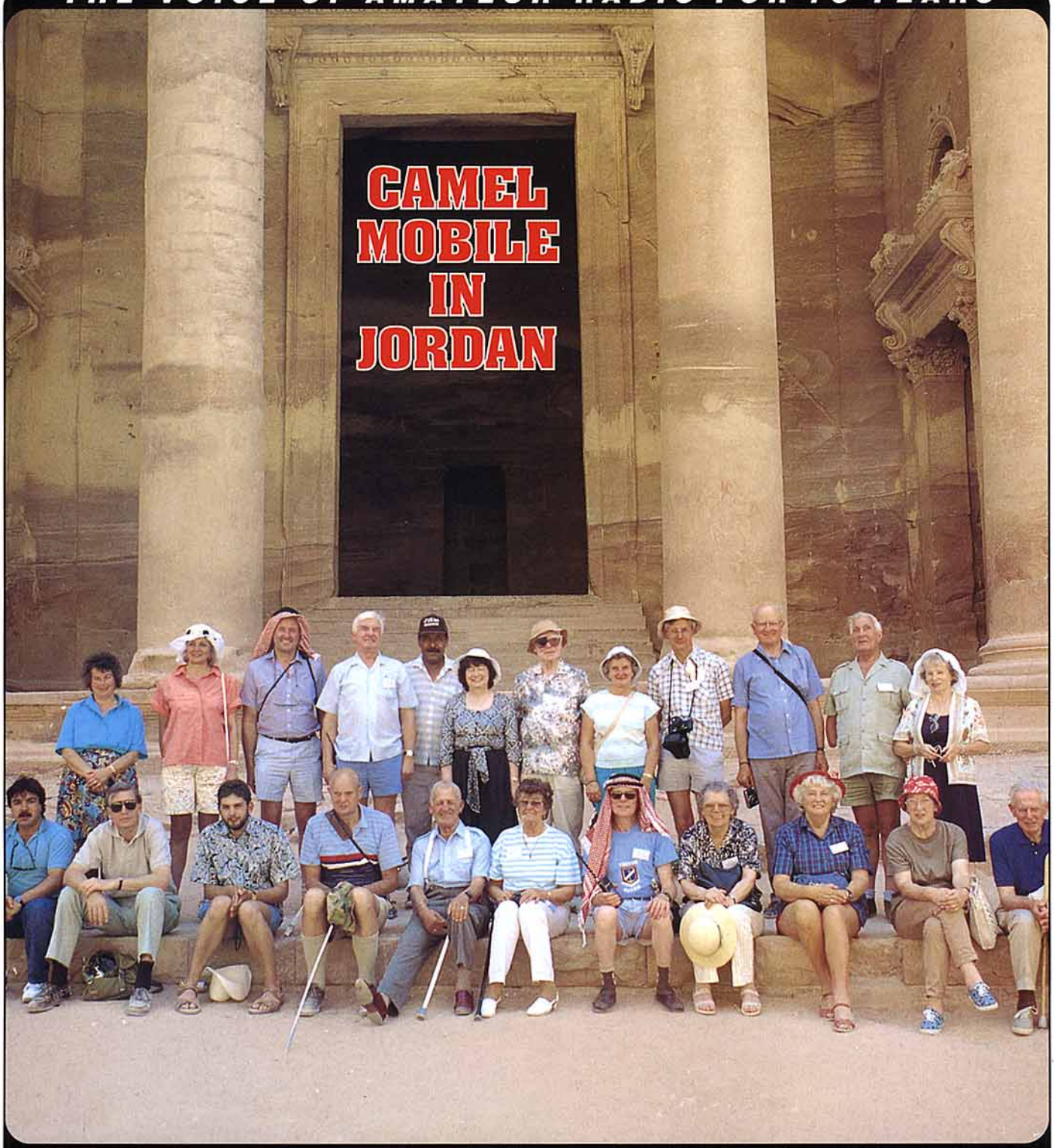
THE VOICE OF AMATEUR RADIO FOR 78 YEARS



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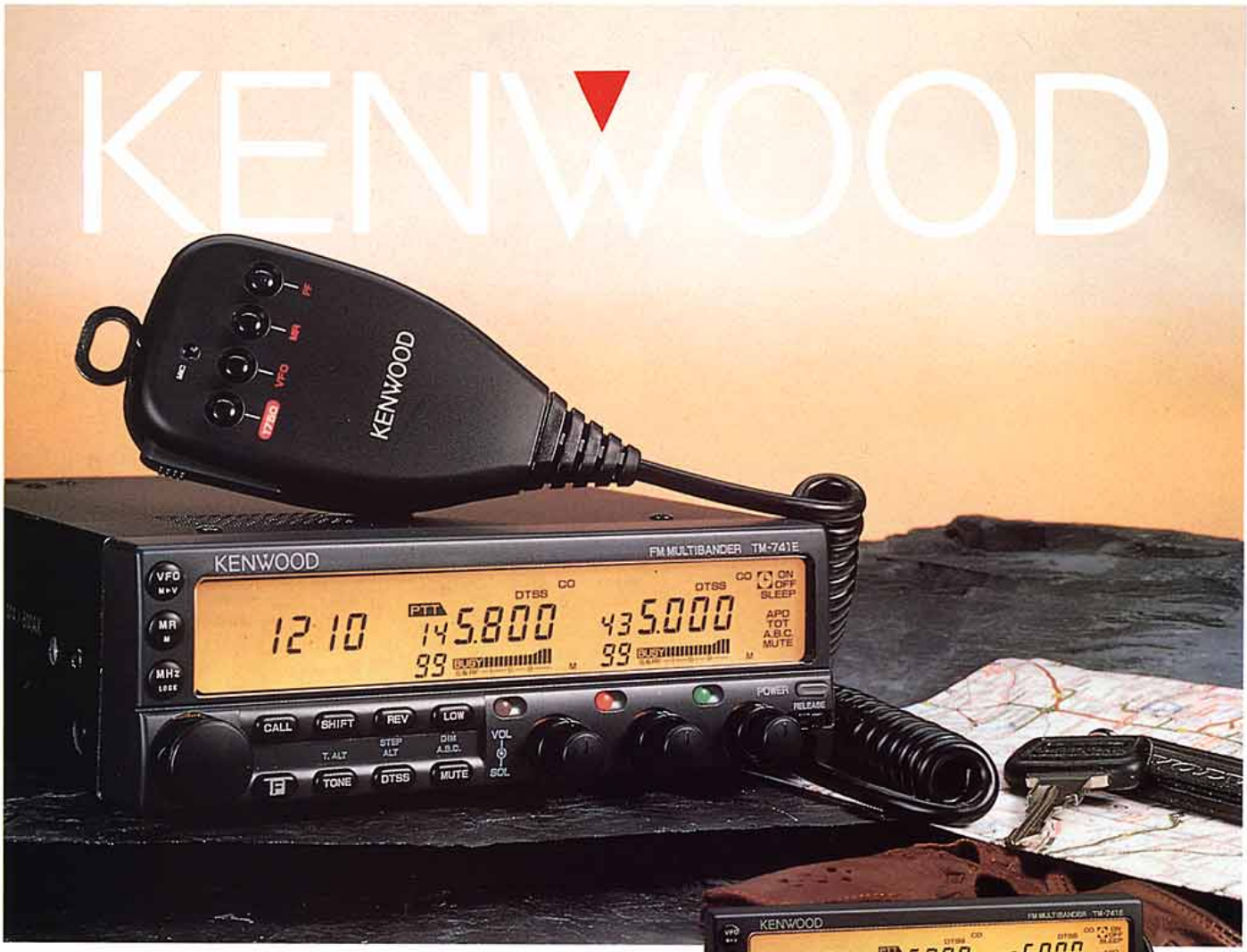

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Radio Communication

Now *RadCom* has sixteen pages of colour *every* month:

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NEWS AND REPORTS

TECHNICAL FEATURES

COVER PICTURE:

Members of the St Dunstan's Amateur Radio Society outside the famous Treasury in Petra, the Rose-red City carved out of sandstone rock in the South Jordanian Desert.

See colour feature on page 42.

REGULAR ARTICLES

RADIO SOCIETY OF GREAT BRITAIN

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

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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

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Affiliated club or society/registered group (UK): £30.00 (including *Radio Communication*): **£17.95** (excluding *Radio Communication*) (Subscriptions include VAT where applicable)

Membership application forms available from RSGB HQ

From the Secretary's Office

WELCOME NOVICES

NAME ANY HOBBY, sport or leisure activity and all over the Nation you will find the 'old hands' passing on their skills and tips to the newcomers. That is precisely what we all hope will happen when the UK novices get on the air on 25 July.

Some 200 students completed the Novice Training Course in time to take the very first Novice RAE on 3 June. We expect to see a greater number take the examination in September, and even more at subsequent examinations.

The RSGB's Novice Licence Training Course has gone reasonably smoothly so far with the RSGB's Training and Equcation Advisory Group receiving much feedback on the bad and good points of the course and its administration. The course instructors all over the UK did a marvelous job. We did not expect an entirely smooth ride the first time round and a number of problems had to be solved quickly thanks to the volunteers and HQ staff. The biggest problem, which did cause a lot of frustration, was trying to find examination centres at which the Novice RAE could be taken. The City and Guilds of London Institute, which operates this examination, did hope and expect that their centres which currently hold the (full) RAE would be able to offer the Novice RAE. However, for a number of reasons this did not prove to be the case in June. We hope that this is just a teething problem; nevertheless it is one which will have a serious impact on the Novice Licence programme if it is not resolved quickly. The RSGB is taking this up at high level both with the C&G and the RA.

On 25 July, the Minister will present the very first Novice Licence and from that day on we can all expect to start to hear UK novices on the air with their destinctive '2' callsigns. All beginners need help so do encourage them at every opportunity. Set them a good example which they can take with them through their amateur careers. Use your best voice procedure and wind down your keying speed. Remember that in a few years time the UK Novices will be doing all the things that we enjoy and take for granted now, whether it be working a DX pile-up, sending TV pictures, operating packet, designing or constructing equipment, ragchewing or bouncing signals off the moon.

Recall the never-to-be-forgotten thrill of your own very first contact and extend a welcoming hand to all of the newly licensed amateurs you hear on the air.

David Evans, G3OUF

NEWS & REPORTS

HQ NEWS

AFTER A VERY GOOD APRIL, with the results of the NEC Exhibition contributing to a better than expected surplus for that month, we have had a relatively quiet May. Our cash-flow is benefiting from the early receipts from July renewals but these will be carried forward to next year as a matter of prudent accounting policy.

Gill Mitchell, who has looked after members' queries over the telephone, left earlier this month and Emma Branson has enthusiastically taken over this role. I am planning some alterations to the reception area to make it much more member-friendly with all our publications on display. It should be more accessible, allowing members to browse through our books, watch a video perhaps, and study other literature pertinent to the hobby.

The Society has over the past few months conducted a detailed survey of what members want from their society. This has proved most useful and the results have been analysed into categories, and charts produced showing the levels of interest of our membership. I would like to have been able to publish these so that members who completed the pink slips can see the results of their efforts. However, the results were so interesting and useful to us that they would have a real commercial worth to other magazine and book publishers. Rest assured that we are using the survey result when formulating Society policy.

As a result of the success of that survey, I would like to know the answers to some general questions which seem to be important to some members. I am sending out a simple 'yes/no' questionnaire with all future renewal reminders. I hope to publish the results in *RadCom* as they are unlikely to be commercially sensitive.

I am often asked by members of the Society how they can help, and I find this difficult to answer because we have no structure to co-ordinate such help at present. To remedy this, I am trying to improve the facilities at HQ to enhance members' ability to assist the Society.

I would like to make much more of our historical resources and heritage to re-create a sense of pride in the Society, its Headquarters and many achievements.

We have a certain amount of maintenance to do at Lambda House in the next year, specifically the wiring which must be done first before we tackle re-decoration work.

To reassure those members who may have thought that the President's 'roof fund' was set up actually to finance roof repairs, this is not so; the roof fund was merely an analogy. The roof is in excellent condition and should not need any further attention for some years.

My last meeting with RLOs was very useful and I shall be meeting another group in Wales in a few days time. This provides me with a two-way communication with the membership. I was also at Elvaston Castle Rally this last weekend and had an opportunity to meet many members and see the tremendous enthusiasm of the radio clubs represented.

As part of the plan to improve communication between members, Council and HQ, the minutes of Council meetings are now available to members on receipt of a stamped self-addressed envelope. They are also available to non-members for £1 and an SASE. Our new Company Secretary has achieved the difficult task of producing the minutes in a much shorter form than has been the case in the past. However, this is not an abridged version - these are the complete and only minutes.

Several months ago I was able to let 10% of our office space and the yard at Lambda House to a commercial enterprise for a substantial rent. That income now covers 80% of the HQ rates bill and, as a result, priority can be given to implementing a maintenance programme for the building.

I am shortly to visit the US national society, ARRL, with an open brief to discuss business and amateur radio topics. I hope to explore areas of mutual interest and learn something of the way ARRL do things. If you have any useful comments, please write to me before 20 July. My aim with this column is to inform, stimulate debate, discussion and float ideas.

Philip Smith
General Manager

Royal operator gives K1RAW the contact of a lifetime

Edward's Wild about Amateur Radio

ON THURSDAY, 23 May, amateur radio and the Novice Licence were on parade at Whipsnade Wildlife Park, where a double celebration was taking place: the 60th anniversary of the Wildlife Park as well as the 35th anniversary of the Duke of Edinburgh Award Scheme. A large area of the park was taken over with exhibitions and demonstrations of musical and athletic pursuits, hobbies and pastimes which form part of the DOE awards.

The Dunstable Downs Radio Club, supported by the RSGB, put on a comprehensive display of amateur radio including two HF stations, a VHF station, Slow Scan TV and a weather satellite demonstration. The hobby's appeal to youth was emphasised with the Novice Licence having a high profile.

Dunstable Downs Radio Club Chairman, G4ENB, supervises HRH Prince Edward's first experience of amateur radio.

It is not reigning . . .

Whilst Dunstable RC Chairman G4ENB was in contact with K1RAW in Boston, using the call GB1DOE, a swarm of press descended. HRH Prince Edward entered and was invited to sit down and experience amateur radio at first hand. To say that K1RAW was shocked to find himself in conversation with a real English prince was an understatement! The Prince showed a high degree of competency in handling the contact, obviously an expert in radio communication.

After being introduced to Dick Joyce, G3WLM, DDRC President, and Hilary Claytonsmith, G4JKS, RSGB's Project YEAR Coordinator, the Prince moved on to inspect more of the displays.

During the day, 15,000 children from all backgrounds and of all ages enjoyed themselves getting a taste of a variety of leisure activities and skills. Much interest was shown in the amateur radio area, with youngsters clamouring to go on the air. They showed no apprehension and became 'amateur radio naturals' as they chatted to amateurs all over the world.

Other helpers from DDRC included: G1JCC & XYL Wendy, G1NWZ, G8ADC, G0OJB, G0OIL, G3NVL, G4WYO, G7CWK, G1ATQ, G1ALL.

Former Indian Premier, Rajiv Ghandi, who was assassinated last month. As VU2RG, he was a firm supporter of amateur radio in India. He recently operated a station set up by the Indian national society NIAR at Vijayawada for cyclone operation.

● South Midlands Communications Ltd (SMC) regret that the showroom at Eastleigh will be closed for stocktaking on Friday 28 June. It re-opens on the 29th.

● The fifth IEE International Conference on HF Radio Systems and Techniques takes place at Heriot-Watt University, Edinburgh, 22 - 24 July. Details from IEE Conference Services, Savoy Place, London, WC2R 0BL.

● RSGB's new Trophies Manager is well known contester Bob Harrison, G4UJS. He takes over from Hilary Claytonsmith, G4JKS.

The first British astronaut, Helen Sharman, at the Royal Aeronautical Society on her return to the UK.

Return to Earth

THE FIRST Briton in space, Helen Sharman, completed her successful trip after six days on the soviet Mir space station. She returned to earth with Musa Manarov, U2MIR. Three British projects were undertaken: 'The Earth from Space' taking high resolution pictures of the earth as an educational resource; 'Seeds' which will provide 5,000 schools with an exciting space project; and 'Space Station Mobile'.

This latter project involved Helen using the amateur radio station permantly installed on the Mir space station to talk to a number of British schoolchildren who were operating their school radio club stations. The special callsign GB1MIR was issued following representations to the RA by the RSGB. Towards the end of Helen's time on Mir, she had the opportunity to make random QSOs with several British amateurs, despite a high noise level on her receiver. GB1MIR was a very strong signal on Earth and many were able to hear their first space amateur.

On her return, she attended a Press Conference at the prestigious Royal Aeronautical Society (RAS), an organisation not unlike the RSGB in concept but devoted to exploration in the air and in space. The RAS presented Helen with their Gold Medal in recognition of her contribution to aeronautical science and astronautics.

During the conference she reported that one of the most difficult jobs to do whilst weightless was putting on her socks which, of course, involves two hands and one foot at a time. She finally managed to jam her spare foot behind an equipment panel and hang on with her toes! Care was also needed to prevent a weightless drop of water getting into the electronics. Learning Russian was the most difficult part of the training. Her tutor could speak no English so early communication was in French and German. Text books were completely in Russian. Despite these snags, the total emersion in the language quickly did the trick, and the long message she gave to Russian TV from the RAS sounded very proficient.

From space she was able to see the Kuwaiti oil fields ablaze and huge shoals of plankton off the West coast of Ireland, but missed seeing the Great Wall of China which is the only man made object visible from the Moon.

She told *RadCom* that she enjoyed her amateur radio experience but the large number of stations audible over Europe meant she could be heard far better than she could hear.

The space station was quite noisy - a permanent 75dB from the ventilation system - and most experiments had motors or fans. The only smell was the food!

A RADCOM EXCLUSIVE!

The Helen Sharman Interview

AS AT THE previous week's Press Conference, Helen Sharman came over as being unflappable and confident, obviously qualities which helped her to be selected from 13,000 candidates. She was nevertheless charming and . . . . dare we say it . . . . down to earth.

Clearly impressed by the front cover of the first edition of *D-i-Y Radio* featuring the JUNO Mission -"Great!", she signed a proof copy.

Helen took great interest in the copies of *Amateur Radio for Beginners* and the *Space Radio Handbook* presented to her by *RadCom* Editor Mike Dennison, G3XDV, on behalf of the Society.

What radio equipment was on board? There were various handhelds for communicating within Mir coupled to an internal loudspeaker system, and similar equipment for contacting the ground. An antenna malfunction on the Soyuz spacecraft had caused a 5° error when starting the docking procedure from several tens of kilometres from Mir. This had to be over-ridden manually. Helen revealed that, unlike popular space fiction, the crew did not eat meals in the form of boring pills. They had perfectly normal and typically Russian food - cans of fish or meat, tubes of soup and fruit juice - these have to be squeezed to get the liquid out, dried food such as soups, grains (rather like porridge) and dried cheese with nuts. Eating and swallowing was not impared by weightlessness, "after all", she explained, "on earth you can still eat and drink whilst standing on your head."

It was not only English amateurs who contacted GB1MIR. One VK and a ZL were privileged to talk to her. These were chance contacts as she passed the 'shack' whilst U2MIR was operating. There were very few opportunities for such QSOs owing to the short stay on the space station. Apart from one TV interview, the amateur radio activity afforded the only oportunity to speak English whilst in space.

There had been a continuous round of press conferences and interviews since Helen's return to earth. How did she feel about questions from schools? "Young people always ask the best questions, the most sensible and most interesting - and they are the most polite people too." Putting *RadCom's* editors firmly in their place, she added "I would much prefer all reporters to be young people."

Although like all youngsters, she had been interested in space travel, and had followed the Apollo Missions at school, it was not until the opportunity arose for a British presence in space that she became interested in becoming an astronaut.

What about the benefits of an interest in amateur radio for a future astronaut? Well, obviously it helped having a hobby in which you never stop learning - about life and the world - these are the most interesting hobbies.

A final comment from the first British astronaut on seeing that the new RSGB book *Amateur Radio for Beginners* starts off with the space shuttle - "Ah! Brilliant".

Cofion gorau (that's Welsh for 73s) from GB1JUNO, Bigyn Co Primary School, Llaneli: (l to r) Garry, Carl, Claire, Thomas and Rhian, with teacher Rowland, GW7EPO, wearing the JUNO tee-shirt.

GB8JUNO, Orwell Park School: (l to r) Pupil Andrew Beamish with Paul, G4YQC; Clive, G6MCG; Neville, G0JVU, of Felixstowe and District ARS.

Richard Horton, G3XWH, who co-ordinated the JUNO radio stations, and the girls of Harrogate College - GB0JUNO.

GB5JUNO, Belfast Royal Academy: (l to r) Jonathan Chin, Geoffrey Woods, Glenn Carberry.

Excitement and Frustration as Schoolchildren Prepare to Talk to Astronaut

GB1MIR Calling

THE ROYAL Grammar School, Guildford, was allocated GB7JUNO. Contact was made with GB1MIR on the first orbit, though this proved to be very short. Next time round, though, there was time to ask two questions, about her appetite and what she could see in space - she could only see the bits of the Soyuz capsule coming from the engine, plus the Moon and stars. Interest in the event has swollen the radio club membership from 10 to 25.

The only Welsh school involved was Bigyn Co primary School which used the call GB1JUNO. Their poem appears in *The Last Word*. The event was covered by three TV crews and other press teams.

GB4JUNO was the call of Canterbury High School. No strangers to communicating with space travellers (see *RadCom*, April 1990), the pupils were able to see amateur radio demonstrated by local club members, using equipment loaned by ICOM (UK). Contacts included a teacher from Casablanca High School (CN8GM) and W8ZJI who described in detail the excitement of watching shuttle launches. On 9 May, the Rt Hon Kenneth Clark, Secretary of State for Education and Science, visited and sent a greetings message during a QSO with Australia.

Another notable contact was with W4GXT who had lost contact with Canterbury amateur G3JES. The school was able to get them back together on the air, an event which reinforced everything which had been said about the excitment of amateur radio.

On the first sked with Mir there was only time to exchange callsigns. Disappointingly, Helen's workload prevented amateur radio activity during the other sked times. On the plus side, the children were impressed by the many encouraging messages, especially from soviet amateurs who were pleased to have a British guest on Mir.

Fourteen radio club members from the Belfast Royal Academy ran GB5JUNO which was operated for 42 hours during the mission. Pupils gained valuable experience from this for their Novice exams. Unfortunately, they were to be disappointed as Helen was unable to go on the air during the scheduled passes. All was not lost, however, as they connected to the Mir packet station and left a message.

A competition was held at the Orwell Park School in Ipswich (GB8JUNO) for the best question to ask Helen Sharman, the prize being to ask the question personally. The local press was very interested and pictures of the radio station were published.

Contact was established with Helen but, as with the other JUNO stations it proved hard going owing to the large number of stations audible on Mir. Packet messages were also exchanged with U2MIR. Anglia TV, BBC Radio Suffolk and BBC Radio 5 were present. This resulted in some excellent media coverage, including a re-run on Radio 4's *Pick of the Week*. The children's interest was well and truly captured by the clear signals received and the very strong Mir communications channel just below 144MHz. Result - eight pupils and their Physics teacher now want to take the Novice licence.

YOUR VERY OWN SPACE TEE-SHIRT

As an RSGB Member, you can own one of the special tee-shirts designed exclusively for the JUNO mission, *and* help a good cause.

Money from the sale of these tee shirts will go towards covering the costs of "JUNO: A Mission for Education", organised by Space School. Also, for every tee-shirt sold, Space School will donate £1 to help youngsters enjoy amateur radio.

Send a cheque or postal orders for £7.50 inc. post and packing, made out to "Brunel University Space School" plus the flash from this page, to Rodney Buckland, Space School, Brunel University, Uxbridge, Surrey. Don't forget to say what size you are (small, medium, large, or extra large).

RSGB/JUNO TEE-SHIRT OFFER

COUNCIL BRIEF – 12 May 1991

- The President welcomed Nigel Roberts, G4IJF, to Council as a co-opted member to fill the post vacated by the resignation of Hilary Claytonsmith, G4JKS. He also welcomed John Hall, OBE, G3KVA, to his first Council Meeting since assuming the duties of Company Secretary.
- Council elected to co-opt David Jackson, G4HYY, to fill the vacancy created by the resignation of Geoffrey Smith, G4AJJ, from Council.
- Bob Harrison, G4UJS, was appointed as Honorary Trophies Manager, following the resignation of Mrs Hilary Claytonsmith, G4JKS.
- Messrs Gilbertsons have been given permission to use the RSGB logo on a limited edition run of 1000 model vans.
- The Budget for the financial year 1991/1992 was accepted. There is currently no provision for a subscription increase in the budget.
- The principle of payment of subscriptions by instalment was agreed, but cannot be implemented until an Extraordinary General Meeting is held to amend the Articles of Association. It was also decided to introduce the ability to pay subscriptions by Direct Debit, and to cease the use of Standing Orders.
- A special extension of £500 to the Raynet budget was made to cover extraordinary costs associated with the investigations of changes of status for Raynet.
- Council discussed the mis-use of the Packet Network that appears from time to time, especially in connection with the use of bulletins addressed to 'ALL', as many of the messages sent did not fall within the definition of 'messages of a technical or personal nature'. In some cases they have not only been totally inaccurate, but libellous in nature. GM4AUP, Chairman of the Datacomms Committee reported on the progress in agreeing a Code of Practice with the RA. Despite messages to the contrary that had appeared on the Packet Network, at no time was it suggested that the facility should be withdrawn.

Standing orders and Direct Debit

A number of members who pay their subscriptions by Standing Order will have received letters from HQ explaining that they have not changed their Orders to reflect the increase in Subscriptions that took place in January 1991, and requesting an additional payment. As can be imagined, the administrative load (and cost!) to the Society when dealing with this is quite high. Additionally, some Banks are now charging their customers for the provision of Standing Orders at a much higher rate than for Direct Debit. It is therefore a convenience to members and the Society to be able to pay by means of a Direct Debit rather than a Standing Order. The Society also benefits by paying less in Bank charges.

Some members may have reservations about paying by Direct Debit. However, there need be no worries about this, as banks will not allow the introduction of a Direct Debit facility without specific safeguards, and in the event of an unauthorised debit, customers are able to instruct their bank to automatically correct the matter. There is no way in which access to the details of a members' bank account would be available to the Society - only the Bank Sorting Code and the Account number, both of which are printed on cheques. Additionally, the use of Direct Debit makes the paying of subscriptions by installment practical, but this facility can only be introduced after the Articles of Association have been changed at an Extraordinary General Meeting.

Direct Debit is intended to replace payment by standing order. Members will, of course, still be able to pay by cash, cheque or credit card if they so wish. A further announcement will be made when the system for payment by Direct Debit has been commisioned.

Raynet

The Presidential Working Group, comprising members of RSGB Council and the Raynet Committee, has been formed following the Council meeting held on 27 April. The first meeting, in London on 10 May, discussed a series of ways by which the relationship between RSGB and Raynet could be enhanced.

At the time of going to press, significant input was still being received from Raynet members regarding the 'Roadshow presentations'.

The Presidential Working Group will be present at the next Raynet Committee meeting in early July. This will have been the first opportunity to work out a series of joint actions as to how Raynet members' Roadshow views can be consolidated, what additional discussions need to be carried out with Council and the necessary timescale.

Stolen

YAESU FT230R, S/N 2D030203. Anyone with information should contact Mr L Nelson-Jones, G4JDW, 15 Gainsborough Road, Bournemouth, Dorset.

From a car in Shefford on 28 Feb, Trio TR9130 S/N 3090590, police coded with callsign G6PTB. Information, please, to Biggleswade police on 0767 312222, or to Gerald, G0GGQ, QTHR.

From the Sevenoaks area, Trio R2000 receiver with VHF Converter (s/n 4010437). Information to G0BSR, QTHR.

From the premises of the Bury Radio Society, Yaesu FT980 (s/n 3E -010513); Yaesu FT225RD (s/n 9H 060023). Information, in the strictest confidence, to G4GSY on 061 761 5083, or Bury police on 061 832 5050.

From the showroom of ICOM (UK) in Herne Bay:
IC-0781 (s/n 7310001018);
IC-765 (773001163);
IC-575 (598000991);
IC-475 (585001122);
IC-R71 (22003635);
IC-A20 (601002834);
IC-A2 (42202429);
and an IC-M12.

Contact Dennis Goodwin on 0227 741741 if you have any information which may lead to the recovery of any of this equipment.

News in Brief

● Following the resignation of Geoffrey Smith, G4AJJ, Council has co-opted David Jackson, G4HYY, as Member for Zone A (the North of England). David, who lives in Todmorden, has been Chairman of the Training and Education Committee since 1 January.

● The new RLO for the Isle of Man is Arthur Birchenough, GD4XWH. His address is 'Glenduff', Lezayre, Ramsey, IOM.

● New QSL Sub-manager for the G3A series is Ted Allen, G3DRN, 30 Bodnant Gardens, Wimbledon, London, SW20 0UD.

● New QSL Sub-manager for the G0P series is Allen Spence, RS90961, 6 Woodend Terrace, Aberdeen, AB2 6YG.

● Council Member for Scotland (Zone F), Ian Suart, GM4AUP, has a new telephone number: 0236 765937. When phoning volunteers, members are reminded to keep to sociable hours such as mid-evening, or weekend afternoons.

● The new RSGB Liaison Officer for Devon is Dave Hind, G3VNG, 4 Thornyville Villas, Plymouth, Devon, PL9 7LA, telephone 0752 401511.

● The Society's IBM38 mainframe computer was replaced last year by a more modern and smaller unit. The '38 is redundant and using up valuable office space. Why not make us a silly offer? Buyer collects. Enquiries to Janet Cragg or Philip Smith at RSGB HQ.

● The Trowbridge and District ARC will use to callsign GX2BQY on HF and VHF as part of the West Wiltshire '91 Trade and Commerce Exhibition on 11-13 July. The club hopes to raise money towards a dedicated music centre in West Wilts for young musicians.

● Some members may be unaware that the RSGB's Morse Practice Service, GB2CW, frequently operates on 145.250MHz (S10). This service is provided by volunteers for those wishing to learn the code and it would be appreciated if the frequency could be left as clear as possible.

● The Paisley VHF repeater has been stolen from its site, together with PMR and seismic equipment. The Central Scotland FM Group is building a new one and would no doubt appreciate contributions. The Secretary is GM3AXX.

Datacomms

RadCom column

Data fans will be pleased to hear that a new *Datacomms* columnist has been appointed. He is Rick Sterry, G4BLT, and his first column should appear next month.

Improving standards

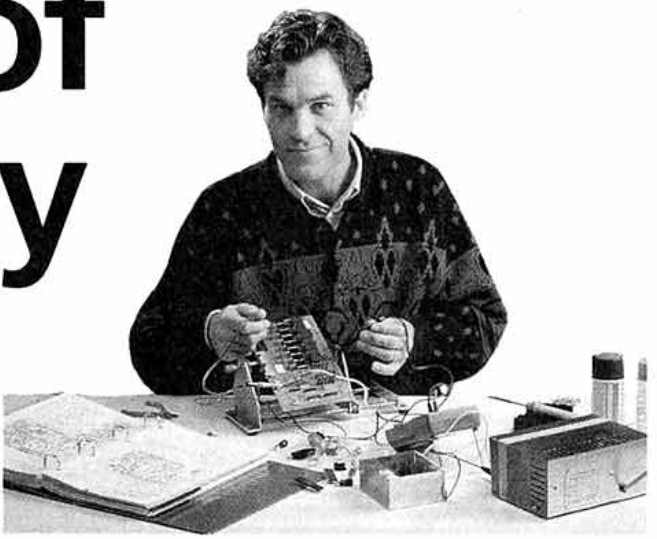
The Society has agreed with the RA some guidelines for the use of the packet radio network, particularly concerning mailbox bulletins. Turn to page 71 for the full text.

AMSAT-UK Colloquium

THIS YEARS Colloquium for anyone with an interest in amateur radio satellites takes place 25 - 29 July at Surrey University. The first day is for international experts. The rest of the Colloquium comprises a packed programme of lectures on all aspects of satellites, for the beginner, the regular user and the expert. As usual, the event will be truly international with delegates and speakers from a large number of countries worldwide. In addition to the lectures, there will be trade stands, videos, raffles, best home-brew competition, and a bookshop (RSGB/ARRL/AMSAT-UK books at over-the-counter prices).

There are still a few day-only tickets available at £20.50 per day. These include admission to the Colloquium, tea/coffee, biscuits, three-course lunch, bar, identification badge, and presentation folder/note-paper/pen. Contact Ron Broadbent, G3AAJ, tel 081 989 6741; fax 081 989 3430, as soon as possible to ensure your place.

How to make the most of your hobby



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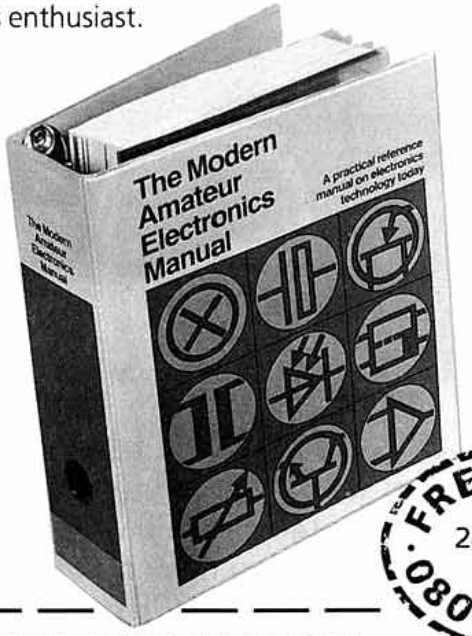

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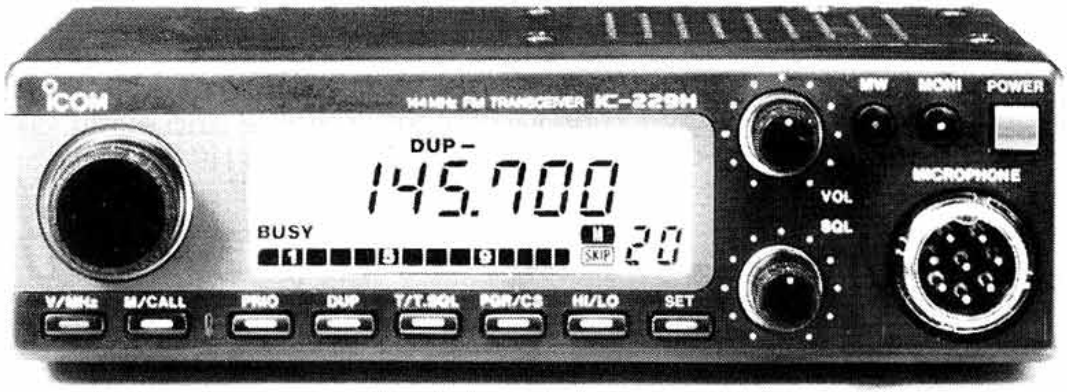
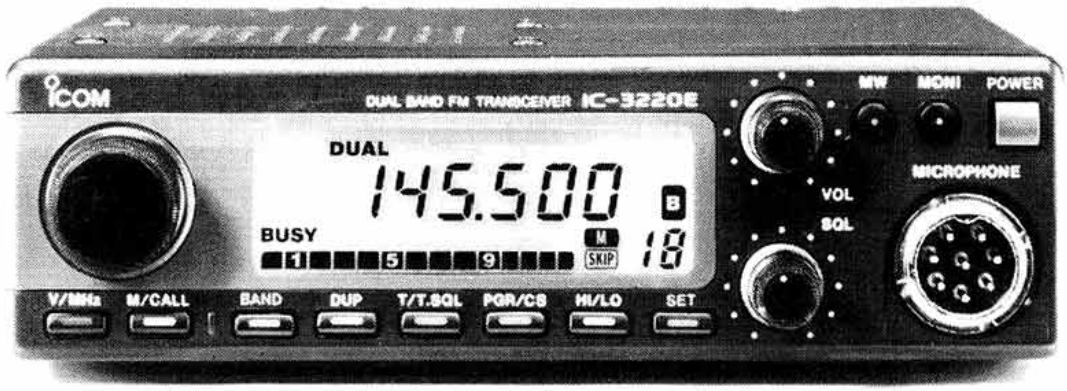


IC-229E/449E
2M, FM Mobiles



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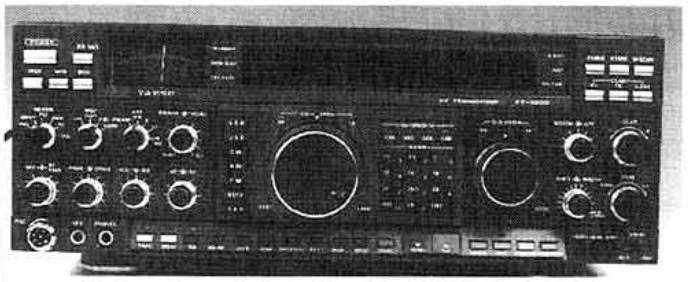

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HS-GP62	6m 2 step collinear	£66.36	D
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GP23	2m 3x5/8 collinear	£45.00	C
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CA2X4MB	2m/70cm 4.5/7.4dB	£38.50	C
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SMCSOCAL	Cable Ass. 6m SO239/PL259	£7.36	B
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SOMM	Mag Mount c/w 4m cable	£13.02	B
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CB2F/4k	1:1	2-30MHz	SO239	4kWPEP	£56.00	B
CB2F/6k	1:1	2-30MHz	'HN' type	6kWPEP	£179.00	D
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HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham
B17 8QB

I HAVE TO apologise this month because I have had to complete my copy before the 'official' closing date due to an urgent IARU committment [for those who do not know, John is Secretary of IARU Region 1]. This means that the Band Reports are missing and the 1991 28MHz Countries table is not fully updated. Things will be back to normal for the August issue.

If you are an existing DXCC member who has sent in for an endorsement or you have just applied for membership you will like to know that applications from new members received on 11 April were being processed on 21 April - but at the same date endorsement applications received on 18 October 1990 were still being dealt with - and there were 3,110 of these.

WE WOULD BE GREATLY OBLIGED IF. . . .

A FEW WORDS on behalf of that very worthy group - the users of low power! Unfortunately the band-plans published in March 1991 *Radio Communication* left out the footnote mentioning the unofficial QRP frequencies.

Angus, G8PG, communications manager of the 5,000 strong G-QRP Club writes:"We would be greatly obliged if some of our QRO colleagues would remember that 7.030MHz is used throughout IARU Region 1 (and elsewhere) as a meeting place for QRP users, and that QRO operation on it can spoil things for a great many low power operators both in the UK and in western Europe.

"We realise that we do not *own* the frequency but one 400W CW station using it for short range working can make it unusable as far as we are concerned. So - if you want to use 7.030MHz, why not drop your power to 5W or so and join us?

We will be delighted to welcome you, and you may be very surprised at the results you obtain and the fun you have."

THE OK QRP CLUB

FOLLOWING THE theme of low power working, OK2PCN has sent details of this club which was formed last year. It already has more than 80 members in Czechoslovakia and elsewhere and produces a news bulletin four times a year. The aim of the club is to spread the amateur spirit, to make friendships with other amateurs and to exchange technical and operational experience in the low power field. Membership is open to licensed amateurs and listeners and they need 300 'points' to qualify. One point is scored for a QRP QSO and two for a QSO using QRPP. Seventy points is gained for each part of the equipment home-built (Tx, Rx, or transceiver). The annual sub is 15 IRCs. More info from Pavel Hruska, OK2PCN, Malinovskeho 937, CS-686 01 Uherske Hradiste, Czechoslovakia.

KENYA

HOLIDAYING IN Kenya - then please contact RSK! Thus begins a press release from the Radio Society of Kenya. It continues: "Kenya is an extremely popular destination for British tourists and no doubt many amateurs are included among them. For those who are regular visitors or maybe coming for the first time here are a few facts about amateur radio in general and the Radio Society of Kenya. Currently, licensing in Kenya has its difficulties as the licensing authority, Kenya Posts and Telecommunications is negotiating reciprocal licensing agreements with several countries - the UK included. At the present time therefore the licensing of new stations has been suspended. However, it is hoped that this problem will be resolved in the near future. For the latest information contact the secretary of RSK whose address appears below.

The Radio Society of Kenya is an active society with over 90 members. There are some 30 active licensed stations in Kenya at present. RSK maintains a 144MHz repeater in the Nairobi area (input 145.175MHz and output 145.775MHz), and a weekly net for members is held on 7.075MHz on Sundays at 0930 (local time). In addition the Society maintains the 5Z4ERR beacon on 28.2075MHz.

So if you are coming to Kenya, remember that amateur radio is alive and well in this tourist haven! If you intend visiting please contact the Secretary, Donald S.Radley, 5Z4FN, at PO Box 45681, Nairobi, or give him a call during office hours at Nairobi 217560 - remember that Kenya and RSK will welcome you!

DX NEWS

THE RADIO Society of Kenya will be running a special event station using the 5Y prefix during the weekend of 13 and 14 July. 5Y4RS/A will operate on SSB and CW on 3.5, 7, 14, 21, and 28MHz. The operation of this station is planned to coincide with the IARU HF World Championship. Note that contacts with 5Y4RS/A will count as ten points towards the Worked Kenya Award. G4BZP is in **Burundi** and was hoping to be on the air with the callsign 9U5BZP - he will be leaving very soon.

Amateur radio was expected to become legal again in **Mozambique** on 17 May and a club station is being constructed at the training centre in the Telecommunications Department. Much credit for this progress should be given to the S.African Radio League who have been heavily involved in negotiations with the officials responsible.

BT80TUA was the callsign being used early in May to mark the 80th anniversary of Beijing University. According to the *RSGB DX News Sheet* there is a possibility that *Pratas Is* - which is very close to mainland China and the Spratly Is - might count for DXCC and that there are plans to activate it

DXPEDITIONS

THE ISLAND Hoppers DX Group will be activating Great Blasket Is (off the coast of Ireland) from 20 to 27 July. It counts separately for the IOTA award. The callsign was not known at the time of writing but the prefix will certainly be EJ. Likely frequencies are 1.985, 3.785, 7.085, 14.285, 21.385, and 28.585MHz. QSL via EI3BA only please.

The Dynamic DX Group (which has already been active from Andorra through its members C30CAG, C30EOA, and C30EPA) is preparing an expedition to **St. Pierre et Miqulon Is** in August. There will be four French, one Canadian, and one US member in the group and they will be on CW, SSB, and RTTY.

VK2GJH should still be on **Tarawa** as T30JH at the time this is being read. He is believed to like 21.222 and 28.520MHz and sometimes checks into nets on 14.440MHz at 0530 and on 14.315MHz at 0800. He may also make a visit to **Banaba Is** where he will probably be T33JH.

I4ALI is due to leave home for Bangkok, Auckland, and Fiji on 14 July on a journey which will last until early September. During this time he hopes to visit **Fiji**, **Tonga**, and **S.Cook Is** (in that order). He will try to visit some rare IOTA areas. All operation will be on CW with 100W output to vertical/loop/quad antennas on 14.005, 21.005, and 28.005MHz.

According to *RSGB DX News Sheet* a fax has been received from Romeo Stepanenko (of 3W, 1S, and YA fame) to say that he has a licence to operate from **Myanmar** and that he and three others with considerable experience in DX and contests will operate from an island off the

RB5IM and UA1D2 at the World Radio Team Championships 1990 in Seattle.

QTH CORNER

BT80TUA	PO Box 2654, Beijing, PR China.
EJ7FRL	via EI2BB, J.Bartlett, Chicamauga, Deansgrange, Blackrock, Co. Dublin, Ireland.
H44SX	G3SXW, 7 Field Close, Chessington, Surrey, KT9 2QD.
H44VG	GW3WVG, Homelea, Manor Rd, Abersychan, Pontypool, Gwent, NP4 7DY.
H44XF	G3TXF, Falcons, St. Georges's Av, Weybridge, Surrey, KT13 0BS.
P29DX	via G3LQP, 32 Albert Rd, Sutton, SM1 4RX.
P4 QSL Bureau	AARC, PO Box 2273, San Nicolas, Aruba.
PY0SK	(see PY0SR)
PY0SR	PS7KM, Karl Mequita Leite, Box 385, 59001 Natal, RN, Brazil.
S21U	via JA1UT, 4-20-2, Nishi-Gotanda, Shinagawa, Tokyo 141, Japan.
T30JH	VK2GJH, Box 299, Ryde, NSW 2112, Australia.
XZ Expedition	PO Box 812, Sofia 1000, Bulgaria.
1A0KM	I0IJ, Antonio Privitera, Via Ceresio 34, I-00199 Rome, Italy.
4J1FS	OH2BU, Jari Jussila, Pilvijarvi, SF-02400 Kirkkonummi, Finland.
5W1GY	Box 344, Forster, NSW 2428, Australia.

coast for a period of at least two weeks. Activity will be on all bands (including WARC) 1.8 to 50MHz with two stations running continuously. The names of the other operators and the callsign to be used have not been given so far to prevent piracy. It is estimated that the cost of this effort will be US $45,000 and *DXNS* will accept donations payable to B McCartney, at DXNS Office, 123 Reading Road, Finchampstead, Wokingham, RG111 4RD.

The first ever expedition to Fastnet Rock will begin on 9 July with a helicopter landing and it should continue until 19 July. The callsign will be EJ7FRL and frequencies to be used on SSB will be 3.775, 7.075, 14.140, 21.275, and 28.450MHz (plus WARC bands), and on CW 10kHz up on 3.5 and 7MHz and 10 and 30kHz up on 14, 21, and 28MHz [see also June *RadCom* p7 - Ed].

HERE AND THERE FROM REGION 2

THE LATEST issue of *Region 2 News* contains a number of interesting items. One is that you are asked *not* to send QSLs for Aruba stations via the VERONA QSL bureau - P4 cards go to the address in *QTH Corner*. In the Cayman Is the WARC bands have now been made available from 6 May. There is a new class of licence in Cuba - this is the Third Class and follows a 5WPM morse test and examination. Holders have CL prefixes and operate on 1.8 and 3.5MHz CW only.

HAMVENTION LENINGRAD - 91

THE THIRD International Hamvention 'Leningrad - 91' will take place from 2 to 5 August in Leningrad.

The programme will include "reports on vital topics in short wave amateur radio, VHF and UHF, discussions on some new themes in HF, competitions, information on rare DXpeditions, European VHF and UHF review, free topic discussions - 24 hours a day."

Representatives from many countries are expected to take part and anyone interested in attending is invited to contact Inter-Radio Center, Box 376, Leningrad 190000, USSR - telefax (812) 3113003, telephone 3145264 or 3129164.

It may be easier to contact the Association for International Cultural Exchange Programmes, Suite 33, Canvin, Kirkland, Quebec, Canada, H9H 4S4 (tel: (514) 697 3735, or fax: 697 0628. This could be a most interesting get-together...

AWARDS

IARU REGION 1 NOVICE AWARD

THIS IS A brand new award being issued by the Society to encourage newcomers with their brand new 2A calls. It requires that they contact and get confirmations from at least 20 countries having national societies which are members of IARU Region 1.

Send your 20 QSLs, together with a list of contacts they represent, to RSGB HF Awards Manager Steve Emlyn-Jones, GW4BKG, PO Box 20, Bridgend, Mid-Glamorgan, together with £1.50p.

There are over 60 countries to choose from and they are: Algeria, Andorra, Austria, Bahrain, Belgium, Botswana, Bulgaria, Cyprus, Czechoslovakia, Denmark, Djibouti, Egypt, Faroe Is, Finland, France, Gabon, Gambia, Germany, Ghana, Gibraltar, Greece, Hungary, Iceland, Ireland, Israel, Italy, Ivory Coast, Jordan, Kenya, Kuwait, Lebanon, Lesotho, Liberia, Liechtenstein, Luxembourg, Malta, Mauritius, Monaco, Mongolia, Morocco, Netherlands, Nigeria, Norway, Oman, Poland, Portugal, Romania, San Marino, Senegal, Sierra Leone, S.Africa, Spain, Swaziland, Sweden, Switzerland, Syria, Turkey, United Kingdom, USSR, Yugoslavia, Zambia, and Zimbabwe.

CONTESTS

IARU HF WORLD CHAMPIONSHIP

1200 13 July - 1200 14 July.

Single operator phone only, CW only, or mixed, and multi-operator mixed mode. Exchange consists of RS/T plus ITU zone (UK is in ITU Zone 28). IARU HQ stations send signal report and official member society abbreviation. A station may be contacted once per band/mode - but note that contacts must be made in the appropriate IARU recommended band segments.

QSOs with own zone or society HQ stations count one point, with different zones in same continent three points, and with different continents five. Cross band, cross mode and repeater QSOs do not count. The multiplier is the number of ITU zones plus HQ stations *worked on each band* added together.

Entries must be postmarked no later than 30 days after the contest and sent to IARU HQ, Box 310905, Newington, CT 06131-0905, USA. They may be submitted on IBM compatible, MS-DOS formatted, 3.5 or 5.25in disks or on official entry forms or a reasonable facsimile - copies of which can be obtained from the address above. I have photocopies of the detailed rules - SASE please.

Results of the **1990 UBA SWL Competition** have arrived. Unfortunately the number of entrants was only half that in the previous year. In the phone category BRS22643 was 13th with 168,000 points, and BRS91529 46th with 12,104.

In the CW competition BRS84869 scored 19,104 points to become 17th. In the all-mode section a group of members of ISWL came top with 300,288 points. Interim scores of the phone section of the 1991 competition (as at 28 April) show BRS22643 6th with 95,380 points, RS84869 47th with 2,736, and RS91529 51st with 648.

Results of the **31st All Asian DX Contest** have appeared in *JARL News*. Fortunately scores are printed in Roman script and the UK ones are as follows: (Mutiband) **G3ESF** 35,620 points, **GW3HGJ** 22,533; (14MHz) **G3FXB** 28,170; (21MHz) **G4IJW** (6,156), **GM3CFS** 5,353.

In the **First World-wide Naval Contest** Class C section G0GPO scored 7,596 points. In Class B UK scores are as follows: G4LZB (165,362), GM3BKC (92,435), G3MRC (84,500), G3AWR (76,041), G3JWY (47,880), G3WP (9,266), and G3ZGC (7,770).

NCDXF BEACONS

THE LATEST *Northern California DX Foundation Newsletter* says that W6WX/B is now transmitting on three bands, one after the other. After W6WX/B completes its one minute transmission on 14.100MHz it automatically switches to 21.150MHz for a repeat of the same one minute message.

Next it switches to 28.200MHz. There is a two second interval between transmissions so a listener has two seconds to switch between bands.

NCDXF invites you to listen on the three bands and send in reception reports to Al Lotze, W6RQ, PO Box 2368, Stanford, CA 94309-2368 USA.

The long term plan is to convert all the NCDXF beacons to the three-band design over the next few years. It seems that lightning has struck the NCDXF system twice because the JA2IGY beacon disappeared from its 14.100MHz slot on 10 Octobar last and on investigation it was discovered that in spite of its remote location on the top of an 8,000 ft mountain it had been stolen just as W6WX/B had been last year! It has been replaced with a Kenwood TRC-70 which is a crystal controlled single frequency transmitter for commercial use.

Thank you to the *RSGB DX News Sheet* (G4DYO), the *Ex-G Radio Club Magazine* (WA8TGA), *DX Report* (VK9NS), the *Lynx DX Group Bulletin* (EA2JGO), *DX'press* (PA3CXC), *DXNL* (DL3RK), and the *Long Island DX Bulletin* (W2IYX), and of course all those who have sent in information.

The closing dates have been made a little earlier for the time being so please note that I need to have all items for the **September** issue by **25 July**.

Propagation NEWS

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

50MHz

WHILE SPORADIC-E propagation on 50MHz can occur earlier, it usually starts in earnest in May and this year has proved no exception. Many amateurs monitor the Band 1 television channels as several European countries still transmit in this band.

The first openings are usually to the south, but as the month progresses, E_s signals from other regions begin to arrive. There is an anticlockwise rotation with openings to the southeast, then east and finally northeast by the end of the month. This pattern has been observed again this year. In the first week of May propagation was predominantly to southern France, Spain, Portugal and Morocco, and briefly to Malta on the 4th.

During the second week many Italian call areas were received including Sardinia. On the 9th the Cyprus beacon, 5B4CY, was received in Jersey. The first opening to Scandinavia was on the 20th to Norway and Finland and on the 22nd, several Swedish call areas were contacted from Britain.

As we approach mid-summer, the predominant F-layer longer distance propagation is confined to the southerly and south westerly directions with no openings to North America or Asia. However, the 50MHz band often springs surprises with its mixed mode propagation possibilities - eg the 'auroral' contact between GM3WOJ and CX8BE reported in *VHF/UHF News*.

The key to understanding some of the very off-great-circle contacts is by accurate measurement of the time the signals take to travel from A to B. Such esoteric research was undertaken by Costas Fimerellis, SV1DH, some years ago in connection with transequatorial propagation studies on the 144 and 432MHz bands between Greece and southern Africa. It involved the use of atomic time standards, hardly likely to be found in the average radio amateur's shack!

HF

G8KG's REVIEW of what has been happening on HF reads as follows: "By the middle of May it was clear that the spell of exceptional solar activity and HF band conditions in the first quarter of the year was drawing to a close, although the first half of the month saw the daily solar flux rising above the 200 mark with a peak of 244 sfu, and HF band conditions exceeded the predictions on several days. The overall trend was, however, clearly downwards, the 'highs' in the four previous solar rotations being 367, 311, 276, and 268 sfu and this, together with a very 'one sided' sun meant that the 27 day average had fallen from 252 to only 185 sfu - though this is still higher than in the autumn of 1990.

By the end of next month it should be apparent whether indices are still falling steeply or, more likely, will settle down to a more gentle overall decline which would leave the level of activity at the end of the year still equal to that at the peak of an 'average' solar cycle."

HF F-LAYER PROPAGATION PREDICTIONS FOR JULY 1991

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

Time / GMT	28MHz 000001111122 024680246802	24MHz 000001111122 024680246802	21MHz 000001111122 024680246802	18MHz 000001111122 024680246802	14MHz 000001111122 024680246802	10MHz 000001111122 024680246802	7MHz 000001111122 024680246802	3.5MHz 000001111122 024680246802
** EUROPE								
MOSCOW	.....	.....11.	...221112441	212444334674	656655556788	875333334578	642111.11357	32.....24
MALTA	.....	.....21.	1..222222542	412554445775	867766666899	997543344689	885211112367	+52.....35
GIBRALTAR	.....	.....	....1....221	2..232222553	743665555788	988654445689	886421112468	++3.....35
ICELAND	.....	.....	.....	121	311233222565	765554444567	665322112245	342.....2
** ASIA								
OSAKA	.....	.....	....11..1221	...121112442	....1...2573	251	.....2.	.....
HONGKONG	.....	.....121.	..1121112542	1..122113674	2.....2586	364	32	.....
BANGKOK	.....11.	..1111.132.	1.1122223663	311112224786	5.....2688	3.....367	35	2
SINGAPORE	.....11.	..1111112331	1.1222224663	311122224786	51.....2688	3.....367	1.....35	2
NEW DELHI	...11...111.	..1111112331	112222224663	421111124786	73.....2688	51.....367	3.....35	2
TEHERAN	...1111.122.	..2222213442	3243223335775	545211224787	863.....2689	84.....367	62.....35	3.....2
COLOMBO	...1111.111.	..1222213231	312323335564	532112224787	84.....2688	61.....367	4.....35	2
BAHRAIN	..1111112321	1.2323324553	424332335786	755211224798	973.....2689	851.....368	62.....35	3.....2
CYPRUS	...211112321	1.2333334553	425655556886	757765567898	987533345789	88521..12478	752.....246	42.....24
ADEN	1.1212323432	2123334456 54	645423446887	876311225899	985.....2689	862.....368	64.....36	3.....3
** OCEANIA								
SUVA/S	.....	.....	.....11.	..1111..1331	..232...154.	..12.....22.	.....	.....
SUVA/L	21.....42	3212.....64	3445.....85	23661.....74	.1451....151	..22..:..22.	.....	.....
WELLINGTON/S	.....	.....	.....2.	..1211....42	11441.....63	..22.....141	.....2.	.....
WELLINGTON/L	21.....2	421.....4	6542.....26	5664.....57	34651....175	.133.....252	..1.....2.	.....
SYDNEY/S	.....	...11.....	..13221....2	1125321....4	1.141...1225	...2.....253	31	.....
SYDNEY/L	1.....1	31.1.....3	4313.....6	43351.....27	21262.....56	...3.....153	21	.....
PERTH	...1111.....	..12322.....	21344331....	53334221....	63..1...111.	4.....25.	1.....34	2
HONOLULU	.....	.....	.....11.	...111..121.	..231...12..	..22.....	.....	.....
** AFRICA								
SEYCHELLES	1.1212323321	2123334455 43	635423446777	866312225789	985.....2689	862.....368	63.....36	3.....3
MAURITIUS	..1222334432	1.2434445765	3.5434446888	617322224899	9461....1689	873.....368	65.....36	32.....3
NAIROBI	1.1222444533	4124335567 55	745533446888	977512225899	9972....2689	884.....368	662.....36	33.....3
HARARE	2..222445643	4..433556865	823633446888	955722224899	9875....1589	8852.....368	663.....36	43.....3
CAPETOWN	...12245551.	...33356773.	...654446861	...742224884	41.52....1588	8612.....268	662.....36	43.....3
LAGOS	1..121455642	4213334578 75	753653346898	986741114799	99851....1589	8862.....268	663.....36	43.....3
ASCENSION Is	21234541	21..42345763	541.53335887	873252114798	99742....1589	8863.....268	663.....36	43.....3
DAKAR	21.121243542	4212423547 64	764553234787	987752112799	99862....489	8863.....167	663.....35	43.....2
LAS PALMAS	....1..11221	21.132232442	532464465776	864776666898	998765445689	997532112378	77521....157	542.....24
** S. AMERICA								
Sth SHETLAND	......24351.	......35572.	......34586.	1224781	1585	411.....267	653.....35	43.....2
FALKLAND Is	233441	1354664	3....2345887	6....2224789	9321....1579	8752.....258	663.....25	33.....2
R DE JANEIRO	11....1132431	321..2344664	753.13344687	986222222589	99842....279	8863.....47	663.....15	33.....2
BUENOS AIRES	1....1132331	3211.2243553	7534.3344687	9866.2223588	99861....268	8863.....37	663.....15	33.....2
LIMA	1.....1.111	21..11121233	631232232246	863442121237	99752.....16	8863.....3	563.....1	23.....
BOGOTA	1.....11	2...11111123	531122121236	863432121137	89752.....5	7863.....2	563.....	23.....
** N. AMERICA								
BARBADOS	1.....111	21..11111233	631233222256	863442111157	99752.....27	8863.....4	663.....1	33.....
JAMAICA	11	2....1....122	52.112111135	752222111126	88652.....4	6863.....1	363.....	.3.....
BERMUDA	1	1....1....22	42..12111135	7422221111 36	88552.....15	6863.....3	463.....	.3.....
NEW YORK	.....	1.....1	31...1.1.124	6311.1111125	77431.....4	5853.....1	253.....	.2.....
MEXICO	.....	1.....11	31.....1.112	53111.111112	57442.....	2653.....	.43.....	.....
MONTREAL	.....	1	3.....24	521..1111125	77431.....14	4753.....1	253.....	.2.....
DENVER	.....	.....	1.....1	31.....	3533.....	1453.....	.23.....	.....
LOS ANGELES	.....	.....	1.....	21.....1..1	14331...1...	.353.....	.13.....	.....
VANCOUVER	.....	.....	.....	1.....	13331.....	.252.....	..2.....	.....
FAIRBANKS	.....	.....	.....	...11.....	.1232...11..	..22.....	.....	.....

The provisional mean sunspot number for May 1991 issued by the Sunspot Data Centre, Brussels was 121.1. The maximum daily sunspot number was 163 on 27 May and the minimum was 86 on 1 May. The predicted smoothed sunspot numbers for July, August and September, were respectively: (classical method) 125, 123, 121; (SIDC adjusted values) 121, 119, 119.

VHF/UHF NEWS

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

AFTER MONTHS in the doldrums there was some reasonable tropospheric propagation on the bands at the end of May, yet activity was very low, particularly on 430MHz. There have been a few auroras, the steady growth of moonbounce activity continues, a few lucky FM operators contacted GB1MIR and there is news of DXpeditions.

GB1MIR

DURING THE JUNO Mission, Helen Sharman, the first British astronaut, contacted the special GB-JUNO school stations and on 25 May worked a few ordinary UK stations on 145MHz FM from the Mir space station. Tony Jones, GW4VEQ (GDD), had a brief QSO with her at 1654 and he played me a recording of it over the telephone. She sounded a competent operator even though she did not give any conventional RS reports; she also contacted G4PIQ, G4SMC, G5TU, G3MRJ and probably a few others.

INTERFERENCE

TWO READERS have suggested possible sources of the garbled voices heard just below the 50MHz band by Brian Williams, GW0GHF (GNS), mentioned in last month's column. Alan Troy, G4KRN (MSY), reckons they are caused by children operating illegal AM QRP walkie-talkies.

M D Butler, G8KTX (WMD), is quite sure the source is wireless baby alarms which are quite legal; he has one. They operate between 49.8 and 49.97MHz at 30kHz channel spacing. The fundamental crystal frequency is around 16.6MHz using NBFM. PA filtering seems minimal as harmonics can be detected well beyond 200MHz; fortunately none fall in amateur bands.

Paul Pasquet, G4RRA (SRY), says his completely blots out TV channel E2 which he monitors for Sporadic-E activity. For such low power devices - about 35mW - they have a considerable range. Unfortunately many users leave them switched on all the time so they could broadcast all sorts of domestic noises.

Some readers have reported telephone traffic in the 144MHz band. At G3FPK, ringing tones and conversations on about 144.29MHz are heard for much of the day. Ted Bardy, G6ODA (LDN), has a very strong local one on 144.304MHz and which he has positively identified. The owner told him that the instrument carries a green 'Approved' label.

One legal band for such FM base stations is 47.45625 to 47.54375MHz, so third harmonics from them would be well below the band. This in-band QRM suggests some of these devices may be operating illegally above 48.0MHz. Your comments and reports would be welcome.

VHF RECORDS

DURING THE AURORA on 29 April, Chris Tran, GM3WOJ (IO77), worked CX8BE (GF15), on 50MHz SSB at 1536. The Uruguayan could only be copied when beaming at the aurora, about 45°, with nothing on the 220° great circle path, so he is claiming it as ". . . . a new world distance record for auroral working."

Chris sent a copy of the tape recording of this confirmed, but unusual, QSO and the CX8BE signal sounds no different from the other Europeans heard and worked in the event. However it raises the question of what we accept as an auroral contact, particularly when other modes must be involved.

From the British Isles on 144 and 430MHz it is fairly simple; signals are propagated through the troposphere, probably with a bit of refraction, up to the E-layer region of the ionosphere to the north of your QTH. They are usually reflected back to an area to the south of the auroral zone, eg from the Midlands, to an auroral region above the Norwegian coast, back to Poland. Of the 510 entries in the 144MHz section of the *Dubus* 'Top List', only 4% claim QRBs over 2,000km.

Chris assumes that CX8BE's signal arrived at the aurora either via the F2-layer or by TEP mode. The Ursigram data for the time shows that F2 mode can be compeletely ruled out; the f_oF2, or critical, frequency at Slough was only 7.0MHz so some TEP must have been involved for the major length of the path.

So, should we bother keeping records for different, and mixed, modes on 50MHz at all? After all, 50MHz propagation modes seem to have more in common with those experienced on 28MHz than on 144MHz and nobody worries about mode records and firsts on 28MHz. VHF Committee Chairman Peter Burden, G3UBX, agrees we should consider this matter at a future meeting so we would like readers' comments. Does anyone know who now keeps any official VHF/UHF records on behalf of the Society or the IARU?

PHANTOM QSOS

SOME UK STATIONS have received QSL cards confirming QSOs with UB5KY which never took place. John Nelson, GW4FRX (PWS), himself a victim, sent photocopies of Anatoly's card confirming an imaginery 144MHz contact with SV1EN on 17/6/89. Nick wrote that there was Es propagation from Greece to DL, F, I and Y2 that day. He has returned UB5KY's card with the added comment: "Dear OM. I always QSL *after* I make a QSO. Never before!"

G4RRA recently received a batch from UB5KY requesting him to forward them to others he had not worked. It seems his *modus operandi* is to ascertain, from published reports, who was QRV in an aurora or Es event in squares he needs. He then sends a card in the hope that the recipient needs KO31, so will 'confirm' his fairy tale QSO.

DX NOTES

THERE MAY BE 144MHz operation from Fastnet Rock (IO51RJ) by a group signing EJ7FRL on 9-19 July, weather permitting. Proposed QRGs are 144.040 for CW and 144.260MHz for SSB. See page 7 of the June *RadCom* for comprehensive details.

Keith Tatnall, G4ODA (LCN), has confirmed that the Five Bells Group's 1991 DXpedition will be to Suduroy (IP61), the most southerly island in the Faroes group. Calls will be OY/G4DHF and OY/G4ODA, with others to be arranged, and they hope to be on by 5 or 6 August until the 13th. The main activity will be MS, EME and auroral operation using the same equipment as in last year's trip to Iceland and the Faroes. Likely QRGs are 144.028, 144.215, 432.028 and 432.215MHz and possibly 50.125MHz. They will monitor 14.345MHz for sked making.

METEOR SCATTER

LAST YEAR the Bavarian Contest Club organized its first MS contest. David Hilton-Jones, G4YTL (OFE), has sent a mass of information from DL5MAE, including the results and analyses of this December event and details of the 1991 Geminids contest. 135 stations took part, including 10 from the UK, and 31 entered. The overall winner was RB5AL who completed 46 QSOs. Only G0CUZ and GM4CXM sent in entries from here.

This year's contest will run from 00UTCon 11 December to 24UTCon the 14th and is again for random CW only, 144.095 to 144.105MHz; recommended speed 1,000 letters/min and 2.5min periods. I will publish fuller details in a later issue. There are no significant meteor streams in July, the next major one being the Perseids in August - details next month.

SOFTWARE

THE LATEST ADDITION to my library of Public Domain amateur radio software for the Amstrad PCW computers is G3LBL's TNC Driver Software, a suite of programs totalling 53k. Peter says it should work with any TNC but, not being a packet buff, I cannot try it out at G3FPK. I have edited the ASCII documentation into both original LocoScript and LocoScript 2 manuals.

If you want a copy of any programs from my collection send an SASE for the latest PROGLIST but do not send any discs initially. Please note that the PCWs, running under CP/M, are completely incompatible with IBM PCs and clones. Rod Smith, G4DQY, has sent a copy of the latest issue of the PDSL's *IBM PC Software Reference Guide* the cover price of which is £2. The Ham Radio section comprises three pages and if you join this library, certain classes of membership entitle you to download files direct; see page 20 in the June *RadCom* for QTH and telephone numbers.

MOONBOUNCE

THE MAY ISSUE of Mark Turner's, G4PCS (BFD), *2M Direct* newsletter includes reports of EME activity in April. Conditions were difficult with many skeds incomplete.

144MHZ

THE ULTIMATE EME contact must surely be to work a station while mobile and this was achieved on 20 April by Graham Daubney, G8MBI/M, and G4PCS in a sked with W5UN at 00UTC.

The equipment was housed in driver Dave Baxter's, G8KBV, Land Rover, power being derived from a 1kW generator mounted on the front bumper.

The installation comprised an IC-275E with 500Hz bandwidth IF, Datong FL3 audio filter, Dewsbury SupaKeya, RX preamp and Dressler D200S amplifier. The antenna was a 13-ele Tonna Yagi on the roof. The only suitable stretch of road pointing in the right direction was the A604, an old Roman road running between the northern end of the M11 motorway and Huntingdon.

Top speed during this first ever vehicle-in-motion EME QSO was 45MPH, claimed as a new moonbounce land speed record! They travelled from JO02AG to IO92XG during this historic 7,820km contact. A full account of this extravaganza was published in the May *2M Direct*.

More conventional EME operation was reported by Tony Read, G0GMS (IO91UB), John Regnault, G4SWX (JO02PB), G8MBI (JO02ID), Andy Steven, GM4IPK (IO99IW), Keith Kerr, GM4YXI (IO87WI) and GW4VEQ (IO73SG) who completed his first EME contact on 21 April with W5UN at 0016.

VK3AMZ is now very active; he runs four long Yagis and 1kW and was worked on random by G4SWX on the 20th. Mark Holloway, G4YRY (IO90CR), has added a Howes Kit filter between his TR-751E and headphones; it has worked wonders in removing receiver generated noise. In May he completed with K2GAL at 1656 on the 12th, W5UN at 2340 and KB8RQ at 2350 on the 18th and with I2FAK, 1630-1720 on the 24th.

432MHZ

BOB HENSHAW, G4GCM (HPH) assembled eight 21-ele Tonna Yagis over Easter. On 19 April he proved the system with a successful sked QSO with SM2CEW. The next day he completed with 11 stations. His transceiver is a much modified TS-700 and the PA uses two Eimac 8930 tetrodes, which are beefed-up 4CX250Rs; he has two home-brewed masthead preamps.

Dave Cox, G8OPR (HPH), is QRV with what he calls "a small station" consisting of an FT-790 and a pair of 21-ele Yagis, with masthead preamp, fed from shack to power splitter through 25ft of LDF4-50. A single 4CX250 amplifier delivers 250W at the antenna. His first QSO was with SM4IVE in April. In the 18/19 May activity weekend he completed with DL9KR, PA3CSG, K2UYH, SM2CEW and N4GJV.

Dave Dibley, G4RGK (IO91ON), was also QRV in the period 19-21 April, taking in the REF contest; he completed with 13 stations in variable conditions. The *432MHz and Up EME Newsletter* published by Al Katz, K2UYH, mentions that more UK stations are getting on this band.

The next day sked weekend coincides with VHF NFD, 6/7 July. The Moon sets around 1415 on the 6th, rising again just before midnight. Moonset on the 7th is around 1530 so there will be 14 hours overlap. Asian windows occur for the first hour, North American ones for the last 2.5 hours, the rest favouring Europe.

50MHZ

FIRST SOME NEWS from Ted Collins', G4UPS (DVN), *6m Information* pages. ZS6CE is now ZR6EMN; Etienne's new QTH is: PO Box 14, Honeydew 2040, Republic of South Africa. G1OIB (QTHR) is the QSL manager for his son, ZB0X. George Galea (ex-9H5AA) is now 9H1AA, having passed his CW test, and his QTH is: 241 Dakota, St Margaret Heights, Mosta, Malta GC.

CE8ABF proposes to run a keyer on 50.007MHz when the band is quiet. Beacon LA7SIX (JP99LO) on 50.051MHz runs 20W to a 4-ele Yagi beaming 190°; it sends "LA7SIX in JP99LO" then 80s of carrier. UL8GDD (MN83KB) is a new beacon in Kazakh on 50.055MHz; it runs 5W.

Joe Craig, VO1NA, wrote to confirm that VO1ZA is the new callsign of the beacon at the Memorial University of Newfoundland - it was VO1MUN until 20 March. The carrier frequency is 50.040MHz with FSK 500Hz lower sending its callsign, latitude and longitude in morse code. It runs one watt to a 0.27 wavelength vertical antenna, 24m AGL.

There was Es propagation to various parts of Europe on an almost daily basis in May with most all available countries heard/worked at one time or another. The only aurora mentioned was on the 13th around 1715 when the A index was 25. A nice new one was 4J1FS (KP40), the annual joint Russian/Finnish DXpedition to Malyj Vysotskij, workable on 24-27 May; QSL via OH2BU.

From mainland Britain in May there were inter-continental openings to Argentina (LU) on 2, 3, 8 and 14 and to Uruguay (CX) on 2. Namibia (V5) was worked on 2 and 4; South Africa (ZS6) on 4 and 17; Botswana (A2) on 4; Malawi (7Q7) on 4 and 9 and Zambia (9J2) on 24, 25 and 30.

144MHZ

THERE WAS A MAJOR aurora on 29 April when the A index reached 49. Between 1400 and 1848, GM4IPK (SLD), worked dozens of stations on CW including UV1AS (KO59) at 1419; QTEs were 15-75° with the Germans best at 50°. Other auroras occurred on 2, 13 and 14 May but were not outstanding events from southern England.

Tropo propagation livened up from mid-May although it was rather average during the contest on the 18/19 weekend. There is no doubt that far fewer individuals and groups participate in 24 hour events these days compared with previous years. Consequently, serial numbers from the leading stations towards the end of the contest were well down.

Clive Penna, GM3POI (OKE), telephoned me on the morning of the 28th to say that GB3VHF was quite strong in Deerness but that activity was very low. We had a QSO later at 1714 but even then there was no huge pile-up of stations wanting to contact this relatively rare region. Conditions remained well above average up to the end of May and on the 30th, I listened to a 'QSO party' including GM4AFF, GM4YXI, G4PIQ and G4KUX, all at good strength.

430MHZ

THIS IS A SHARED band and radio amateurs are secondary users. There are many frequencies allocated to services which come under the umbrella of the Ministry of Defence. For example, 435.725 and 435.750MHz are assigned to the ATC, ie in the sub-band allocated to the Amateur Satellite Service (435-438MHz).

There is tremendous pressure on the UHF spectrum for more frequencies for land mobile services. It does not go unnoticed, by those who monitor this band officially, that for much of the time it is virtually unoccupied. It has been said often enough: "Use it or lose it."

Frankly, I will be very surprised if the status quo is maintained after the WARC next year. It must be appreciated that representatives of radio amateurs can only attend this conference as invited observers. They will not be delegates and will have no say in any of the numerous committees. Unless we can demonstrate we really are using this, and other bands, we might end up with just a few repeater and packet radio channels.

SINGAPORE SCENE

CHRIS NICHOLAS, G0LZV, sent a detailed account of the amateur radio scene in the Republic of Singapore. Foreign amateurs can get a 9V licence after having established a sufficient period of residence. The 50MHz band is not available, and on 144MHz all they have are four simplex QRGs and one repeater channel - 144.025/144.625MHz input/output - with an access tone of 203Hz. There is no current 430MHz activity.

DEADLINES

PLEASE SEND your contributions for the September issue by 25 July. The October deadline is 24 August, both dates by which copy should reach me.

ANNUAL VHF/UHF TABLE
January to December 1991

Callsign	50MHz Cty	50MHz Ctr	70MHz Cty	70MHz Ctr	144MHz Cty	144MHz Ctr	430MHz Cty	430MHz Ctr	1.3GHz Cty	1.3GHz Ctr	Total Points
G6HKM	50	36	-	-	47	12	12	3	10	2	172
G0NFH	39	9	17	2	29	2	27	3	6	2	136
G4LDR	23	9	8	2	43	11	32	3	-	-	131
G8ESB	4	2	13	3	36	6	25	6	4	2	101
G8PYP	13	16	1	1	19	9	8	4	-	-	71
G8XTJ	17	5	-	-	38	8	-	-	-	-	68
G0EHV	-	-	20	3	12	2	25	4	-	-	66
G4OUT	-	-	18	3	29	6	-	-	-	-	56
G3FPK	-	-	-	-	45	8	-	-	-	-	53
GW7EVG	-	-	-	-	15	5	-	-	-	-	20
G7CLY	-	-	-	-	17	3	-	-	-	-	20

British counties are those listed on page 64 in the January 1991 RadCom, but excluding HBN; 77 in all. Up to three different stations allowed in all 12 GM regions. Do not include EI counties. Countries are the usual DXCC ones plus IT9.

SWL NEWS

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

MY MAY COLUMN referred to Egbert Hertson's attempts to sway *CQ Magazine* towards allowing SWLs to apply for the *CQ* Awards. If you recall, I asked listeners to write giving their support to the idea of these prestigious awards being available to SWLs. Unfortunately, at the time of penning this piece, the response had been extremely poor. There must be many, many listeners who enjoy collecting QSL cards and who would be delighted with a *CQ* Award to show for the achievement of collecting cards from 100 different countries, 40 different zones, etc.

All you have to do is send me a letter supporting the idea. Let us show that there is a large and active body of short wave listeners in the country who would relish the chance to claim a prestigious award. I will do the rest.

MARCH CHALLENGE

WHILE ON THE subject of disappointments, I received only eight logs for this Challenge. This cannot be a true reflection of the number of listeners who monitored the 14MHz band in March - can it? Where were all the other entries? I deliberately chose this band for the challenge this year as I felt convinced that the level of participation would be high, but alas it was not to be.

Those who submitted logs of stations heard which were outside Europe were: ONL383 - 140 countries; BRS8841 - 131; BRS36554 - 118; BRS90813 - 93; BRS25209 - 89; BRS52543 - 72; BRS32525 - 55; and BRS62088 - 24. The prize for the best log to a member who has joined the Society since January 1990 goes to Bill Craggs, BRS90813. Space does not permit an analysis, but there was a surprisingly high number of 10 point loggings (those in the Pacific), for example - A35, C21, FK, FO5, FW, H44, KH2, KH6, KH0, P29, V73, VK, VK9L, VK9N, VR6, YB, YJ8, ZL, ZL9 and 9M8.

1990 UBA SWL COMPETITION RESULTS

ONCE AGAIN, the number of logs from the British Isles was poor. There were 91 entries with 23 from Russian listeners and 19 from Belgium. Logs from 18 countries were received. Congratulations to BRS22643 who was the highest British Isles entrant in the SSB category. BTS84869 sent in the best CW log, while the ISWL club station came first in the multi-mode category. It is too late to publish rules for the 1991 competition as it started on 1 January!, but if anyone wants to plan ahead for 1992 they can write to Marc Domen, ONL6945, Postbus 188, B-2600 Berchem 1, Belgium. I also have the 1st Interim Results for this year's competition. Once again, British activity is low, but SSB entries can be seen from BRS22643, who is 6th, and BRS91529.

NEWCOMERS

IT'S A LONG TIME since I've featured a newcomer, so it is especially pleasing to welcome Gordon Foote, BRS93194. Gordon lives in Abingdon and his equipment can be seen in the photograph. The station comprises a Kenwood R2000, AT1000 antenna tuner, ERA microreader and SEM QRM eliminator. He has returned to SWLing after a 20-year absence so is still a newcomer. Gordon intends building a DCRX in the near future so he can compare the Howes kit with the Kenwood 'black box'. It will be an interesting comparison.

The shack of Gordon Foote, B4S93194.

RSGB LISTENER CONTEST 91 RULES

OBJECT OF THE CONTEST

To log as many stations in QSO as possible. Operation is over 24 hours but only 18 hours may be operational during the 24, and a continuous 6-hour rest period must be clearly marked in the log.

DATE AND TIMES

1200GMT 13 JULY TO 1200GMT 14 JULY 1991

SECTIONS AND BANDS

(a) SSB only

(b) CW only

Only one section may be entered - mixed-mode entries will not be accepted. The 28, 21, 14, 7, 3.5 and 1.8MHz bands may be used. Please note that entrants from the British Isles must be members of the RSGB.

SCORING

For scoring purposes the station logged must be in QSO with another amateur station. It does not matter whether the station is taking part in a contest or not. CQ, QRZ or similar calls cannot be counted for scoring. One point to be claimed for each station heard on each band. A multiplier may be claimed for each different country heard on each band. In the case of the USA, Canada, Australia, New Zealand and Japan, each call area numbered prefix may be claimed as a separate multiplier, for example: W1, W2, VE2, VE3, VK5, VK6 and so on. All other countries will be determined by the ARRL Countries List.

The final score is made up by the addition of the points scored on all bands multiplied by the total number of multipliers claimed on all bands.

LOGS

Logs should show in columns, time (GMT), callsign of station heard, callsign of station being worked, an RS(T) report on station heard at SWL's QTH, multiplier (if any), points claimed. If both sides of a contact are heard, they may be claimed as separate stations, and the callsigns are to appear in the station heard column. Each station heard can only appear once in the station heard column on each band. In the column for station worked, a callsign must only appear once in every three contacts logged (1 in 3) unless it is a new multiplier for the receiving station. The same 'station worked' may not be used for more than three successive multipliers.

Logs should be submitted with each band listed on separate sheets, 28MHz on one sheet, 21MHz on another and so on. A separate sheet listing all multipliers for each band should also be included.

Duplicate loggings for which points have been claimed will be penalised at 10 times the contact value.

ADDRESS FOR ENTRIES

R A Treacher, BRS32525, 93 Elibank Road, Eltham, London SE9 1QJ, England. Entrants should ensure their entries are postmarked no later than 5 August 1991.

AWARDS

Certificates will be awarded to the leading three entrants in each section in the British Isles section provided there is a minimum of 10 entrants. A certificate will be awarded to the leading station in each country in the overseas section provided that station scores at least 50% of that section winner's score.

THE VHF BANDS

MICK TOMS, BRS31976, is starting to enjoy his first summer on 50MHz. In two short openings early in May he logged YO2IS, CT1WW, ZB0X and the prize catch of CN8ST. We will most definitely hear more of Mick's activities on 50MHz in the course of the next few months.

Another who will tell us about the goodies on the band is David Whitaker, BRS25429. David is the first UK listener to have confirmation from all continents on 50MHz. Ian, G4OUT, will obviously be busy handing out 50MHz Awards in the near future. Unfortunately, your scribe is QRT at the time of penning the column, and will miss the beginning of the E_s season, but I will soon be active once I have taken up residence in a new, very palatial, loft extension.

THE HF BANDS

BEING OFF THE AIR has not lessened the amount of HF DX reported, thanks to my army of regular reporters. Here goes with the best stations reported:

28MHz: AP2UR, A22AA, A71AA, BT80TUA, D68FT, FR5CY, KB5LRO/KH9, TG9GI, TU2XZ, VP8CEX, VS6VO, XX9MD, 3DA0BK and 8Q7ZL.

21MHz: BV4AS, H44MS, P29NMD, SU1ER, T30A, VK6BFZ/VK9X, VQ9HW, XQ0X, 5V7DP, 9M8PV, 9V1WW and 9X5SW.

14MHz: AH6EE, A35KB, CE0DFL, FK8FS, FO5BI, P29KH, TU4DP, KB6CC/V63, ST0DX, 3X1AU, 4S7SW, 9K2MJ and 9M8ST.

FINALE

ONCE AGAIN, THE space has beaten me. Please keep sending any news which is for or about listeners. I am still particularly keen to receive good quality photographs. The next deadline is **Tuesday 11 June**.

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

THE RSGB National Convention has been and gone, and I spent two interesting and profitable days there. I was struck by the large number of youngsters - all happily active - constructing, looking, buying, asking questions. Free admission for accompanied children under 14 must have had something to do with this. Full price admission for everyone obviously makes for a very expensive day out before the other spending begins. Most events offer reductions for children, senior citizens and the disabled and this general policy is of benefit to families and organizers, leading to an enjoyable family outing.

By contrast, at the rally at Hatfield in December, there was one standard entry charge, true a much lower one of £1, but children were not to see much return for that. Perhaps, knowing how crowded rallies can be, it has been done deliberately to reduce numbers and reduce discomfort,but this must be a decision left to parents, who of course, will be with their children and keep them safe.

Many Mums are licensed, and of course, they can't leave their children at home, so a single-fee charge excludes these amateurs too. Please, rally organizers, remember that we are trying to catch 'em early. Make youngsters welcome at a reduced rate and offer something to interest them. Most rallies do already.

GROUPS

WITHIN THE hobby of amateur radio, there are very many branches: telephony, morse, packet, weather forecasting, slow scan TV, to mention just a few. Each is a group within the larger group and, depending on your particular interests, you will find a body of amateurs who can, and will, give all the help and advice you need. Membership of most of these bodies is fairly inexpensive although, as yet not many have thought about junior membership, hint, hint.

Other groups bring together amateurs of a particular background. Ex and serving Services personnel, professional etc. Yet others cater for specific groups of people: RAIBC (Radio Amateur Invalid and Blind Club), BYLARA (British Young Ladies' Amateur Radio Association) etc. As amateurs are spread country-wide, and often never meet in person, these organizations maintain links between people of like backgrounds with magazines, newsletters and nets to give news and views within a particular interest. If you want to find amateurs who think and feel as you do, the *RSGB Call Book* will give you some ideas.

A WINDOW OF OPPORTUNITY

MANUFACTURERS HAVE given their support to amateur radio from the 1920s to the present day, from the early transatlantic tests to Project YEAR. Many different companies now fund activities connected with all branches of education, whether directly linked or not. To give but one example, Hampton's estate agency sponsor extensive riding facilities at a girls' school, thus widening the range of activities normally available.

Amateur radio is widely recognized as a training subject, both for itself, and as a potential source of recruits into technical and electronic industries. Project YEAR, and the enthusiasm it has created, proves this point, but complacency is dangerous.

Since November 1990, when the Government announced plans to make the UK the most liberal environment for telecommunications, there have been many other proposals, eg computer links on the 27/81 CB band, PCNs and other new systems, many of which should be operational within the next five years. The Olympus educational satellite is already in use and there are plans to use it to allow computer links between schools in Canada and the UK.

As technology expands at an ever increasing rate, and these and other systems develop and become more easily available, the advantages at present enjoyed by amateur radio may begin to lessen. The 'magic' of amateur radio is the ability to communicate on a one-to-one basis with someone of similar interest anywhere in the world - without knowing in advance where that will be.

The present impetus set in motion by the advent of the Novice licence must be sustained, and the ideal place to do this is in the schools, where, in most cases, there is no 'resident' amateur. One way that schools could be helped to come to grips with the educational possibilities of the hobby, is for clubs to give a hand, and there are usually club members available through the day.

If a club 'adopted' a school, think of the advantages. Enthusiastic amateurs introducing pupils to an exciting new outlook on life. A future Marconi on the path towards new technology? [Clubs all have the RSGB video *Amateur Radio For Beginners* available for use in such situations].

ANY ADVANCE?

AS REPORTED last year, Siobhan Rydings passed the 12WPM morse test at nine years old, thereby proving the ability of youngsters to do this. Belated personal congratulations from me, Siobhan, but this was not a record, I learn.

Mark Firth, passed the same test way back in September 1974, when he was only *eight* years old! Under the old rules, of course, Mark could not hold an amateur licence until he was fourteen, and even then would have had to retake the morse test, as it had to be taken within a year of passing the RAE. The waiting proved too much. Mark's interests turned in other directions, and he was lost to amateur radio. A less youthful Mark is now studying Physics and Astro-physics. Mum and Dad, (Rae, G4JMT, and Bob, G3WWF) sent the information as encouragement to other youngsters.

Although there is provision for Novices to take a 5WPM morse test, there is no reason whatsoever (if they enjoy a challenge and have time and inclination for the extra effort) why they should not follow the example of Siobhan and Mark. Then if and when they go for the full amateur licence, that is one hurdle, considered by many the hardest, already overcome.

The record for the 12WPM morse test rests at eight years old. Can it be beaten?

REAL CONTACTS

WITHIN DAYS of publication of May's *RadCom*, I received a useful hint from Jeff, G3LWM, which I am pleased to pass on to all Instructors.

49MHz Licence Exempt sets complying with MPT1336WT, such as the Tandy 60-4016 at £19.95 a pair, would give practical help in learning procedures to be used on the air when the licence is gained (another practical aspect for the course?).

If the Instructor also has a set, and sent his students out of shouting range, even into another room, a two or three way contact (QSO) could take place with 'callsigns'

NOVICE MORSE TEST

THE RA HAS issued a Press Notice detailing the form the Novice Morse Test will take. The RSGB will conduct the tests as agents of the RA.

The test will comprise a receiving test and a sending test. Up to three candidates will take the receiving test simultaneously but the sending test is taken individually.

The receiving test will use computer generated Morse on a tape comprising a minimum of 120 letters and 7 figures *in the form of a typical exchange between radio amateurs.* The test will last about 6 minutes and each character will be sent at 12WPM, but with longer gaps between letters and words to reduce the overall speed to 5WPM. Up to six uncorrected errors will be permitted.

In the sending test, the candidate will be given a text of at least 75 letters and five figures to send on a straight key in three minutes. Again, this is in 'QSO' format. No uncorrected errors are permitted.

The test is likely to include frequently used Q-codes, abbreviations such as ABT, FER, OM, XYL and 73, procedural characters (AR, KN etc), punctuation (?, /), and of course the error correction character.

The fee is the same as for the 12WPM test - £13 and tests will commence from 1 July for those who have taken the Novice RAE. For full Class B licensees wishing to gain Novice Class A privileges, the RA has announced that tests will be available from 1 September. Test application forms can be obtained from RSGB HQ.

Members requiring further details should request standard leaflet no:1/33 Novice Morse Tests from Sylvia Manco at RSGB HQ.

GB4MGR

LAST MONTH, JOTA stations were featured, now it's the turn of the Guides. Only one Thinking Day On The Air (TDOA) station operated from the Isle of Man. This was GB4MGR (Manx Guide Radio) at Ardwellin, the Outdoor Pursuit Centre, Baldwin, and it was a huge success with Guides and visitors from far afield.

In the UK the weather was not kind, nor was it in the countries contacted, where it was also raining - except in Norway - where it was snowing! In Southdennis, Mass. USA, the girls learned that the maximum temperature around midday was +1 and -10 the rest of the day! (and we grumbled). Very informative, this amateur radio, as well as exciting for the youngsters who were able to give greetings to other Guide stations in the UK and around the world.

Many of the Guides will be wearing a Communication Badge after this event as they were able to pass two sections of it. James and Stephen from Douglas, who are taking communications as part of the Duke of Edinburgh Award, came to the station and were also able to pass a greetings message. GB4MGR, through Denys, GD4OEL, expresses thanks to: the Isle of Man Post Office for its gift of IOM TT cards for use as QSL cards; Nevada of Portsmouth who supplied a 10m vertical antenna; and all others who helped to make the event such a success - not forgetting the visitors, Guide and Scout officials.

chosen by the Instructor. This method has been successfully used by Jeff in his Auxilliary Coastguard activities as a training aid, and he has passed the idea on. Thanks, Jeff.

GX6HH/P

HELENSWOOD SCHOOL in Hastings is holding a Grand Fete on Sunday, 14 July. A Special Event station is being organized to demonstrate the hobby to the girls, their parents and visitors. This station will also be operational on the Saturday.

The callsign used will be that of the Hastings Electronics and Radio Club, GX6HH/P, so that the girls may pass greetings messages near and far. Other schools, clubs and anyone interested in arranging skeds, please contact Gail, G0GRK (address below), who could probably arrange for other local stations to be 'on air' if she knew this was wanted. A unique QSL card could be yours if you make contact. All QSLs via Gail.

They are hoping to contact other towns named 'Hastings' but would be delighted to meet you, and contacts with GX6HH/P count two points towards the Hastings Award. This information came from Mrs Gail P Stevens G0GRK, 33 Langham Road, Hastings, East Sussex, TN34 2JE, who would be pleased to give you any further information that you require.

WANTED ALIVE!

TOO LATE to tell you now of the 'Open Day' at the premises of the Pontypool Amateur Radio Society on 4 June this year. Not too late to tell you of its purpose, which was to publicise the following:-

The members of the Club intend to run a pilot Novice training course starting Monday, 5 August. Classes will be held from 9am to midday, Monday to Friday, for two weeks in local Education Dept premises. The minimum number required to run the course is twelve. Are there twelve youngsters in the area who would like to have a go?

Apart from preventing a Novice course from interfering with normal education, this could prove an ideal way to fill those long boring hours of school summer holidays!

More mature students could possibly not be able to attend during daytime hours, and would probably be more easily accommodated in the evenings, but anyone interested - especially in the daytime course - please contact: Con Lonsdale GW0FJH, 27 Jerusalem Lane, New Inn, Pontytpool, Gwent (Tel 0495 762604), as soon as possible.

AWARDS

BOB, , G3PJT, Chairman of the RSGB's HF Committee reminds us that many amateurs 'collect' Worked All Britain (WAB) Awards.

Great Britain and Northern Ireland are divided into Large Squares, 100km x 100km, and given a two letter reference in Great Britain and a single letter reference in Northern Ireland. These large squares are divided again into 10km x 10km squares and two numbers added to the letters, the first giving the position on the horizontal, and the second the vertical scale. This is the WAB square.

Finally, for the WAB Area, the administrative county is added. (eg SP38 West Midlands, J37 Down). There are various awards to work for, open to all radio amateurs and short wave listeners. Many foreign stations try to collect these awards too, and there are contests and nets to add to the interest, apart from the friends made.

The HF Committee looked at three awards for the Novice to consider as being a reasonable challenge:

- Worked All Britain, UK County Award,
- IARU Region 1 Award,
- Worked All Continents, (WAC).

A brand-new IARU Region 1 award has already been agreed by the HF Committee for which Novices will submit QSL cards for twenty IARU Region 1 countries.

For more information concerning WAB, write to: Mr B J Morris, G3KSQ, 22 Burdell Avenue, Headington, Oxford, OX3 8ED. And for details of the IARU Award and WAC, contact the RSGB HF Awards Manager, Steve Emlyn-Jones, GW4BKG, PO Box 20, Bridgend, Mid Glamorgan, CF35.

COMING ATTRACTIONS

ALL SORTS of little tips are coming my way; simple but good ideas that will save money. For instance, did you know that 35mm film containers make sturdy battery cases for SP11 1.5V batteries?

All you need to do is make a hole in the bottom and the lid and push paper fasteners - the type with 'legs' - through and secure them. Easy to connect a wire to the 'heads', and there you are!

In future columns I hope to pass on other ideas like this, some quite ambitious, some so simple and obvious when they are pointed out. Please share your money-saving ideas, perhaps a 'Scrooge's Corner' can save us all a lot of money!

A LAST WORD . . . .

. . . . TO INSTRUCTORS of courses completed, or nearly completed: How did the timescale work? Did the course fit easily into the 30 hours, or did it require more time? If so, how did you fit it in?

All information about your course could help in the running of future courses. Your comments, please, on this or any other subject of interest and value to readers of this column.

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TS-850S . . £1,325

The HF rig which has taken the world by storm. We have a queue of eager folk waiting for delivery; and it's no surprise when you see and hear the TS-850S in action. All band operation from 160 to 10 with a general coverage receiver which beats everything except the TS-950S. Every possible operating convenience and total ease of use make the TS-850S the world beater in the HF field. Send for details today or call at any of our branches to see it.

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High power (50W) compact FM mobile for 2 metres, combinining top performance, ease of use and ease of fitting; thanks to diminutive size. Bright easy-to-read display coupled with a multi-function microphone make mobile operating a real pleasure. Indeed, owning a TM-241E is a pleasure in itself. There is a 70cm brother in the TM-441E (£325) and even for 23cm in the TM-531E (£415).

TR-751E . . . £610

Kenwood's all-mode 2 metre mobile/base station rig. SSB/CW/FM all provided with 25W on all modes. Hot receiver, ease of use, total satisfaction in the Kenwood way. Chatting on the repeater, chasing the SSB DX, satellite comms or AMTOR, all is yours with the best all mode rig on the market. Why not have it all in one box?

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The ultimate two band multi-mode base station with 2M/70cm bands as standard with optional 23cm internally fitted unit for three band operation. The TS-790E is accepted as being way out in front as far as performance is concerned and facilities are there to match that performance. Matching the new TS-850S HF rig, the TS-790E completes the station to perfection.

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It was clear to us many years ago that a technical hobby like amateur radio was going to see the use of modern surface-mount technology in the manufacture of transmitters and receivers. It was also clear that the opportunity for many radio amateurs to service that equipment was going to be increasingly difficult. Not through lack of ability but simply from the lack of the professional equipment required to work with circuit boards and sophisticated micro processors.

From the very earliest days, the cornerstone of Lowe Electronics' sales policy has been the development of its customer base through a solid reputation for service. We see many ways in which this policy has been successful and are encouraged by the warm praise we receive from so many of our customers - old and new.

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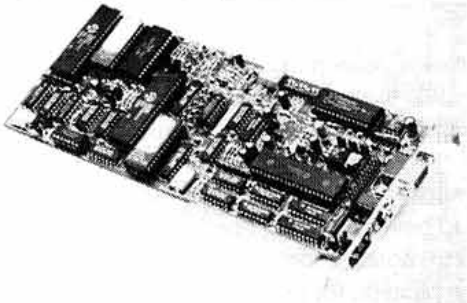

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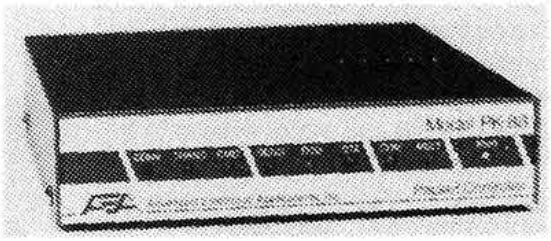

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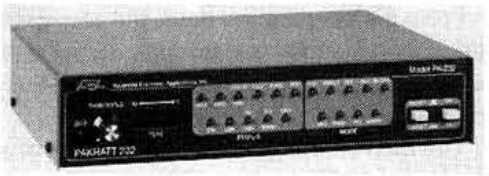

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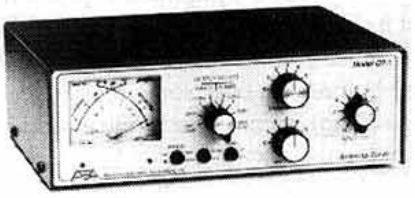

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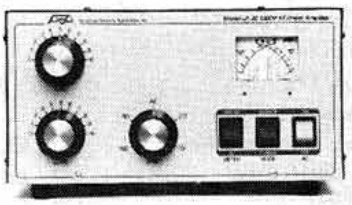

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TOPICS

PAT HAWKER G3VA

'PARASITICS REVISITED' REVISITED

TT, DECEMBER 1990 digested information from Part 1 of a *QST* article by Richard L Measures, AG6K, on 'Parasitics Revisited'. This warned of the damage that can be done to high-power, high-cost transmitter valves by VHF parasitic oscillations which may exist undetected over a long period, intermittently or continuously, due to unwanted resonances.

Part 2 of AG6K's article (*QST*, October 1990, pp32-35) continued the sad saga, showing how VHF parasitics can also damage band-change switches and tuning capacitors. It also provides useful information on improved forms of parasitic suppressors.

He points out that VHF parasitic-oscillation damage to band switches and tuning capacitors stems from the high VHF voltages that are generated by the parasitics in the amplifier anode circuit causing arcing, which melts and/or burns switch and capacitor materials. AG6K writes: "Band-switch damage can occur in two forms:

"(1) Band-switch contacts burned so badly by VHF energy that they no longer make contact. In some cases, the contacts may be missing because the arcing has vaporized them! The fix: Drill out the rivets and replace the burned contacts, or replace the defective switch wafer - after installing better (lower VHF-Q) parasitic-oscillation suppressors, cathode-circuit protection and an HV (high-voltage) fuse resistor in the amplifier.

"(2) Conductive material deposited by the arcing on the surface of the ceramic insulation of the switch. Even if better parasitic suppression is successfully applied to the amplifier, the conductive material must be removed because such paths can arc during normal amplifier operation."

AG6K adds that when the VHF arc vaporizes and burns the contacts, carbon-black and gasified metal are deposited on the ceramic insulation which is indirectly heated by the arc. These conductive substances stick to the ceramic like glaze on pottery and when cooled are difficult to remove:

"If you know where the switch arced, and only minimal arcing occurred, you may be able to remove the metal particles with 400-grit wet or dry silicon-carbide abrasive paper, applied under dripping water. Polish and dry the ceramic, and coat it with suitable HV-insulating paint to reduce the possibility of the arc recurring at the original site. Frequently, however, the only fix is to replace the wafer concerned. (Don't discard the damaged wafer - you can salvage its undamaged contacts to replace damaged contacts on wafers that don't have arc-contaminated ceramic.)"

AG6K explains that arcing can also pit, blister or even partially melt the metal plates of an air-dielectric variable capacitor in a high-power amplifier. This can reduce the working voltage of the capacitor and in severe cases may result in arcing under normal operating conditions. However, such faults can be easily overcome (again after first suppressing the VHF parasitics) by using a thin, flat file inserted between the plates of the capacitor and filing them smooth, rounding off any sharp edges, realigning any bent plates with long-nose pliers and ensuring that the air gaps of fully meshed plates are consistently equal. Do not worry if part of a plate has been destroyed, this will only reduce the maximum capacitance by a minimal amount.

He describes a superior form of parasitic suppressor having a U-shaped (hairpin) inductor: **Fig 1**. This can be used if there is room in the amplifier box. He writes: "This form of inductor offers advantages over a conventional coil: it affords less inductive coupling with its associated suppressor resistor(s) and its inductance can be adjusted without desoldering and adding or removing turns. This is useful if it is necessary to decrease inductance to reduce suppressor-resistor dissipation at 28MHz. The inductance is lowered by squeezing together, or increased by spreading, the two sides of the U."

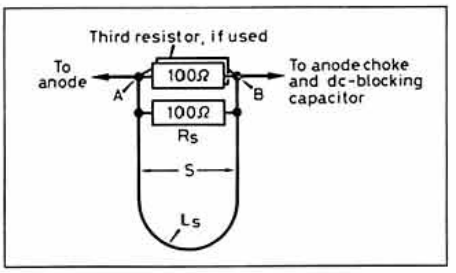


Fig 1: A U-inductor VHF parasitic suppressor recommended by AG6K for use in high-power HF amplifiers. L_s consists of a single loop of No 18 nichrome-60 wire. The network resistor, R_s consists of two or three 100Ω, 2W, metal-film resistors soldered across the U. For typical 3-500Z amplifiers, the wire length between A and B is about 3.5in, producing an L_s of about 60nH. For lower voltage amplifier valves, A-B may be increased to about 4in for an L_s of about 80nH. The maximum spacing between the inductor sides (S) is set by the length of the resistors that make up R_s. See text for adjustment of the inductance by squeezing the sides.

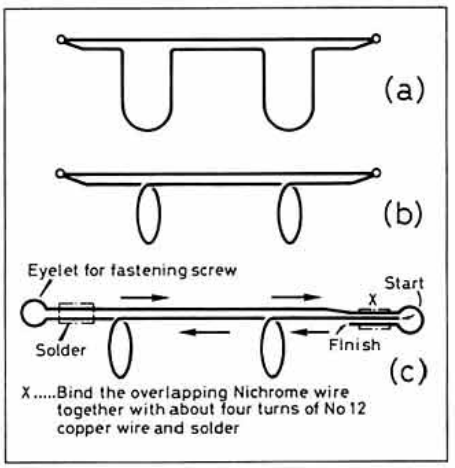


Fig 2: To kill really stubborn VHF parasitics it may prove necessary to substitute low-VHF-Q conductors for existing high-Q anode straps. Paralleled straight and inductively loaded nichrome-60 wire runs are one answer. The loading inductors can take the form of Us as in (a), or single circular turn coils [shown in side view in (b) as loops]. C shows a method of constructing such a low-VHF-Q conductor from a single length of nichrome-60 wire. (AG6K, *QST*).

AG6K provides further information on solving really stubborn cases, for example by the substitution of low-VHF-Q conductors (**Fig 2**) in place of the usual high-Q anode straps fitted in high-power amplifiers.

He also describes the provision of a low-VHF-resistance path to chassis earth at the cathode terminal(s) on the valve socket: for example a metal-film resistor in series with a small-value capacitor. This can be 25pF and 1 - 10Ω; the object being to find a capacitance that resonates with the valve's inductive input reactance at the parasitic frequency. A capacitor without resistor may exhibit a high-Q self-resonance that could aggravate the parasitic problem.

AG6K suggests that this VHF input-swamping technique is especially useful with valves such as the 3CX1200A7 and 3-1000Z "which exhibit about four times more plate-to-cathode feedback capacitance than other valves of similar power capability." For these valves he suggests one RC network consisting of a 10Ω resistor in series with a 245pF capacitor between each filament terminal and chassis.

AG6K also notes the difficulty in tracing intermittent VHF parasitics even with a spectrum analyzer or VHF oscilloscope. Dip meters can reveal resonances in a dead amplifier (unpowered and unplugged). The resonant frequency of the amplifier-box cavity can be measured with all covers in place by coupling the dip meter to the cavity via a small continuous loop passed through the box's ventilation holes.

The above notes, and those in the December *TT*, form only a brief digest of the discussion and suggestions of AG6K's long two-part article, but may serve to show that VHF parasitic oscillation can be, and often is, a very real problem not only in home-built but also factory-built high-power amplifiers. A note from K H Green, moreover, stresses that the general problem of VHF parasitics is far from being confined to transmitter amplifiers. He writes:

"The *TT* item on VHF parasitic oscillation takes me back a few years but I feel sure there is still a lot of it about.

"About a year before I exchanged the soldering iron for a typewriter, I built a handheld absorption-wavemeter-probe with a DC transistor amplifier. Coupled to a 2-turn coil on the end of a feeder from a roof-top three-element Yagi array at Epsom, this would indicate the two carriers from the old Crystal Palace Band I sound and vision transmitters. It covered (and still does) the range 600kHz to 360MHz although it was intended to go lower and all the way up to 1000MHz. Currently I have plans to replace the crystal-diode/DC-amp with a modern op-amp unit but the weeks do not seem as long as they used to. (An age affliction from which I find myself increasingly suffering! - G3VA.)

"The device was built to go looking for parasitics which I had long believed to be the cause of many unexplained and often unedetected problems in electronic equipment. If you build four identical audio amplifiers or identical receivers, the chances are that one of them will be a rogue; about 2dB down in gain, about 1 to 2dB up in noise; it will overload just before the others or be unhappy-ish with transients; it will resist adjustments to its

input impedance and sound a lot nastier than distortion-measurements say it ought to.

"The firm had a family of 'mains stabilisers' which used motor-driven variacs in buck-and-boost arrangements. They were always fine when first built but would soon become lazy and develop hysteresis effects. Certainly, my probe showed that many of these problems were indeed caused by VHF parasitics but, alas, I departed from that realm before my investigations really got under way.

"The most notable of these 'ossers' however was a UHF sweep oscillator which I developed and built to provide a daily performance check on a string of unattended 400-500MHz recording-receivers. I cannot recall the valve-type but it was used in a resonant-line TATG oscillator around 450MHz part-tuned by a motor-driven 360° capacitor.

"The prototype worked well - eventually - and a draughtsman folded it all up, tidied it away and passed it to Workshops to make the first one. I then had to make it work all over again - and successfully. Workshops then made four more. I wired the first of these and, when it was powered, it oscillated powerfully like any good audio amplifier! The only problem was that I could not find the oscillation frequency.

"Eventually I dug out our latest acquisition in absorption wavemeters and traced it to 960MHz. After two hours of messing about, I had not succeeded in shifting that frequency by even 1%. My problem was out-of-band and I believe that I used a search coil on the none-too-sensitive absorption wavemeter to discover that the very many milliwatts were centred within the very-hot valve envelope.

"The valve electrode assembly was acting as a resonant line and the entire oscillation function was in a world of its own. However, the cure proved to be simple. I lowered the impedance of the feed line (can't remember which) by moving the two copper strips closer together.

"If you translate this experience from a small-signal valve to a high-power transmitting valve, then it is not surprising that valves can suddenly melt-down. My advice to all designers and redesigners would be to keep their grid and anode circuits at low impedance at both VHF and UHF. And always to remember that a capacitor that serves admirably at HF is almost certainly an inductor at VHF, let alone UHF, and that the tank circuit for many parasitic oscillators is labelled in the circuit diagram as decoupling."

While the above notes apply primarily to valves, it is worth emphasising that, over the years, the subject of VHF parasitics in transistor amplifiers (which can result in instant destruction of the device) has been discussed a number of times in *TT* and elsewhere.

HOME CONSTRUCTION AND THE PCB

THE SAD STORY OF THE electronic hobbyist (*TT*, May p29) whose interests spanned from broadcast receivers to hi-fi to computers to computer software (but not amateur radio experimentation) raised, once again, the thorny question of what type of constructional practices are most suited to equipment not intended for mass production in a factory. There can be little doubt that for those who wish to build one of the many complete kits that are still on offer within our sector of electronics, the PCBs provided with the kits represent a satisfactory way of reproducing the intended design, and so achieving a specified performance without the need to exercise any design or layout skills.

But when it comes to trying out your own ideas or 'half-copying' a published design, but using available components, the home-made 'one-off' printed circuit board has little to recommend it. *TT* has on many occasions pointed to the advantages - from the standpoint of KISS, flexibility and often performance - of alternative techniques such as the now widely-known W7ZOI 'dead beetle' ('ugly-board') approach.

An excellent two-part appraisal of the various approaches suitable for RF circuits including various pin-and-wire, sticky-copper etc, not involving conventional PCBs, appeared in *RadCom* (February and March 1991) by Ian White, G3SEK, under the title 'How to lay out RF circuits'. It should be emphasised that even 'old-fashioned' breadboard and connecting wires still have a role to play in PSUs etc, easing subsequent modification and repair rather than creating 'throw-away' modules. There is, however, a real danger that newcomers to amateur radio may have already come to believe that the PCB is the *only* effective modern form of c%%onstruction.

Dave Plumridge, G3KMG, feels very strongly on this subject. He writes: "Robert W Lucky (*TT*, May) remarks on the futility of 'stuffing parts onto boards and soldering the connections' - yet what do I see on the front cover of *RadCom* but one of those wretched boards for a simple PSU regulator! While I would agree that the PCB approach gives a good introduction to constructional practices it is surely the most stultifying procedure ever adopted by home constructors who seem to think it must be the only correct method since all commercial, factory-built equipment is made like that!

"I do hope that young novices will be weaned off the PCB syndrome and on to techniques which allow scope for innovation, experimentation and modification. Then you are no longer a 'board stuffer' but a creative experimenter. Result - *much* more fun and sense of achievement.

"I was glad to see such non-PCB techniques described in the recent two-part article by G3SEK - but please no emphasis in *TT* or elsewhere on 'How to etch your own PCBs'.

"Copper clad board is a wonderfully versatile material. It cuts easily with tin snips, allows tracks to be cut quickly with 'hobby tools', solders easily, makes strong and RF-tight boxes, etc, etc. It also forms a super ground-plane giving enhanced RF performance. Remember the problems that constructors had with the 1988 *RF Design* low-cost spectrum analyser? It emerged that they were making PCBs whereas K2BLA had built his 'dead-bug'-fashion on copper-clad board. My current project is based on the 'High perform-

ZAPPER II AND ZAPPER III ANTENNAS

ROD NEWKIRK, W9BRD was particularly pleased to find the *TT* references to his 'BRD Zapper antenna, the unidirectional version of a single-section, end-fed W8JK array (*TT*, September 1990, pp31-32). He sends along two variations, one of which obviates need for the home-built matching circuit.

He writes: "The simplified approach to phased antenna directivity suggests variations. For example, need for a dedicated matching circuit at the stub can be avoided by using two Zapper arrays in phase (**Fig 3(a)**) for an acceptable match to balanced 300Ω line. A standard balanced-output matching unit can then be used at the transmitter. Directivity reversal must be done at the stubs. Added collinear gain, up to about 3dB, can be realized by spacing the Zappers apart, as limited by the combined stub lengths.

"A vertical version provides switchable unidirectivity in four directions (**Fig 3(b)**). This version requires the single-tap feed approach detailed in the original article (*QST*, June 1990 for full details), a dedicated T-match being recommended. The selectable patterns are cardioidal, broad in the front quadrant, with a sharp rear null. A high-grade rotary switch at the stubs-juncture selects any one of four lobe/null directions. (The sharpness and depth of the target-frequency null suggests VHF benefits for clashing repeaters, etc). Note that while Zapper/W8JK configurations are fundamentally simple, optimum results depend heavily on proper symmetry and accurate resonance (high-Q). *Ergo*, each half of a double Zapper should be physically identical and identically resonant. Directivity switching then has little effect on matcher settings for unity SWR".

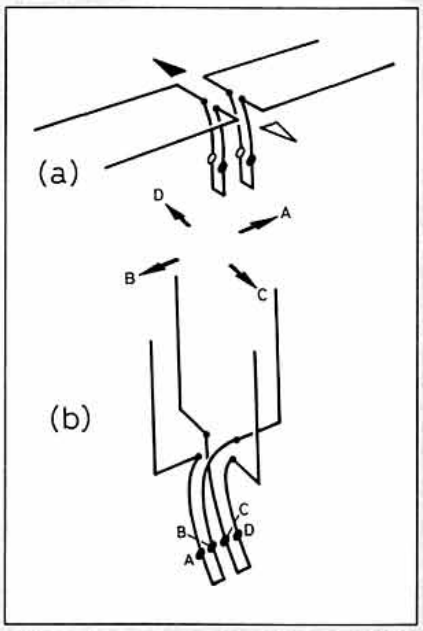


Fig 3: (a) The Zapper II antenna by W9BRD uses two unidirectional Zapper/W8JK arrays. (b) The Zapper III antenna with four vertical elements can provide switched directivity in each of the four quadrants.

ance communications receiver' by W7ZOI (recent *ARRL Radio Amateurs Handbooks*). W7ZOI found that his prototype built this way had a better performance.

"For this receiver project, I am using small pieces of board, usually about one-inch square, with insulated 'lands' cut very quickly with a 12V drill and burr. I then build up a single stage on this and then mount it on a large board, just anchoring it with the decoupling capacitor leads and any earthy-ended components. I can then very easily try different stages or re-arrange them as required. It's really up to you and your imagination how you develop and apply these techniques - which makes for much more fun. For example, QRP-advocate (and *RadCom* columnist) George Dobbs, G3RJV, uses megohm resistors from 'bargain packs' as 'lands' instead of sticking on little bits of board.

"This brings me to the G3KMG Whistling Dipoles, a KISS hand-portable Doppler D/F I built in the 1980s using what could be called 'surface mount technology - ham style'. (This is presented separately. Unlike the ZS6EF design in *TT*, April 91, there are no FET RF pre-amplifiers and Faraday-link coupling to the antenna elements is used -G3VA). To have made a PCB would have required layout, drawing-preparation, then on to the board with etch resist, messy etching, careful drilling and finally component stuffing and soldering. My way is to lay out the components on a bit of board, stick down the chips or pads, solder up and then cut the board to size with tin snips . . . ."

MORE ON SPERRTOPF COAXIAL SLEEVES

FURTHER EXPLANATIONS HAVE come in confirming the explanation given by G4LQI of the term 'sperrtopf' as a 'blocking-pot', with an amateur radio 'Sperrtopf vertical' marketed for amateur radio use by Antenna Andes. Charles James, G0ILF, also points out that the 'FD4 Windom' is as well-known in Germany as the G5RV is in the UK. Peter Nolte, GW7IZG/DC6BN adds that sperrtopf coaxial sleeve antennas have been produced in Germany for many years as commercial VHF/UHF antennas by such firms as Kathrein Rosenheim and the well-known Rohde & Schwarz.

He explains that in commercial/military communications wide-band characteristics of antennas are essential, with the ratio of length to diameter an important factor. For some sperrtopf VHF antennas in the region of 150MHz some of the elements are 35mm diameter and some about 50mm. Two designs from Rohde & Schwarz (HKO12 and HKO14), both wideband antennas, have the sperrtopf part of the assembly really looking like inverted pots, in contrast to narrower-band versions (about 10MHz bandwidth) which have about 35mm diameter. The R&S designs HK001, 012 and 014 feature additionally a kind of inverted basket in order to reduce further the unwanted re-radiation from the feeder cable. Another feature of some designs is the slightly raised elevation angle of the main radiation for ground-to-air operations, whereas normally radiation from such antennas is in the horizontal plane.

Professor Guenter Beuche, DL6AB, adds further details of this barrier-pot form of RF choke, emphasising that there is nothing magic behind the 'sperrtopf' which could just as well be called a 'sleeve' and is widely used as a form of balun to facilitate feeding a balanced load with coaxial cable, with the normal arrangement as in **Fig 4**. As used in Fig 2 of the April *TT* (with details of connections shown in (a)) the sole purpose is to suppress RF current on the outer-braid of the coaxial feed-line. Filling with suitable dielectric material, as mentioned, helps to shorten the length of the electrical quarter-wave sperrtopf used in this way.

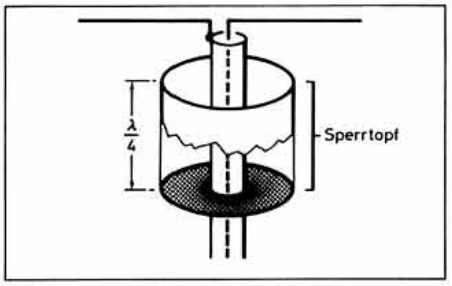


Fig 4: The Sperrtopf (barrier-pot) sleeve used to reduce outer-braid current when feeding a balanced element from unbalanced feedline.

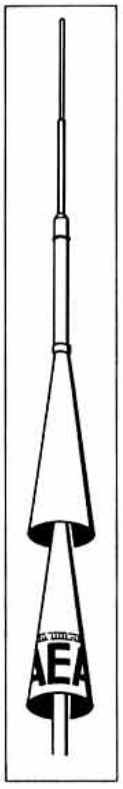


Fig 5: Sketch of the AEA IsoPole VHF/UHF omni-directional base station antenna using two modified Sperrtopf-type 'decouplers'.

He also refers to the 'IsoPole' omni-directional VHF/UHF base station antennas (**Fig 5**) manufactured in the USA by AEA who claim "exceptional decoupling results in simple tuning and a significant reduction in TVI potential" by the use of "decoupling cones offering great efficiency over obsolete radials which radiate in the horizontal plane." They also claim a low SWR across the entire American two-metre band 144 - 148MHz. DL6AB writes: "Although I have not done any analysis of the IsoPole antenna it looks like an application of two Sperrtopf (used inversely) and called by AEA 'decoupling cones' to produce the same effects as the arrangements described by Taguchi (*TT*, April) although with a different mechanical arrangement."

IN-RUSH CURRENT AND THOSE GLOWING VALVES

I STILL USE FOR BROADCAST reception a 30-year-old valve FM tuner (originally forming part of a school installation) that uses valves which are clearly visible since the tuner is no longer in its original enclosure with a gramophone turntable. When first switched on the miniature B9A valves glow so very brightly that at one time I worried that this would shorten their life. However they seem to have survived daily use over many years. I put down the bright heaters simply to in-rush current and left it at that. However, Bob Pearson, G4FHU, raises some interesting points in considering the general question of in-rush currents and their potentially damaging effect on the heaters/filaments of high-cost power-amplifier valves. He writes:

"A brief reference by Peter Chadwick, G3RZP, to the question of in-rush current in his review of the Heatherlite Explorer Linear Amplifier (*RadCom*, December 1990, p52) made me wonder whether it might be possible to tease a new generation of radio amateurs with an old trick question: 'Why do thermionic tubes glow brightly at the moment of switch-on?' The usual answer is 'Because the resistance of the heating filament is lower when cold than when hot, so an excess current rushes in when you throw the switch, falling to normal when the heater reaches operating temperature.' But this is not good logic. If the heater is cold it cannot be glowing brightly, if it is glowing brightly then it can't be cold! The explanation is more subtle. It is not the *whole* of the heater that glows at switch on, but only the parts that are less well cooled than the bulk. End connections are especially vulnerable since, like cathode straps, they are designed not to allow excessive heat loss via the connection pins in the base. The effect is strongest with indirectly-heated cathodes where most of the heater is contained inside a tubular cathode. The result is that it is usually the ends of the heater wire that are found to have burned out when a heater has gone open circuit. These are the parts that visibly overheat quickly while the rest of the heater wire is still warming up.

"It may not be only the thermal shock but also mechanical shock and the vibration produced magnetically that can cause failures. This is less fanciful than it may seem when typical inrush current for high-power valves are calculated. For example, the heater of a TY125 triode runs normally at 5.4A RMS (7.637A peak) with a (hot) resistance of 1.167ohms. But its cold resistance will be only about 0.15ohms, so with a perfect (zero impedance) 6.3V supply, the in-rush current could reach a peak value of 42A. Such a current can produce a force of the order of a gramme weight, vibrating the filament at twice the supply frequency.

"In the Explorer review, G3RZP speculated about a plan to increase the leakage inductance of the supply transformer to reduce the in-rush current. From AC circuit theory, such a scheme may appear promising, although there could be difficulties in regard to tolerances and, especially, of frequency sensitivity. But further consideration suggests there could be another snag.

"In a reactive circuit comprising resistance and inductance (or resistance and capacitance) there is the possibility of a transient surge at switch-on. The magnitude would depend upon the phase of the supply at the instant of closing the switch and upon the reactance/resistance ratio of the circuit. In the ultimate case where reactance dominates, the surge current could be twice the in-rush current predicted by simple AC theory. Although this does not mean that the arrangement would not offer an overall advantage, it tends to make it less attractive. The use of a DC regulator chip with a slow start circuit added, as used by G4LU to DC power the heaters of two 2C39 valves (*TT*, January

1991, p30) is a convenient solution now that such chips are relatively cheap, but problems mount at large currents, requiring heat sinks and expensive electrolytic capacitors.

"It is a great pity that the choke-input filter for rectifier supplies has not yet returned to the popularity it deserves (mainly because of the lack of availability of suitable chokes). For constant current loads of more than a few amps it has great advantages over the more common capacitor-input filter. It scores on life, reliability and less risk of excess voltage on failure. Also it offers much reduced peak currents in diodes, transformers and the supply mains. This latter point is becoming of importance in impending European legislation (see *TT*, December 1990, p30).

"For amateur-radio applications, there remains little to beat the popular arrangement of a surge-reducing resistor in the supply primary that is manually switched out by the operator (using a self-holding relay and push-button) a little while after turning on the main on-off switch. This automatically resets itself when the equipment is turned off. If the relay has a spare contact this can be used to add another panel light to indicate the action; pretty, impressive, and above all, simple!" (In-rush protection circuits of this general type have been described in *TT* etc over the years).

A MEDIUM-COST 'VARIAC'

TT, FEBRUARY 1991 PROVIDED details of a 'Poor Man's Variac' from *Electronics Australia*. This used a tapped 30V/1A secondary winding of a relatively low-power mains transformer that could be switched either to boost or buck the mains supply for equipment drawing up to about 250 watts in order to compensate for poorly regulated mains supplies.

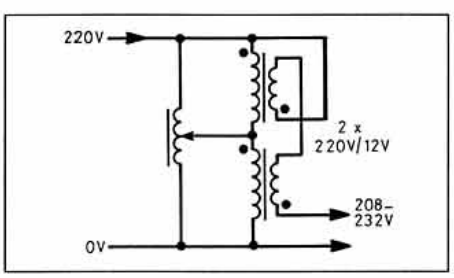


Fig 6: Form of 'Variac' system providing continuous adjustment of bucked-or-boosted AC supplies to compensate for poorly regulated mains supplies.

Basically the same buck or boost technique is used, but in a rather more sophisticated way, by G J Komen, PA0GJK (*Electron*, May 1991, p234). The arrangement of **Fig 6** can provide a continuously variable +/- 12V to the mains supply, ie delivering 220V from a mains supply of 208 to 232V, or 240V from supplies ranging from 228 to 252V using two 12V transformers and a relatively low-power variable auto-transformer. While such an arrangement would cost more to implement than the *EA* arrangement, it would be more flexible and would not require the use of a multi-position switch or a multi-tapped transformer, yet might be expected to be less costly than a high-power Variac.

FETS AS RF AMPLIFIERS

ALTHOUGH, OVER THE PAST few years, *TT* has included a good deal of discussion on, and examples of, the use of VMOS-type power-FETs as RF power amplifiers, it is many years since information has been included on the use of small-signal FETs and dual-gate FETs as RF/IF amplifiers in HF and VHF receivers.

THE WHISTLING DIPOLES 144MHZ DOPPLER D/F

IN THE 1980s, IN CONNECTION with some 'repeater problems' in Scotland, Dave Plumridge, G3KMG, developed a simple 144MHz Doppler direction-finder and has since produced the MkII version shown in **Figs 7 and 8**. While the basic principles, method of use and so on are the same as those described for the ZS6EF unit in the April *TT*, the absence of RF pre-amplifiers as well as the use of 'surface mount technology - ham style' (**Fig 9**) rather than a PCB for the electronic switch makes this a KISS project for home construction.

The two antennas are switched sequentially to the receiver at approximately 800Hz. Whenever the signals reach the receiver out-of-phase due to slight path length differences, the signal presented to the receiver will be phase-modulated at 800Hz. Only when the boom is exactly broadside to the transmitter will the tone disappear, thus indicating the two possible directions of the transmitter (ie in front of, or behind, the observer). G3KMG reports that the 'null' is very sharp and there may be harmonic effects (due to multipath reflections etc) so that it is necessary to listen for the disappearance of the fundamental 800Hz tone.

He also comments: "Incidentally I was impressed by the accuracy of the design information on helical-wound antennas given in Vol 2 of the *RSGB Handbook*. They resonated almost spot on, and with the balun feed as shown gave a return loss of nearly 20dB, not that it mattered too much in this instance for reception only."

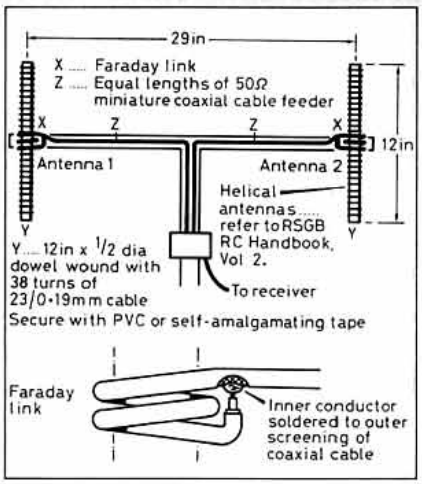


Fig 7: G3KMG's 'Whistling Dipoles' KISS 144MHz Doppler direction finder.

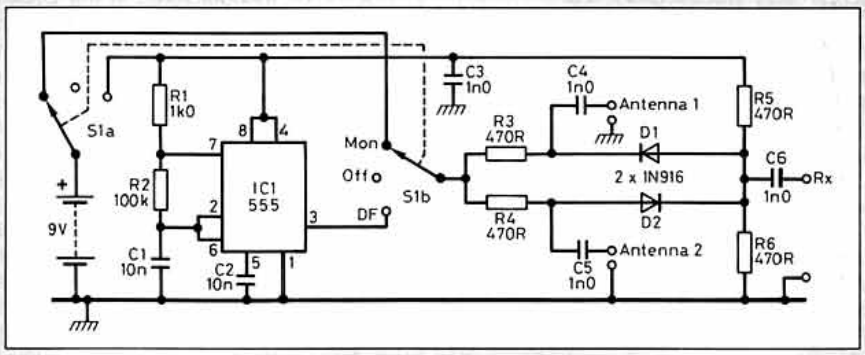


Fig 8: The 800Hz electronic switch for the Doppler D/F.

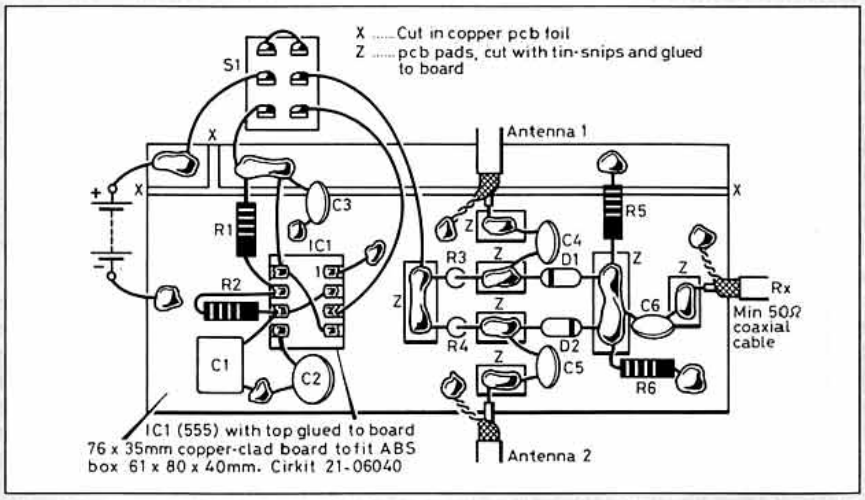


Fig 9: The 'surface mount' form of construction eliminating the need for a home-etched PCB - an approach applicable to other home-construction projects and likely to appeal to those who regard PCBs as a barrier to experimental, flexible constructional projects.

Mike Murphy, VK6KRO, (*Amateur Radio*, May 1991, pp 19 & 30) emphasises that: "Twenty-five years after their introduction, it would be fair to say that FETs are rarely used by radio amateurs except as VHF pre-amplifiers (and sometimes as oscillators - G3VA). This is unfortunate, as they offer many advantages when used properly."

VK6KRO believes this state of affairs is partly due to the belief that FETs are fragile and easily destroyed by electrostatic discharge, and partly because of the belief that since superficially they have characteristics akin to valves, they can be used in basically similar circuits.

He points out that modern FETs are very rugged once they are wired into circuits having an easy, low resistance, path between their gate(s) and earth. He much prefers circuits with a coil connected directly between gate and earth to those with, for example, ten megohm resistances down to an AGC line, akin to valve practice. He says: "I have never blown up a FET and I have used dozens of them." Admittedly, FETs are very vulnerable to ESD (static) when not connected in circuit unless the gate is protected by an internal diode.

If you simply replace a valve by an FET in an amplifier stage you will almost certainly run into difficulties. This is because they have a very high slope g_m of up to 30mA/V (much higher than almost any valve) but also more drain-to-gate capacitance than most triode valves; rather like combining in a single device the high-slope of a frame-grid pentode valve with the inter-electrode capacitances of a triode valve! A sure prescription for self-oscillation if connected into a typical pentode-type circuit.

The saving grace, VK6KRO points out, is that the FET has very low output impedance and can be used as a perfectly stable *low-gain* device, yet providing excellent stage gain from the voltage step-up that can be readily achieved with a resonant input transformer.

For example, the 21MHz pre-amplifier shown in **Fig 10** using the popular 2N3819 FET (g_m = 10mA/V) with a 330Ω resistor as a load has a device gain of only about three, which would hardly be considered worthwhile for some applications. But the input tuned circuit can provide a gain of about 7, resulting in a stable voltage gain of about 21, with the FET's very high input impedance presenting only light loading of the input transformer. A stage gain of some 26dB is achieved without the FET 'getting a chance to oscillate.' (Note that VK6KRO's article does not go into the question of dynamic range, and the effect of a high-gain pre-amplifier in front of a receiver - *G3VA*).

Again, for the IF amplifier of **Fig 11**, standard transistor-type IF transformers can be used by simply reversing the connections used in bipolar transistor circuits, ie with step-up for both input/device and device/output transformers. It is then the IF transformers that provide most of the voltage gain, the FET providing an impedance change (power gain).

VK6KRO writes: "I built a 455kHz amplifier using MFE131 dual-gate devices (**Fig 12**) and, without any special tuning, got a gain of 10,000 using only two stages and it was absolutely stable. A gain of 10,000 will turn

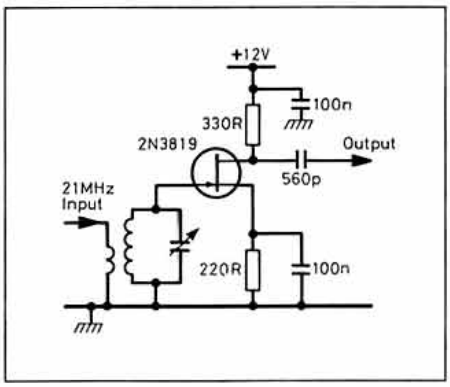


Fig 10: Stable FET pre-amplifier with low-impedance output load and with the main part of the gain coming from the step-up input transformer.

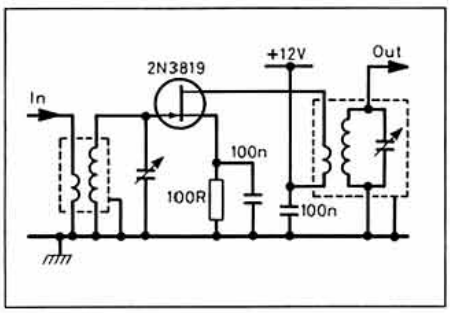


Fig 11: Stable FET IF amplifier using two bipolar transistor-type IF transformers in reverse configuration.

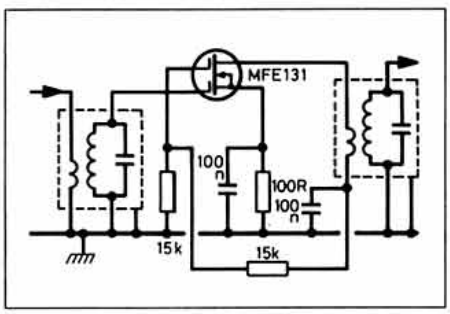


Fig 12: Dual-gate FET IF amplifier.

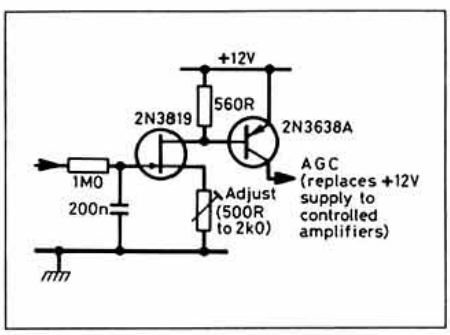


Fig 13: AGC amplifier to provide varying supply voltage to FET RF/IF stages.

10μV into 0.1V, most of the gain needed for a receiver. I also have a receiver which uses three of these stages (to make up for a lossy filter) and it is completely stable. Construction of such an amplifier is not difficult. Normal VHF techniques of mounting all components close to a continuous copper or brass plate and by-passing to the nearest point on it are used. Straight-line signal paths are always a good idea, too; ie don't bring the output back near an input. It is the same arrangement for RF stages and mixer stages: step-up transformers in and out.

"What about AGC? . . . . I tried everything I could think of before I realised how easy it is. FETs work well at 12V but poorly at lower voltages. But 'poorly' just means lost gain, not distortion. You can control the gain of an FET by reducing its supply voltage (to zero if necessary).

"**Fig 13** shows a simple AGC amplifier to control the supply voltages of the stages to which AGC is to be applied . . . . The FET in Fig 61 is biased more negatively by AGC derived from the amplified signal. The FET is effectively a base resistor for the PNP bipolar transistor. As the FET conducts less, the transistor does too, reducing the supply voltage. Oscillators and mixers should be fed from a stable power supply and not from the AGC supply. The arrangement of Fig 61 needs to be pruned to suit the individual FETs - op-amps could do it better and more predictably."

One of the applications for such use of FET devices and circuits, VK6KRO suggests, would be to modify discarded valve receivers for solid-state operation.

BATTERY HAZARDS

DEREK BRANDON, G4UXD, as a chemist, disagrees with the suggestion made by R D Marshall (*TT*, January 1991) that washing soda is twice as effective as sodium bicarbonate for dealing with battery acid spillage. He points out that the RMM (relative molar mass) of sodium bicarbonate, $NaHCO_3$, is (near enough) 84 while that of sodium carbonate (which usually comes as the decahydrate crystals) $Na_2CO_3.10H_2O$, (known as 'washing soda') is about 286. The effectiveness of these two bases in neutralising strong acids, such as sulphuric acid, is proportional to the percentage sodium (RAM 23) that they contain. Thus $NaHCO_3$ (sodium bicarbonate) is about 1.7 times as effective as washing soda, and is also safer to use. Although neither can really be called dangerous, the carbonate, being the stronger base, is more corrosive and dangerous to the eyes.

G4UXD adds: "Many people do not realise how insidious is the effect of even small traces of sulphuric acid in causing cotton to 'rot'. Even tiny spillages on cotton clothes will eventually lead to holes appearing. As suggested in *TT* (August 1990), it is a good idea to keep a battery in a small, cheap plastic bucket to minimise the danger of spillage. It is also, as previously emphasised, an important rule to switch off battery chargers before disconnecting them. ❑

ERRATUM

FIG 7 OF APRIL'S *TT* featured a doppler D/F from *Radio-ZS*. A number of members queried the transistors which should have been marked BF982, not BP982. Several also commented on the apparent non-availability of the BF982 in the UK.

We apologise for the error, of course, but circuits in *Technical Topics* should be regarded purely as sources of ideas, *not* full construction articles, and some specific components may well be difficult or impossible to obtain.

RADCOM CONSTRUCTION FEATURE

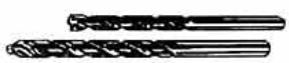
A Miniature 80 Metre SSB Transceiver

Part two of an article by Mike Grierson G3TSO

TRANSCEIVER SWITCHING

MUCH OF THE SIMPLE transceiver (**Figs 5 - 8**) operates from a 6 Volt supply, whilst the primary supply voltage is 13V. The PTT line which is used to ground the transmit relays will be at 0V on transmit, but will rise to about +11V on receive, these are very convenient voltages to permit a simple diode switching system to be operate.

The resistors used to forward bias the diodes should be about 10 times the impedance of the circuit they are switching. If this does not permit sufficient bias current to flow, a lower value of resistor may be used with a suitable RF choke in series to block the signal from the bias supply.



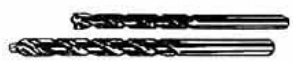
For convenience, the input and output impedances of the bandpass filter are arranged to be 50Ω, with the supply voltages used, 470Ω series resistors are used to bias the BA244 switching diodes. A double diode switch is used between the BPF and the receive mixer to ensure complete isolation on transmit. The receive mixer runs continuously as it has the same power supply as the VFO, therefore, a possible signal loop could exist around the two mixers which collectively have 30dB gain.The 50Ω to 3k impedance transformation between the BPF and mixers is accomplished using 7:1 ratio toroidal transformers which conveniently provide an isolated balanced connection. Small Siemens toroidal cores, available from Electrovalue, are used. The 2k impedance of the ceramic filter is a near enough match to be fed directly from the output of the receive mixer and thence directly to the input of the SL6700 first IF amplifier.

The filter switching diodes are biased using a combination of resistors and RF chokes. It was found necessary to screen the choke L2 in an old Toko screening can because it was prone to mutual coupling with the oscillator signal present in L9 located in close proximity. This caused blocking of the AGC. Good decoupling of the 6V line is essential to prevent any audio instability and should be at least 47µF.

Diodes D18 and D19 ground the AGC line on transmit, muting the two IF amplifiers. Unfortunately, the recovery time is very slow on return to receive and it is necessary to lower the AGC decoupling capacitor to 10µF (C72). This results in a rather fast AGC action, but at least the receiver recovers quickly.

Q8 switches the transmit signal path to ground on receive and serves to decouple the product detector output to RF, the AF output is fed to the AF gain control via an RF choke L13 which blocks RF from the AF circuitry when on transmit.

On transmit, C50 routes the RF output from the balanced modulator to the ceramic filter. DC supplies to the AF amp, Vogad and transmit mixer are relay switched, as are the antenna and PA bias circuits. The Vogad is connected to the balanced mixer via another RF choke L12 to provide isolation from the receive IF signal.



Unlike the more famous SL612 Plessey IF amplifiers, the AGC system voltage on the SL6700 decreases with increasing signals. The attachment of an 'S' meter requires a current source, and a differencing meter circuit; a simple voltmeter on the AGC line does not work. IC9 acts as an 'S' meter amplifier and is biased from a stabilised supply to zero the meter with no signal. The circuit is arranged to read forward and reflected power on transmit, and signal strength on receive with no switching. With the fast AGC time constant, the 'S' meter is inclined to follow at almost syllabic rate.

continued on page 32

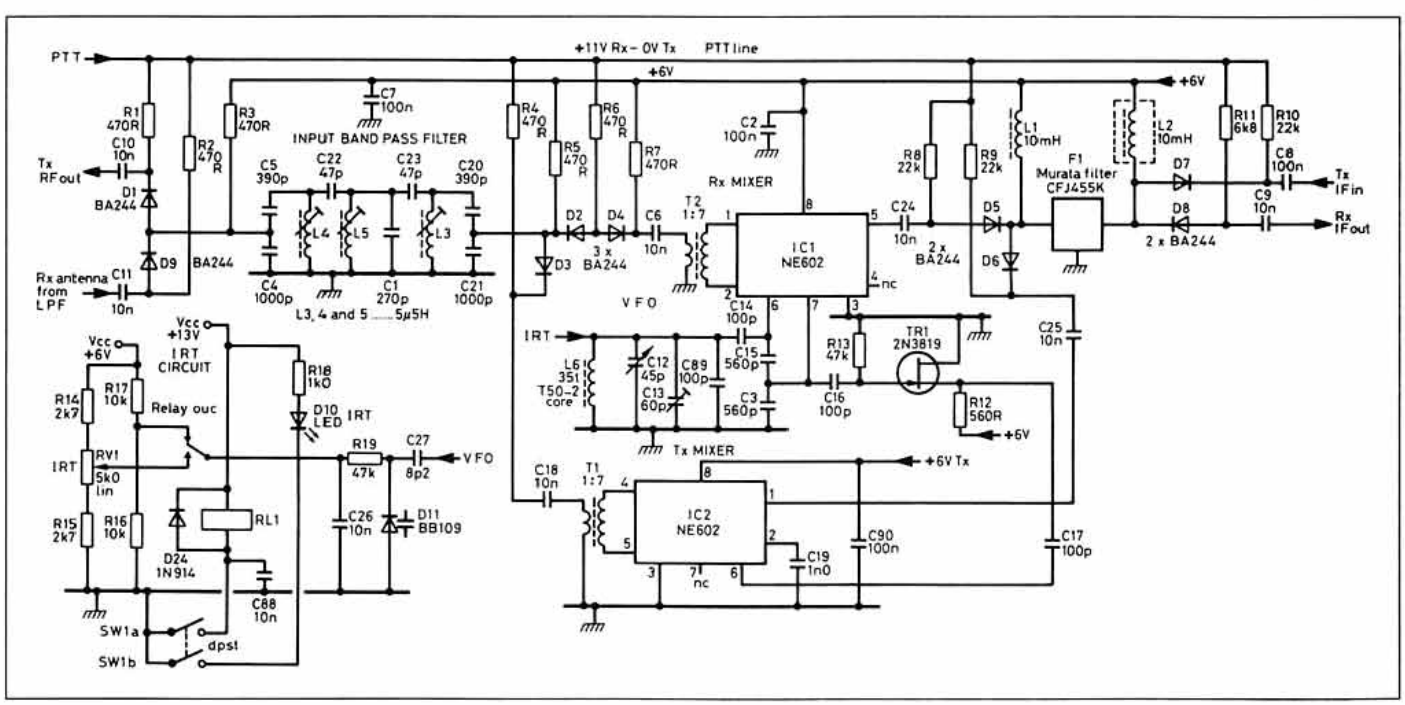


Fig 5: Switching and mixer stages.

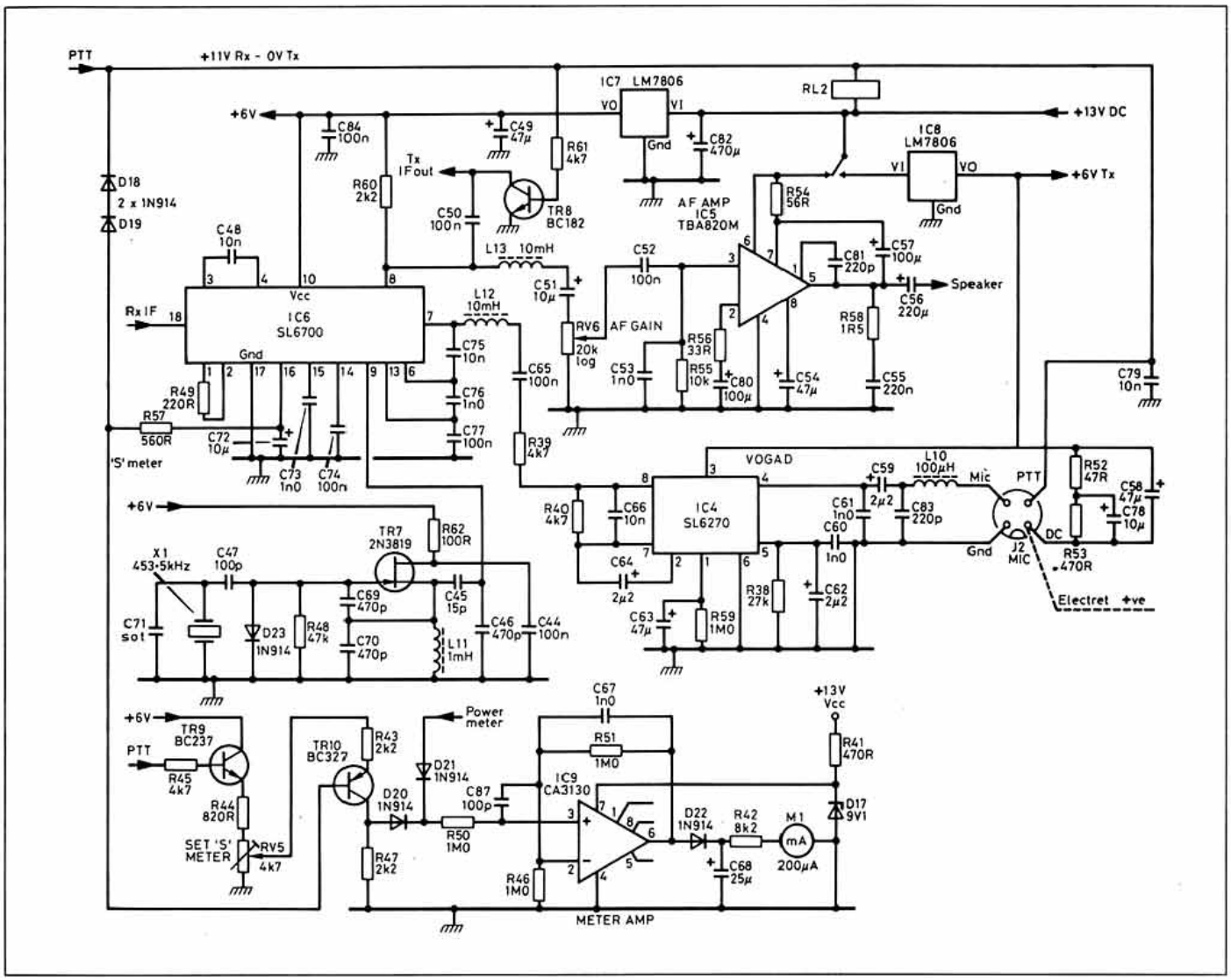


Fig 6: The receiver.

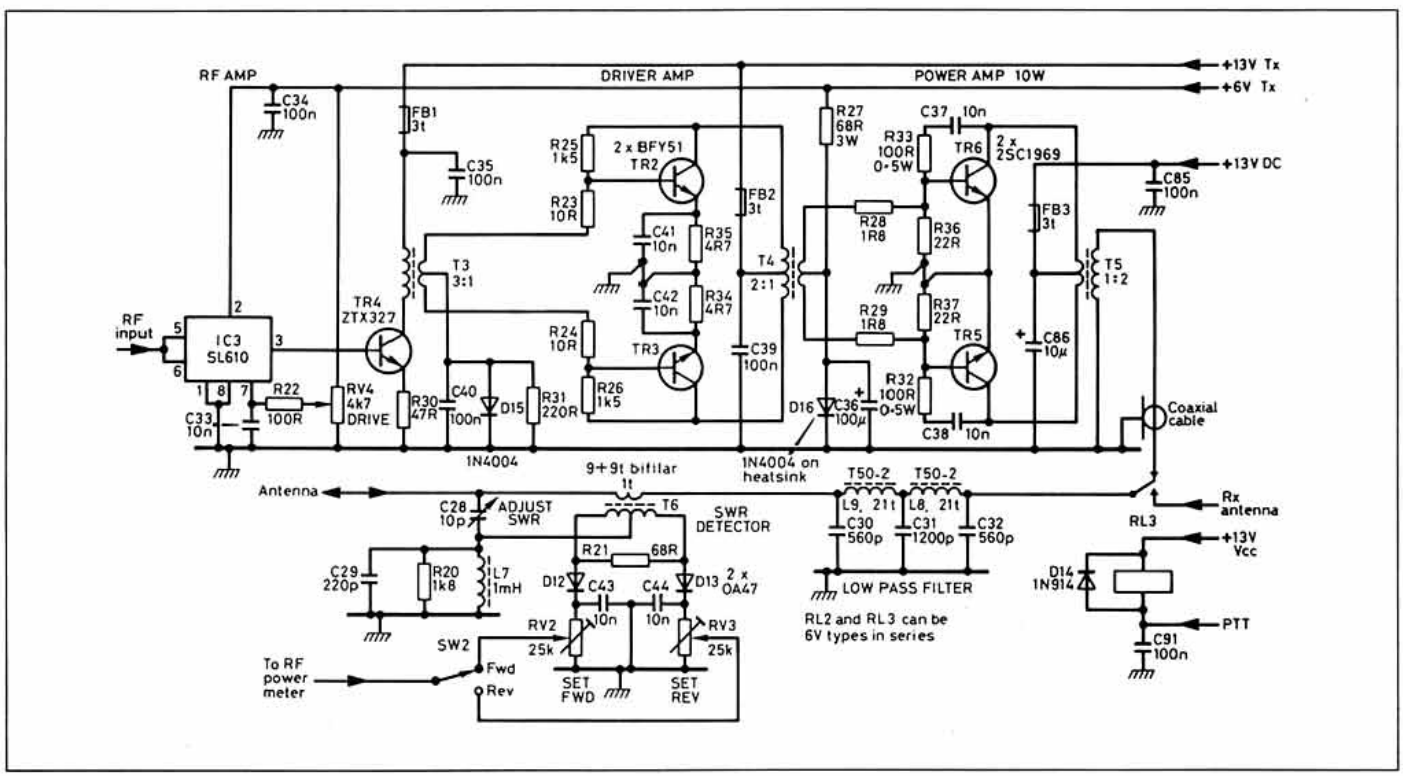


Fig 7: The transmitter.

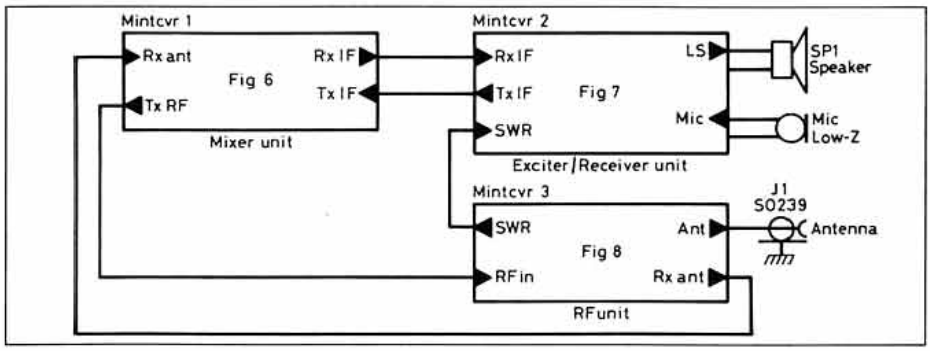


Fig 8: Connecting up the transceiver.

RF AMPLIFICATION

THE LOW LEVEL SSB signal requires further amplification before it is capable of driving a power amplifier. The use of a Plessey SL610 or 1610 provides 20dB voltage gain and produces approximately 1V output. This is directly coupled to Q2, a ZTX327 (plastic 2N3866), permitting the SL610 to feed a low impedance load. The gain of Q2 can be controlled by varying the value of the emitter resistor. The output of Q2 is transformer coupled to the input of a pair of BFY50 (or 2N3866, 2N4147) transistors which are capable of being used as a QRP PA in their own right, producing up to 2W output.

Negative feedback is employed, whilst 4R7 emitter resistors serve to limit the current drawn, they are bypassed with 10nF disc ceramics. The driver stage is biassed by a simple diode arrangement to establish class B operation. If it is intended to use this stage as a PA, the output transformer should have three turns on the secondary.

The power amplifier uses a pair of 2N1969 CB type transistors capable of up to 30W output. Negative feedback is applied to ensure linearity and the bias is derived from a stiffly biased diode D16, mounted on the PA heatsink to provide thermal drift compensation. The collector of the 2N1969 is brought out to the tab and must therefore be mounted on a mica washer.

Standard binocular type broadband transformers are used throughout the amplifier, T3 and T4 are wound on 'FAIR-RITE' two hole balun cores, whilst the output transformer T5 is made up from 4 'FAIR-RITE' beads. The primary of T4 can consist of 3/16 inch brass modelling tube, or can be the braid from some old 1/4 inch co-ax, only one turn is required, and is simply one length through each tube, joined at one end to make the centre tap. The secondary of two turns is wound through the middle of the primary tube or co-ax and arranged so that the ends emerge at the opposite end of the core to the primary. The completed transformer can be conveniently soldered directly to the PCB or to suitable solder pins.

. . . . to be continued

ERRATA

We apologise for the following errors in Part 1:

Figs 1 and 2: Captions reversed.

Fig 3: C4 and C5 reversed.

Fig 4, ICI: Pin 6 earth not 3, and pin 4 on right side should be pin 7.

Page 46, col 2, para 2: R40 should read R3.

Due to improvements to the component list, we have had to carry the conclusion of this article over until August. We apologise for any problems this may cause.

Timestep

Weather Satellite Systems

Timestep produce weather satellite systems that operate from Meteosat, GOES, GMS, NOAA, Meteor, Okean and Feng Yun. Using an IBM PC compatible computer enables the display of up to 1024 pixels, 768 lines and 256 colours or grey scales depending on the graphics card fitted. We support all known VGA and SVGA cards.

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RADCOM SOFTWARE REVIEW

Multimode Tx/Rx Software for BBC Micros

A user review by Mike Wooding G6IQM

TWO NEW SOFTWARE packages for the BBC B and Master computers have recently been made available by Technical Software. Both packages are of particular interest to Amateur Television (ATV) devotees as they support all-mode SSTV.

RX-8 MULTIMODE RECEIVE PACKAGE

THE RX-8 SOFTWARE package is a multimode receive-only system. As the name suggests, there are eight modes supported: AMTOR/SITOR (ARQ and FEC), ASCII, Fax, Morse, Packet radio, RTTY, SSTV, UoSAT 1 AND UoSAT 2.

The package comes complete with an EPROM, a User Manual, a test cassette and an interface with connecting leads. It is well presented and the outward appearance gives a feeling of confidence in the claimed performance.

THE USER MANUAL

The User Manual is well produced and professionally printed, not one of these photocopied efforts. The opening section "welcomes" the reader to the RX-8 and gives a basic explanation of the two-tone system used to send information in the various modes. However, as the author states, it is only a very basic introduction to the subject and further information may be required to fully understand the technicalities of the various modes.

The next section explains how to call up the program and the command keys common to all modes. Also given in some detail are explanations of the screen displays, keyboard use, the text store and the use of printers and disk/tape storage media. At the very beginning of this section, the reader is directed to the end of the manual for instructions on how to install the EPROM and how to connect the interface between the radio and the computer. This I found a little strange, as I expected such instructions to be at the very beginning. They are, however, quite comprehensive and I feel sure that even the least adept among us would be more than capable of installing the EPROM and connecting the equipment up correctly. A detailed page dealing with possible problems is provided for those unfortunate enough to experience difficulty in getting the system running correctly.

The remainder of the manual deals with the various modes and how to operate the software for each one. Advice is also given concerning the type of receiver and aerial required, what to do about computer noise and where on the bands to find the various types of transmission.

CONNECTING THE EQUIPMENT

Once the EPROM has been fitted and the computer reassembled, the interface must be connected to the user port on the BBC using the ribbon cable supplied. The interface unit is housed in a neat cream plastic enclosure measuring approximately 155 x 90 x 40mm. On the front is mounted a bank of three push-button switches (ON/OFF, FILTER ON and NARROW) and an LED bar-graph display.

At the rear are the various interconnection sockets. The unit is connected to the receiver using the 6-pin DIN to 3.5mm jack lead supplied with the package. If your receiver does not have a 3.5mm external speaker socket then an adaptor for the usual 1/4in headphone socket can be easily obtained, or Technical Software will fit the correct plugs if informed when ordering.

THE SYSTEM IN USE

The software defaults on start-up to the RTTY receive program with a full-screen display, featuring the program identification in a bar at the top and the program control bar at the bottom. The control bar indicates which mode the program is in, plus the settings selected for receiving that mode. These two bars only occupy about 10% of the screen, leaving the rest clear for displaying the incoming information.

Switching between the eight receive modes is achieved by a simple shift-plus-single-letter keystroke. Within each mode the various facilities available are also selected by single keystrokes. I found that this simplicity in operation enabled me quickly to make effective use of the software. The only requirement was a simple crib sheet until I had become familiar with the operations.

All the modes have some form of fine-tuning indicator, either on screen or by using the LED bargraph display on the interface. I found this very helpful, as I am not particularly well-versed in the sounds of each mode when being received.

Of particular interest to me was the SSTV receive mode. I found this system very much simpler to operate than other computer-based receive packages used in the past. Reading the User Manual section dealing with SSTV, it appeared at first that this mode might be difficult to drive. However, once pictures are being received, the simplicity of operation becomes apparent. The results obtained on the screen soon indicate if any of the parameters have been wrongly selected, and these can be changed 'live' and the results seen immediately on the screen. Incoming pictures can be frozen on the screen at the end of the incoming frame, and then saved to disk/tape or sent to the printer for hard copy.

It would be inappropriate in this review to list all of the facilities available in the package. Suffice it to say that any signal that I found on the bands could be decoded and read without much difficulty. The software seemed able to deal with just about any signal in any of the modes as satisfactorily as a dedicated unit for that mode.

CONCLUSIONS

All-in-all, I found the RX-8 package easy to install and get running. In use, once I had mastered the relatively simple method of operation, the results obtained were quite impressive. For someone who is an avid short-wave listener, or for use by amateurs as the receive half of a transceive unit, I can highly recommend this system.

The RX-8 package is highly cost-effective when compared with other units designed for receiving only one of its eight modes. As an all-mode (colour and black-and-white) SSTV receive converter, its operation is without fault.

GX-2 DUAL-MODE TRANSCEIVE PACKAGE

AS THE NAME SUGGESTS, the GX-2 is a dual-mode transmit and receive system supporting SSTV and FAX.

The package comes complete with an EPROM, a User Manual, an interface with connecting leads and a disk with the necessary software to convert graphics screens prepared on normal Mode-1 and Mode-2 BBC screens to the equivalent GX-2 format.

THE USER MANUAL

As with the RX-8, the GX-2 package is well presented and the User Manual is a well-produced booklet. The opening "welcome to GX-2" section is followed by the installation and setting up instructions (just where I expected them to be). The EPROM installation instructions are again quite comprehensive, as are the interface connection and set-up details. The 'problem pages' at the end of the manual give a list of possible symptoms and their probable cures.

The next three pages of the manual deal with the screen display, the keyboard, using a printer and saving to disk or tape. For saving and loading screens, Technical Software suggest that it is preferable to use a disk-based system, as individual screens take around 4 minutes to load or save using tape, which would be impracticable during a contact. Another point raised in the manual, which I can confirm, is that when printing out screens the printer ribbon may wear out rather quickly.

The next section in the manual deals with the comprehensive type-ahead facility, which is available at any time except when receiving FAX pictures on the whole screen. Messages can be typed ahead onto the whole screen, or into buffers which occupy only a quarter of the height of the screen. This permits up to five messages to be typed ahead, which can then be selected at random.

When in SSTV mode, however, the text in each type-ahead buffer occupies the whole screen when transmitted. A choice of eight background and text colours is available, or eight shades of grey in monochrome SSTV and eight levels of brightness in FAX. The four selectable text sizes correspond to x1, x2, x4 and x8 normal computer text height, with three widths also available corresponding to x3, x6 and x12 normal width. It states in the manual that these facilities are "very sophisticated", and by 8-bit computing standards they offer a useful range of graphics designing tools - but don't expect the facilities provided in graphics packages for 16-bit machines.

The remainder of the manual deals with the specifics of the SSTV and FAX modes independently, with comprehensive instructions on the facilities available in each. A list of all the keystrokes for each mode is given, and bearing in mind the relative complexity of the software's capabilities you would need this list for quite a while after first learning to drive the system.

SSTV

In the SSTV mode the screen display consists of the control bar down the right-hand edge of the screen, the rest of the screen being the picture frame area. The system defaults to 8-second 128-line mono receive. If the receiver is switched on, the screen will display any incoming signals on the screen as either noise or pictures, according to the type of signal. An R in the control bar indicates you are in the receive mode.

A fine-tuning aid is in the top right-hand corner of the screen, but is only usable if the signal has already been tuned closely enough for the software to start decoding. This indicator is useless if the signal is too noisy.

Changing between any of the receive modes is simply a matter of a double key operation, eg Ctrl-M, Ctrl-Q etc. A full list of these keystrokes is given in the User Manual. It is equally easy to change scan speeds, or between mono and colour receive.

During receive, the program can be set to a 'hold' mode, whereby the picture being received will be frozen on the screen at the end of the current frame scan. The frozen picture can then be saved to tape or disk as required.

Robot VIS mode is fully supported, in that the program will automatically switch to the correct receive settings once the VIS signal at the start of the frame is received. In line-sequential colour mode, the software inserts the SC-1 sync pulse at the start of each red line. On receive, it detects this pulse to regain colour synch if lost. The GX-2 system is fully Robot and SC-1 compatible.

SSTV transmit is selected by keying Ctrl-T (to return to receive key Ctrl-R) and the changeover is indicated by the control bar on

the screen. When transmit mode is selected the system goes into standby, transmitting a steady tone - a useful tuning aid for the receiving station. Pictures for transmission may be loaded from tape or disk, but as stated earlier the use of tape as a storage medium is not recommended for 'live' work due to the prolonged load/save time for screens. Alternatively, text messages may be typed into the buffers and selected for transmission. Each buffer has a colour/grey-scale band at the bottom of its screen area, to remind you not to type into this area when in Robot mode because it will not be sent. In other modes this band, or whatever is typed over it, is transmitted.

The appropriate screen is selected for transmission by pressing Ctrl-f1 to f5 for the five type-ahead buffers, or f0 for the main screen (where pictures loaded in from storage will be). As soon as the required screen is selected the frame is transmitted. The transmission continues until another screen is selected, the system is put on 'hold', or is put back into receive. While on 'hold' during transmission it is possible to change the mode between 128 and 256 lines and also the transmit speed. All other changes have to be initiated whilst in the receive mode.

FAX

IN THE FAX MODE the system defaults to receive at 120RPM at an 'IOC' of 288, with the screen display consisting of the control bar across the top with the rest of the screen for displaying received/transmitted pictures. Again the various parameters available can be changed by simple dual keystrokes. There is no fine-tuning indicator but once a few signals had been tuned across I found it not too difficult to locate the correct spot. As suggested in the manual, tuning slowly from low to high seemed to be the easiest.

Once a picture is being received, the correct 'IOC' must be selected if the picture aspect ratio is not correct. This is done by pressing Ctrl-(up arrow) or (down arrow) until the correct ratio is achieved. The facility for centring the incoming picture correctly on the screen is also provided. As in the SSTV mode the incoming picture can be frozen for saving to tape or disk.

When transmit is selected the same settings are retained as were used during receive. The sequence starts by sending 30 seconds of phasing signal to allow the receiving end to synchronize. The selected screen (or only the top quarter if selected) is transmitted. Unlike SSTV, the frame is sent only once followed by 5 seconds of stop tone, after which the program returns to the receive mode. At the amateur standard IOC of 288 a whole screen takes approximately 7 minutes to transmit. Not for the impatient, this mode! To stop transmitting at any time the Escape key can be pressed.

An optional extra is the Printer FAX facility. This allows received FAX pictures to be directly printed out. Automatic picture phasing is active in this mode, but only works at 120RPM, the most common speed used.

CONCLUSIONS

I found the GX-2 package relatively simple to drive. Within half an hour of starting I had the system running and the first SSTV pictures coming in.

In the FAX mode I had more trouble, which was entirely due to my not knowing a thing about the mode - I still don't, really! However, I did manage to receive enough pictures to show that the package performs as the manual states. The pictures were of reasonable quality relative to the signal strengths received. Unfortunately, I did not have a receiver available tunable to the weather FAX transmissions, but apparently the Printer FAX option gives better results than the on-screen pictures.

I can certainly recommend this package for any amateur station interested in SSTV or FAX. On a cost-effectiveness basis it compares favourably to any other converter I have seen, but at a much lower cost - even if you have to consider getting a BBC micro! As far as FAX is concerned I can recommend it on performance alone.

AVAILABILITY

THE RX-8 SYSTEM is available complete at a cost of £259 including VAT. The GX-2 system is available complete at a cost of £99 including VAT, or £119 including the FAX direct printing operation. Both systems are available only from: Technical Software, Fron, Upper Llandwrog, Caernarfon, Gwynedd, LL54 7RF. Tel: 0286 881886. ❑

RADCOM CONSTRUCTION FEATURE

First Steps in Home Construction

A series of articles by John Case, GW4HWR

The previous two articles in this series dealt with the art of soldering and the circuit and layout of the variable voltage PSU project. This month's article concerns the project hardware and some techniques used in 'metal-bashing'.

PART THREE: CONSTRUCTING THE BOX AND FRONT PANEL

THE BOX

There are three ways of producing the box:

1. Buy the box ready-made - an expensive but otherwise easy way out,
2. Purchase the materials cut to size, or
3. Obtain material and cut it to size yourself.

Either 2 or 3 will demand much more work but in the end you will have the satisfaction of being able to say "I made it *all*."

Option 3 will be described first and the other two should fall into place as the work proceeds. It is assumed that some tools will be to hand but some of the more specialised ones will be described in due course.

The base, which needs to be strong to support the transformer, reservoir capacitor, switches and output terminals is made from 19SWG or 1mm sheet steel. This is the maximum thickness of steel that can successfully be bent without professional bending gear, so do not use anything thicker!

First, mark out the rectangle so that it is perfectly square. For this an engineer's square, a steel rule and some form of scriber (an ordinary drawing compass, etc) will be needed. If you already possess a square or if you buy one at a car boot sale or similar, check it for accuracy as follows. Select a piece of material which has a straight edge and is at least as wide as the length of the blade of the square. Place the square on the straight edge and scribe a line along the length of the blade. Now turn the square over, move it so that the blade lies almost along the line just scribed and scribe a second line very close to the first. If the lines are close enough, any error in the square will be easily seen as the lines will not be parallel.

The size of the material for the base is 312 x 97mm. **Fig 5** shows the dimensions and includes the position of the bending lines. With luck, the piece of steel will have at least one straight edge. If not, scribe a line as close as possible to one edge and cut or file back to the line. Mark out the rest of the shape. The piece may now be cut out using tin snips (very hard on the hands and tends to distort the metal) or by a guillotine if you have access to one, or it can be sawn. The latter was the method used for the prototype.

If you already have a full-size hacksaw, fit a fine blade and very carefully follow the lines, keeping very slightly on the side away from the required piece. As work progresses, the frame of the saw will tend to get in the way and the angle of the saw will have to be adjusted making the job more and more difficult.

Now if you are about to go out and buy a hacksaw; do not! It would be more useful to purchase a sheet saw. This will do almost everything that can be done by a hacksaw (except very heavy cutting) and has the great advantage that it has no frame and will pass through the metal like a carpenter's hand saw.

The handle is fitted with a wide blade rather like that of the carpentry saw and an ordinary hacksaw blade fits along the edge. For sheet metal a fine blade is needed - 24 teeth per inch, while for cutting bar and angle iron a coarse blade with 16 teeth per inch is better. A very good combination would be a sheet saw and a junior hacksaw with adjustable tension. Blades for junior hacksaws are much cheaper than those for the standard frame so keep the sheet saw for sheet!

When cut, file the edges back to the line using a fairly fine file. Also, remove the sharp edges by lightly applying the file at about 45 degrees to the surface of the sheet. When satisfied, scribe the bending lines 72mm from each short end.

For the next phase the help of a friendly mechanical engineer would be useful. A pair of bending bars need to be made. These consist of two pieces of angle iron, 1.25 to 1.5 inches (30 to 40mm) wide and about 12 inches (320mm) long. Try to get hold of material that has smooth outside faces and a rather sharp 90° corner. The bars need to have 0.25" (6mm) holes drilled at intervals on one face so that 0.25" or 0BA bolts can be passed through to hold them together.

It is most important that the holes in the two pieces should match. The spacing of the holes shown in **Fig 6** will provide a range of six-bolt intervals from 55mm to 250mm so that almost any width of material may be clamped between the bars with the bolts fairly close to the edge of the material. The bars can be used whenever metal is to be bent and will last a lifetime.

Clamp the metal for the base between the bars, with the bolts as close together as possible so that the bending line is *just* visible along the horizontal face of the bars. Hold the complete assembly in the jaws of a vice, a big one if possible. With the aid of a piece of wood or a large file held as close to the bending bar as possible, bend the long end of the metal with the bending line on the inside of the bend.

The secret of a good bend is to keep the file or whatever is used, as close as possible to the point where the metal emerges from the bending bars. As the bend takes place near the pivot (the edge of one of the bars), much more force will be needed but avoid moving further out; it will be easier but a rounded bend will result. It is important that the short end of the material is clamped tightly between the bars, then the front and rear panels will remain flat. As the material is steel, a few light blows with a hammer will help convince the metal to bend to a tidy right angle. Try to avoid hitting with the edge of the hammer head and continue to dress (tap) the bend until a respectable angle is formed. Now repeat with the other short end.

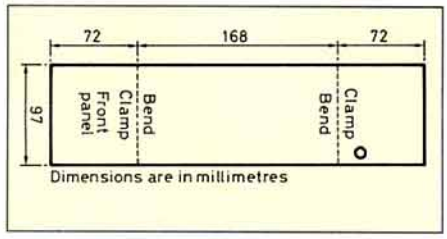


Fig 5: Metalwork for the base.

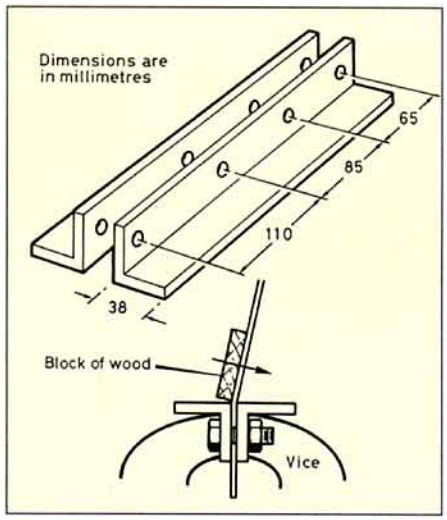


Fig 6: Bending bars which will last a lifetime.

PREPARING THE FRONT PANEL

CAREFULLY MARK OUT THE FRONT panel according to the dimensions given in **Fig 7**. Note that the panel size for the home-built box is 1mm bigger all round than the commercial one. This is to allow for the bends which will not be as sharp as those of the ready-made box. The dotted line in the diagram indicates the larger outline.

Cutting the rectangular hole for the mains switch is relatively difficult. The switch could in fact be replaced by any other *mains grade* switch and could be part of the voltage setting potentiometer. However, the switch suggested was chosen because a positive indication of the 'ON' condition is most desirable in any mains operated equipment. Punches are available that will cut rectangular holes but they are extremely expensive.

Two other ways involve only a little outlay but quite a lot of hard work:

1. SAWING WIRE or ABRA-FILE. This is really a thin circular file which is designed to fit into a hacksaw frame. A junior hacksaw with adjustable tension is ideal and the sawing wires are much cheaper than those for a standard frame. The blade will cut in any direction, so to remove the rectangular metal involves drilling a hole inside the rectangle outline large enough to allow the wire to pass through and it is then fixed in the hacksaw frame and tensioned in the normal fashion. The rectangle is now sawn out keeping as close as possible to the inside of the outline. It feels a bit awkward at first but is not really difficult. Sawing is easier if the work is held in the vice so that cutting takes place as close as possible to the jaws. The hole is then cleaned up and adjusted to the correct size with the aid of a medium file. Try the switch in position but do *not* push it right in. It is quite difficult to remove so wait until the box has been painted.
2. HOLES. Simply drill a series of holes on the inside of the rectangle outline. A 3mm or 1/8" drill will do but the size is not critical. The important thing is to keep on the inside of the cutting line and to get the holes as close together as you can. When a complete ring of holes has been drilled, break the web between them with side cutters, a small cold chisel on to the jaws of a vice or an old knife (take care!). If the holes are not too close to the cutting line it sometimes helps to pass a larger drill through some of the holes. Once three sides are broken free, the last can be dealt with by bending the centre piece back and forth. Hold the chassis in the vice and file back to the line. Try the switch in the hole but do not push it in all the way.

Whichever method is used, it is important to avoid damage to the paintwork if the box is a ready-made one. Protect the work to be held in the vice with pieces of card folded and laid in the vice jaws, or for a more permanent job use pieces of thin aluminium tapped around the jaws to make liners.

Next, the three holes marked 'A' in **Fig 7** should be drilled and enlarged to 6mm or a quarter inch. Centre pop the exact position and drill using a small bit. The holes should then be increased to the correct size by:-

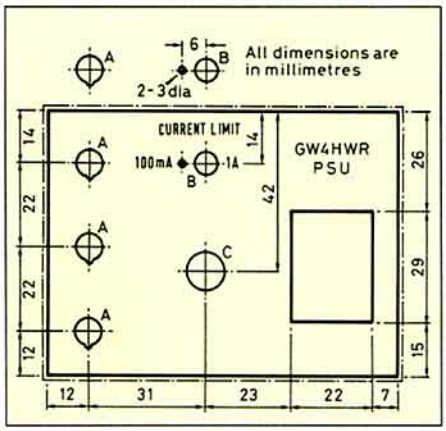


Fig 7: Front panel cutting and drilling.

1. Drilling with the correct size bit.
2. Enlarging with a round file - this has the advantage of allowing some adjustment if the position is not quite correct.
3. Using a taper reamer. One of these will take the place of a large number of different size drills and will always produce a round hole, something that can be quite difficult when drilling thin sheet metal. Two sizes are generally available; 2-12mm and 6-30mm. The first is more useful and can be bought at rallies or from Cirkit for about £3.50. The larger one is more expensive - about £6.00 - and less often used. If the holes are drilled as near as possible to the correct size, the reamer will last longer.

The terminals which fit into these holes have a small key to prevent them turning when being tightened. The keyway may be cut in the holes by means of a needle file (needle files are very small and come in a variety of shapes) or by an abra-file.

Hole B is the same size and carries the current limit switch which is fitted horizontally. Again, to prevent turning, a small locking hole is drilled as indicated in the inset. This hole locates the peg on the special washer supplied with the switch. A 2mm drill is needed for this hole. Centre punch (pop) the exact position. Any sharp point will produce the necessary dent to allow the drill to be started. The twist drill must be handled very carefully to avoid breaking the bit. When drilling, a dab of light oil or penetrating oil such as Lusol will always make the operation much easier.

The switch is supplied with two nuts and the lock washer. It is assembled on the panel by fitting one nut to adjust the amount that the switch sticks out, then the lock washer is fitted so that the tab locates in the small hole, and finally the second nut is fitted and tightened.

Hole C is 10mm or the size of the bush if an alternative type of voltage control potentiometer is used. Again, the reamer will be useful. Constructors making the box should now fit the two 164mm lengths of aluminium angle along the edges of the base. Commercial boxes have a piece turned up which accepts the fixing screws for the cover. Drill each piece 20mm from each end using a 3mm or 1/8" drill to give 6BA clearance. Hold one of the pieces so that it is central between the front and back of the base, and with the vertical outer edge level with the edge of the base, mark through the holes, centre pop and drill. Repeat with the other three holes. Pass a 6.4mm 6BA round-headed bolt up from the underside of the base through the hole in the angle and lightly secure with a half nut.

Next, drill the holes for the transformer, bridge rectifier, reservoir clip and the fuse carrier. Use 4BA bolts for the transformer and the rectifier and note that all bolts should be fitted from the underside of the base. The rectifier is bolted directly to the chassis, no insulation is necessary. When a home-made box is being used with an RS transformer, a small spacer will be needed under the transformer to raise it to the level of the aluminium angle along the sides of the base. A piece of 16SWG (1.5mm), 20mm x 74mm PCB or aluminium will be fine. With the transformer in position, mark the hole for the cord grip on the back panel so that both the grip and the cable will clear the transformer. Now remove everything, including the angle from the base, drill the hole for the cable and enlarge to 1/2".

ERRATUM

THE FIRST DIGIT of a few components 'fell off' last month's list. R4 should have read 6.8k Ohm, R5 680 Ohm, and R6 560 Ohm. Our apologies for any inconvenience this may have caused.

FINISHING

REMOVE ALL BURRS AND ROUGH edges and give the base a good buffing with wire wool. For a smart but economical finish give two coats of household white undercoat. Lightly smooth with fine glass-paper or wet and dry between coats. The more patient you are, the better will be the final finish. Finally give a coat of gloss, leaving the *front panel* to dry in a horizontal position to avoid runs.

When completely dry, use rub-down transfers such as Letraset to mark the current limit switch as in Fig 7, and to enhance the feeling of achievement, add your own callsign or name. A final coat of thin clear varnish will protect the lettering. Re-fit all pieces commencing with the aluminium angle. This time use a shake-proof washer under each nut. Fit two 6BA solder tags under the nut and washer below the ON/OFF switch and spread them approximately 180°. Remove the paint around this hole if the box is a commercial one.

The ON/OFF switch can now be fitted, adjusting the hole carefully with a fine file if required. Do not damage the paintwork. Be certain to get the switch the correct way up. At one end of the rocker the resistor which is in series with the neon lamp can be seen. This is the bottom of the switch. Fit the 'limit' switch horizontally and the three terminals with red at the top, green in the centre.

Cut the spindle of the voltage control potentiometer to suit the control knob; about 10mm is normally correct. Fit the control. Mount the transformer with the terminals facing the front panel, do not forget the spacer if required. The capacitor clip is held by a 4BA bolt, nut and lock washer. Next, fit the fuse carrier using a 6BA bolt, etc, and then the bridge rectifier. Make sure that you can identify the four terminals as in Fig 4.

. . . . to be continued

How King Hussein gave war blinded radio amateurs the trip of a lifetime

Camel mobile in Jordan

by Robin Bellerby, G3ZYE

IN THE SUMMER OF 1989, a meeting took place in London between His Majesty King Hussein bin Talal, callsign JY1, Bill Shea, G4AUJ, and Ted John, G3SEJ, Chairman and Secretary respectively of St Dunstan's Amateur Radio Society. St Dunstan's is the organization for Men and Women blinded on War Service. His majesty graciously accepted honorary membership of the SDARS in appreciation of his services to international friendship via amateur radio, and in return suggested that members of the Society might like to visit Jordan.

The mechanics of the visit were organised at this end by the Anglo-Jordanian Society - by a strange coincidence the Chairman of their Education and Cultural Committee is a licensed amateur, G3ZYE, - and in Jordan by the Royal Palace and the Royal Jordanian Radio Amateurs Society (RJRAS).

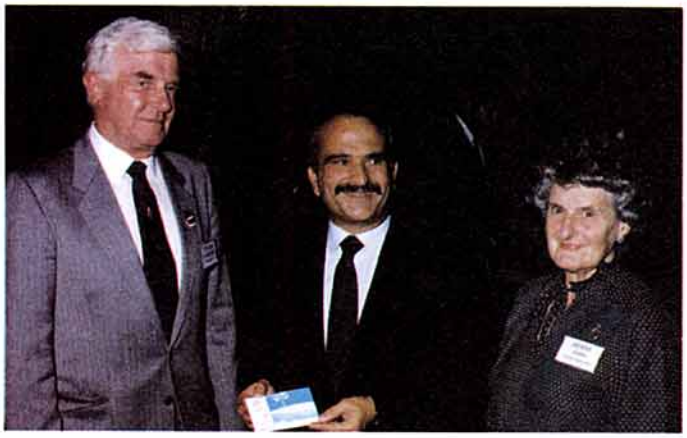
Twenty three amateurs, wives and supporters took part in the visit and set off from Heathrow by Alia (Royal Jordanian Airlines) towards the end of May, on a visit which was to last ten days, but which will be remembered for much longer.

The Wilderness of Wadi Rum.

VIPs

THE TONE OF THE VISIT was set upon arrival at Amman. The party was met by His Royal Highness Prince Ra'ad, JY2RZ, Chairman of the RJRAS, and Mohammed, JY4MB, (Secretary), and Ibrahim, JY5IM, (Shack Manager), and whisked through the VIP lounge to a garden party at Prince Ra'ads residence.

Presentation of shield by CO Royal Signals, Col A L Shakri, to Bill Shea, G4AUJ, Chairman of St Dunstans ARS.



Ted John, G3SEJ, and XYL Beryl, exchange QSL's with HRH Crown Prince Hassan, JY2HT.

HRH the Crown Prince of Jordan, Prince Hassan, JY2HT, made the group welcome, and the evening was the first of a round of luncheons, visits and evening receptions which, unfortunately, left little time for operating.

Each member of the group was presented with a watch bearing the Royal crest - braille versions, naturally, for the St Dunstaners. St Dunstan's ARS was also presented with an Icom HF transceiver, an IC781, for their HQ station in Brighton. Thanks to Royal Jordanian Airlines, the British Ambassador and HM customs, this magnificent gift was transported back to the UK.

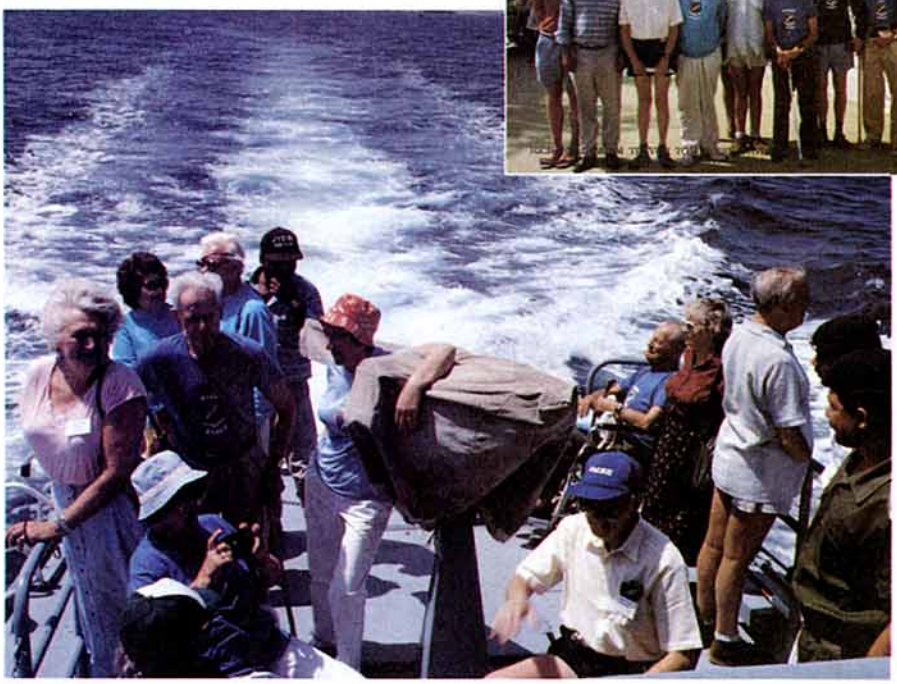
On the air

MANY OF THE PARTY had taken with them VHF/UHF handhelds, so the Amman repeaters carried a heavier traffic level than usual during the visit. The RJRAS HQ station, JY6ZZ, equipped with Icom, Yaesu, and Drake gear was made constantly available and

Flags flying high on the Royal Jordanian coastguard patrol boat.

was used on HF phone whenever the social programme permitted. Some 600 contacts were made, including many Gs, and a special QSL card (via QSL manager G3ZYE) has been sent to all stations worked and in reply to SWL reports received.

The QSL card used on the trip.



A high-speed run in the Gulf of Aqaba.

Members of St Dunstans ARS by the Red Sea at Aqaba.

The party was most interested to hear of the training programmes operated at JY6ZZ, where prospective amateurs are put through a carefully staged programme which starts with CW and operating technique. Only candidates who can complete live CW QSO, 100% uncorrected-error free, are allowed to proceed to phone operation.

The party also visited the Jordan Royal Signals HQ at Zarka and, after taking over the CW training section for a while, activated JY6RS, using a Collins line running 2kW. The whole establishment turned out to observe the expertise shown, and the armed forces were particularly interested to hear how all of the St Dunstaners present had been able to lead active and productive lives after being invalided out of the services, a concept new to some of them.

The visit achieved an unexpected objective in giving weight to a new training scheme for the disabled in Jordan, by providing a practical demonstration to the mobility and independence of the St. Dunstaners.

Camel mobile

THE GROUP VISITED a number of ancient and historic sites, including the ruined cities of Jerash and Petra, the beautiful wilderness of Wadi Rum, crusader castles in the desert, the Royal Stables, Aqaba, the Dead Sea, Madaba, Mount Nebo, and the Red Sea.

The Royal Jordanian Coastguard placed a patrol boat at our disposal, and the whole party enjoyed a high-speed run in the Gulf of Aqaba. The army provided a military station under canvas on the beach, also at Aquaba, and the whole group managed to qualify for the Coral Sea Award.

Radio operation took place from each and every location visited - fixed stations, mobile, portable, maritime mobile and even from the back of a camel!

Our thanks go to all those magnificent friends in Jordan who opened their houses and hearts to us, from His Majesty JY1 down to our coach driver. Thanks also to Gs who tried to work us, and apologies to those who failed to do so. There will be a next time, so please try again.

The group is already planning their 1992 visit - the Malaysian Peninsular, Singapore and Borneo. Where do they get the energy?

NEC '91

THIS YEAR'S RSGB National Convention and Amateur Radio Exhibition was, as usual, much more than 'just another rally': 50,000 square feet of stands, 150 traders plus RSGB committees, the Radiocommunications Agency, numerous specialist societies, RSGB book stand, Novice Information stand, lectures, and the Grand Lottery prize draw.

The theme of the show was Project YEAR and the Novice Licence and a great many young people came along to see what amateur radio was about.

Part of the massive hall: (above) on the 'make-up' day and (below) during the show.

Tea break for those building the RSGB stands and displays: (L to R) Jenny Shardlow, G4EYM; Bert Mair (RSGB Stand Manager); Margaret Mair (RSGB HQ staff); Hilary Claytonsmith, G4JKS (i/c Novice Stand); Brett Rider, G4FLQ (RSGB HQ staff); John Allen, G3DOT (Council Member); Mike Dennison, G3XDV (RSGB HQ staff); Terry Barnes, GI3USS (Executive Vice President); Frank Hall, GM8BZX (Immediate Past President).

RSGB Committees were available to dispense advice and listen to members' views. These included (above left) Stephen Purser, G4SHF, of the Planning Advisory Panel; (Above) Peter Hobbs, G3LET, Ron Glaisher, G6LX and Dave Lawley, G4BUO of the HF Contests Committee; and (left) VHF Committee Chairman Peter Burden, G3UBX.

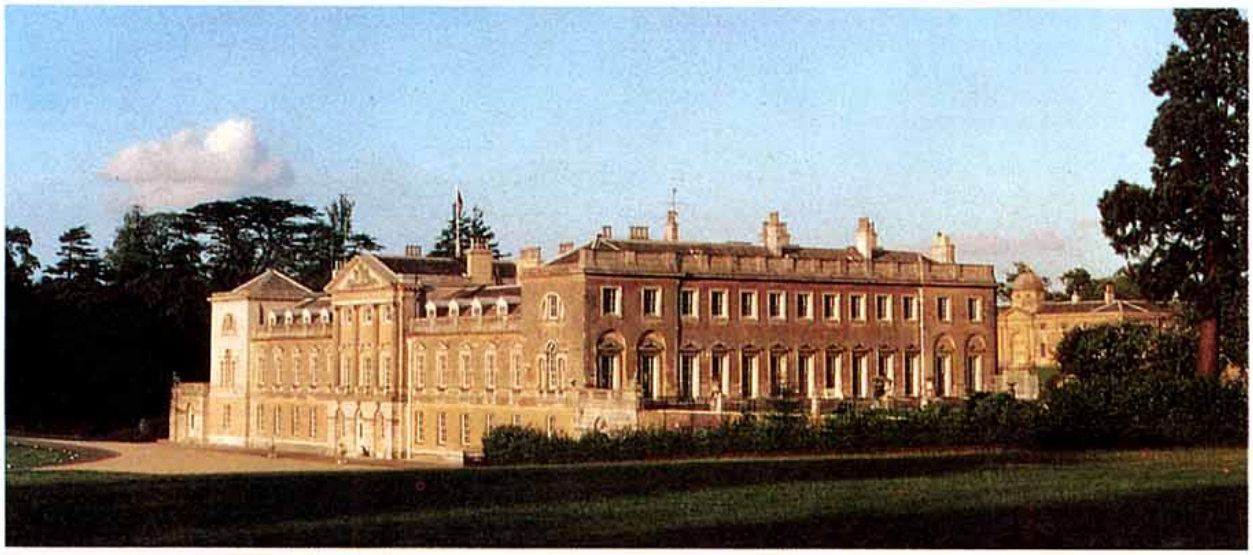
Below: RSGB Accounts Manager Janet Cragg sells lottery tickets to Colin Wilson (of Wilson's Valves) and his daughter. Volunteer, John Cragg, can be seen in contact with RSGB HQ by telephone.

Car winner Bob Harrison, G4UJS, was 'volunteered' to cut the Samuel Morse 200th Birthday cake (made by *RadCom*'s Marcia Brimson). On the right is the display of some of the kits available at low cost from various manufacturers exhibiting at the show.

RSGB National Mobile Rally

SUNDAY 4 AUGUST 1991 OPEN 10AM

WOBURN ABBEY, BEDFORDSHIRE



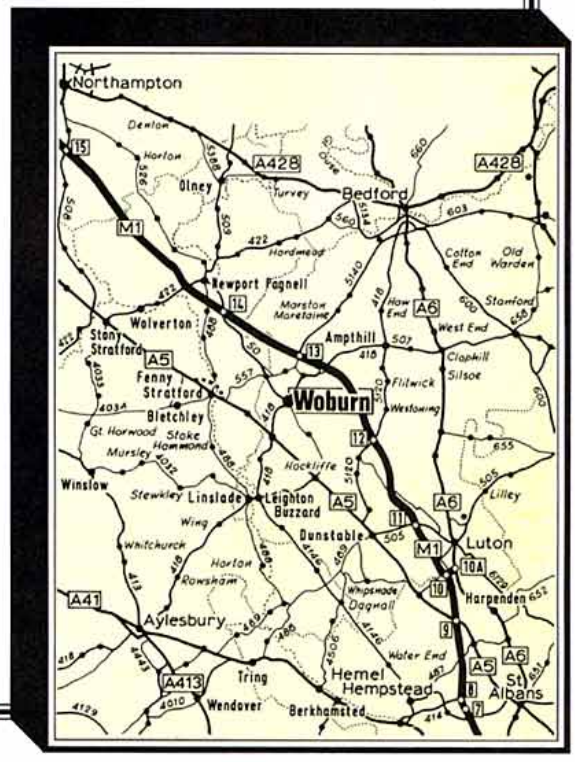
★ **LARGE TRADE EXHIBITION (20,000 SQ.FT)**

★ **RSGB BOOKSTALL AND ENQUIRIES**

★ **MEMBERS' MART**

★ **ALL UNDER COVER**

(COACH PARK SITE AVAILABLE)



Members' Mart this year will be charged at £3 per table which will enable members to sell direct. Tables will be offered on a first-come first-served basis. NO TRADING OUTSIDE OF THE MARQUEE PERMITTED.

The RSGB makes no charge for entrance to the rally but all visitors must pay for entrance to Woburn Park, in which the rally takes place, at £2.50 per vehicle, including passengers.

Limited overnight caravan stay at £4 per night. Booking forms available from Norman Miller, G3MVV.

All the normal Woburn attractions will be available at small extra charges. Various bars and cafes are available nearby.

HOW TO GET TO THE WOBURN RALLY

Via the M1 - leave the M1 from north or south at junction 13, not 12 as signposted, and there follow signposts through Husborne Crawley to Woburn Abbey.

Avoid routes signposted to "The Wild Animal Kingdom" or "Game Reserve". The rally takes place in Woburn Park, and correct routes are signposted to "Woburn Park" or "The Abbey". Also watch for RSGB signs.

All enquiries regarding this event should be make to Norman Miller, G3MVV, 180 Warley Hill, Brentwood, Essex, CM14 5HF, tel: 0277 225563.

RADCOM TECHNICAL FEATURE

Controlled Feeder Radiation Revisited

A follow-up to his 1990 article by B Sykes, G2HCG

SINCE THE ORIGINAL article on CFR in May 1990 *Radio Communication* [1], a considerable amount of further work has been undertaken on the principle, and several letters have been received enquiring about the practical aspects of the concept. These have been in particular about the availability of suitable ferrite materials, and the physical length of the CFR section. Use of the correct ferrite is vital to the success of any CFR system. It should be emphasised at this stage that sources of supply are named for the reader's convenience and the author has no connection with any of the companies mentioned.

FERRITE MATERIAL

AFTER CONSIDERABLE DETECTIVE work and pleading with manufacturers for technical data it has been possible to identify the correct ferrite material for use in CFR chokes. Only three manufacturers of ferrite material have been found so far in the UK, and the type numbers of suitable material are as follows:

- **Neosid** - material F16 order code 28-043-32 F16 or 28-062-32 F16;
- **S.E.I.** - material K10 order code 582/154/K10 or 645/127/K10;
- **Mullard** - Core type FX1588, material probably B2.

Unfortunately, none of these companies is interested in direct supply of small orders. To date, sources of suitable CFR material available to the amateur include:-

Ferromagnetics of Mold, Clwyd, who advertise in *RadCom*. Ferrite ring type FT240 is 2.4in diameter, priced at £7 and is ideal for CFR use.

QED who supply through many hi-fi dealers and component stockists. Two 1.5in diameter rings are shrink packed on a card at £2.85 the pair. The two rings taped together are again ideal.

The **RSGB** offers ferrite rings from Neosid but tests have not yet been possible.

British Telecom filters type 64/1A made up of two cores, type FX1588 wound with 75Ω coax are suitable as they stand if 75Ω feeder is in use, otherwise rewind with 50Ω. These are available from many component stockists - **Birkett** of Lincoln, **Poole Logic** and many others. Price around £1.

Material suitable for interference suppression may not always be suitable for CFR use. A ferrite ring used on a mains lead for example to stop RF on that lead may operate by absorbing the energy by its inherent loss at the frequency in use in addition to rejecting the energy as a choke. Rejection without absorption is obviously the requirement for CFR.

TESTING FERRITES

THE AVERAGE SHOP SUPPLYING ferrite rings has no idea of their performance at HF and, unless the type is known, the only recourse is to test them oneself.

A CFR choke may be bench tested using a signal generator and a means of measuring RF voltage - preferably a RF voltmeter or wideband oscilloscope. The choke should be wound with the type of coax which will be used on the antenna feeder, usually URM76, and the outers of the cable at each end of the choke connected between the signal generator and the RF measuring device with a load resistance of 1000ohms. Simple calculation will show the impedance of the choke at the frequency in use, which should be at least 10k.

Taking measurements at different frequencies will show the frequency characteristic of the CFR choke which will be dominated by the frequency response of the ferrite material, but will also show the effects of stray capacitance across the choke at higher frequencies.

Stray capacitance is a problem and may be minimised up to 21MHz by using the method of winding shown in **Fig 1** of the original article, where the winding is crossed over to the other side of the ring at the half way point.

Above 21MHz, strays must be reduced further by reducing the number of turns on the ring and leaving at least 1cm gap between the ends of the winding. Normally, the maximum number of turns is required for maximum impedance but as the frequency rises, fewer turns may be used in the interests of reducing self capacitance.

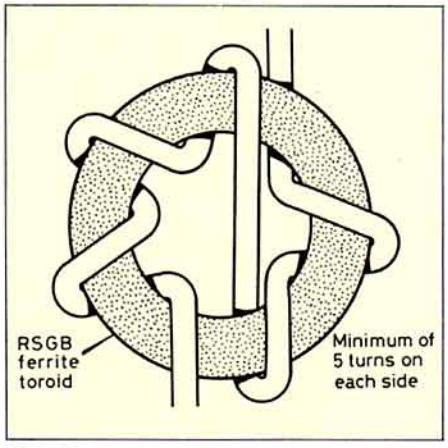


Fig 1: Method of winding choke balun.

PERFORMANCE AT HF

THE FIRST EXPERIMENTS WITH CFR at HF were conducted on the 14MHz band, and this has proved to be the easiest band on which to obtain good performance from the CFR choke. At higher frequencies care has to be taken to reduce stray capacitance and at lower frequencies particularly below 7MHz it is necessary to tune the choke to obtain sufficient impedance. The following are practical details of suitable CFR chokes on the different bands.

- **28MHz:** One Ferromagnetics FT240 wound with 12 turns URM76 coax, close spaced leaving a gap between input and output. A ferrite aerial rod from an old receiver may be used but it must be at least 6in long and be warned - they are very fragile when wound with coax.
- **21 & 14MHz:** One FT240 wound with 18 turns crossed over at the 9th turn, or two QED or FX1588 rings taped together and wound with the maximum number of turns crossed over to the other side of the ring at the midpoint.
- **7MHz:** Two FT240 wound as for 14MHz or a tuned choke as detailed below.
- **3.5 & 1.8MHz:** Tuned choke only.

The tuned choke concept solves the problem of obtaining a sufficiently high impedance, and does have the additional advantage that final adjustment of the exact antenna resonant frequency can be controlled by the choke tuning capacitor. It is of course applicable to one band only.

A tuned choke is made by winding the coaxial feeder into a coil or onto a ferrite ring and tuning the assembly to resonance by a variable capacitor connected between the outers of the cable at each end of the winding. The inner is untouched and continues through the winding.

Practically, the tuned choke should be incorporated in a plastic box with coaxial sockets mounted on it. A metal box is almost impossible since the tuning capacitor is connected between the outers of the coaxial sockets which would be short circuited by the metal box. Although a ferrite ring is not strictly necessary, its use provides considerable space reduction. The type of ferrite used should have low losses at the frequency in use and should be of low permeability, usu-

ally being dust iron. The Ferromagnetics type T200 coded red is suitable and will require 13 turns tuned with a 250pF variable capacitor for 7MHz. A tuned choke on 3.5MHz has not been tried - 78 feet of vertical antenna element is outside my antenna supports - but the same principles of construction apply.

LENGTH OF CFR SECTION

THE WHOLE CONCEPT OF CFR means that a section of the feeder not only carries power to the antenna but acts as a radiating element, and is named, the CFR section.

This means that in the usual case of making part of the feeder act as a quarter-wave low impedance fed element, the part of the feeder at the antenna side of the CFR choke is the high impedance end of the element and is therefore very susceptible to stray reactance effects.

Using a tuned choke the CFR length may be made an exact quarter wave and the stray reactances eliminated by adjustment of the choke tuning capacitor. The assembly should first be resonated with a GDO to ensure coverage of the band. After installation the SWR should be watched while tuning, the normal 1.4:1 SWR of a dipole fed with 50Ω cable will reduce to 1:1 as the choke comes onto resonance.

Giving the exact lengths using an untuned choke, which is far more convenient, is virtually impossible. If the choke is capacitive it will reduce the CFR section length, and if it is inductive it will increase it. The only way is to assume the choke is inductive, as it normally would be, and make the length 0.28λ, reducing if necessary. Typical of the sensitivity at the end of an element is the fact that the CFR length from choke to feedpoint of a centre fed dipole on 14MHz was found to be 19 feet if the choke was wound directly onto the feeder, whereas using plugs and sockets at either side of the choke to facilitate changes reduced the length to a more normal 17 feet - simply the effect of the stray capacity to ground of the plugs and sockets. The type of antenna to which CFR is added also affects the length of the section due to the varying reactances present at the feedpoints of different designs. As with a tuned choke, a correctly operating choke will reduce the SWR of a dipole to near 1:1 and this provides proof that the CFR choke has sufficient impedance at the frequency in use.

ANTENNA TYPES

A NUMBER OF 'CFR specials' were shown in the original article, and the use of the CFR principle has drastically altered the feed system of many types of antenna. Perhaps the most useful type is the simple straight CFR dipole which may be made from a length of URM76 or similar thin coax. The ferrite choke is placed a quarter wave from the end of the cable and the inner alone (or another length of single wire) is continued for a further quarter wave. The result is one straight length of antenna which may be simply strung in one length from an upstairs shack window to a convenient post in the garden, or conversely from a garden shack up to the eaves of a house, or slung almost anywhere for portable use.

The simple CFR dipole also lends itself to vertically polarised phased arrays where a number of vertical dipoles are hung at half wave intervals and fed in phase to make a highly directive curtain array.

Adding CFR to the feeder of a horizontal dipole results in an antenna which will accept all polarisations from all directions, and does get quite close to the impossible - the isotropic radiator, perhaps it should simply be called an 'omni'.

Tests are in hand at this time by Bill Wheeler, G3BFC, a near neighbour and an experienced DX operator who puts the CFR designs to practical use. The latest, on test at the time of writing, is two of these 'omni' antennas, mounted colinearly and fed with a system capable of continuous 360° phase change, between each feeder. Although theoretical gain over a dipole is virtually zero, the ability to control the directivity and accept all polarisations has produced some surprising results, even occasionally beating a three element beam used for comparison.

REFERENCE

[1] 'Controlled Feeder Radiation' B Sykes, G2HCG, *Radio Communication*, May 1990, pp 40-41.

IDEAS FROM ABROAD

Eurotek

TRANSLATED AND EDITED BY ERWIN DAVID, G4LQI

In F6EEM's *Megahertz Magazine* 2/91, **Pierre Villemagne, F9HJ** gives an old favourite a new twist; his **Plumbers' Delight W8JK beam** does not require the elements to be cut and insulated for centre feeding. Advantages, as compared to a two-element trap Yagi of similar gain: simple construction, only one pair of elements for all 5 bands from 14 to 30MHz and no traps or outdoor adjustments. In spite of its disadvantages, bi-directional pattern, balanced feeders and need for an Antenna System Tuning Unit, this antenna just might tempt you onto our under-used 18 and 24MHz HF bands!

ANTENNAS NEED NOT be self-resonant to be effective radiators, as demonstrated by long wires and tuned doublets. The two equal-length elements of the W8JK are part of a *tuned system* which is resonated by the ASTU in the shack; therefore, the length of each element does not have to be some exact fraction of the operating wave length and multi-banding does not require any capacitors or coils at the antenna. According to J Kraus, W8JK, the gain of this beam increases with frequency from 3.6dBd on 20m to 5.6dBd on 10m, *(neglecting losses due to the high SWR on the feeder - G4LQI).* There is little high-angle or side radiation on any of the five bands.

7.50m (24'7") long telescopic elements are used. This length is an electrical and mechanical compromise for the wide frequency range and resistance to wind and ice loading. At 14MHz, the elements are much shorter than ½λ, resulting in a low radiation resistance and high reactance, made worse by feeding two closely spaced elements out of phase. Though the trapezoidal line sections between the elements and the feed point bring some relief, the SWR on the 300W feeder exceeds 20:1, and 300W twin lead is the lowest-impedance feeder currently available capable of operating with high SWR. *(At 400W CW, severest stress under UK license conditions, that feed line must withstand over 1550VRMS and, at 50% duty cycle, 2.6A eff. For Bofa slotted twin no voltage or current ratings are given but, if properly installed, it should survive - G4LQI).*

This beam can be tuned to 10.1MHz, but as the elements are only ¼λ long, good efficiency cannot be expected. Those more interested in 10MHz than in 28MHz can increase element length and spacing accordingly.

CONSTRUCTION OF THE W8JK

FIG 1 IS A SKETCH of the beam. The boom is attached to the elements and to the stub mast with the usual plate, serrated yokes and U-bolts. The phasing lines (copper) attach to the elements (aluminium) via stainless steel clamps to avoid corrosion from copper touching aluminium.

The stub mast sticks out above the boom plate to support a rectangle of thick perspex which is U-bolted to the stub mast, **Fig 2.** The phasing wires pass through holes in the perspex where the feeder is soldered to them. The loop of feeder descending past the 180° rotator must be clamped between the perspex plate and another strip of perspex (not shown) to relieve strain on the solder connections. A similar clamping/stand-off arrangement is required below the rotator.

If a feeder length over, say, 10m (33') is required, consider open wire line from just below the rotator to the ASTU, or using a stub to reduce the SWR on 14MHz. The mast should be earthed for lightning protection - G4LQI.

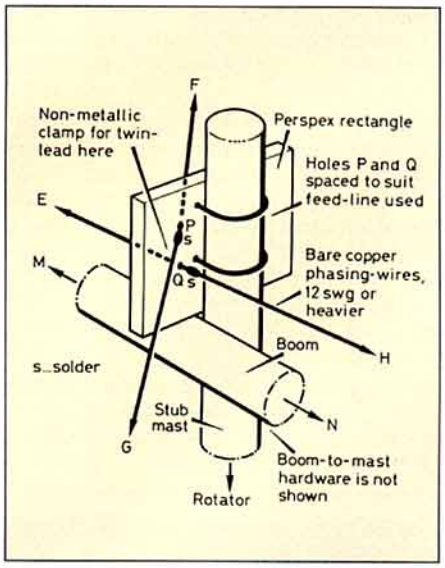


Fig 2. Feedpoint detail (not to scale)

ANTENNA SYSTEM TUNING UNIT

A WIDE IMPEDANCE range balanced, to 50Ω unbalanced, tuner is required. F9HJ recommends one similar to Fig 87(b & c) in G3BDQ's 'Practical Wire Antennas' (Published by RSGB - see this month's *Bookcase* pages).

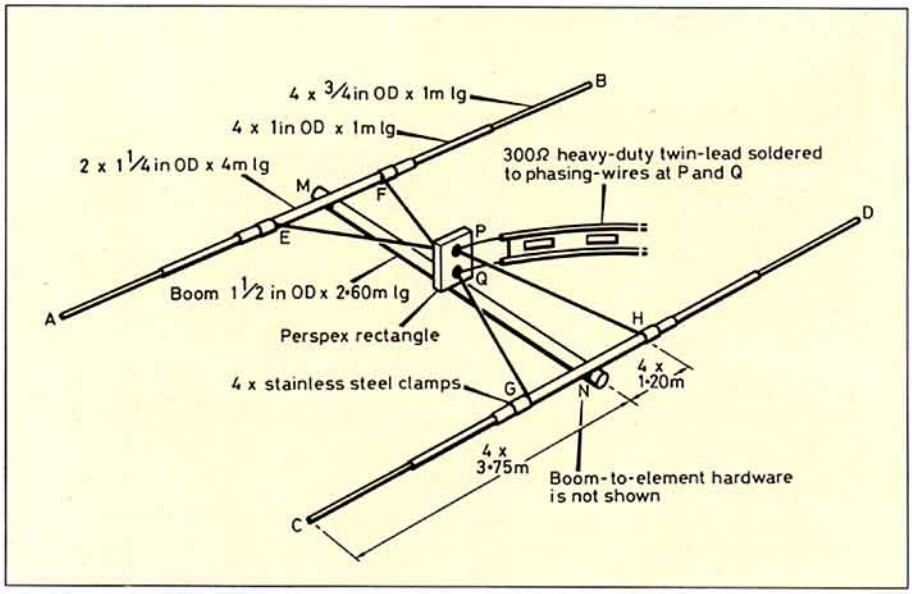


Fig 1: Plumbers' Delight W8JK 14-30MHz bi-directional beam (not to scale).

PRODUCT NEWS

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

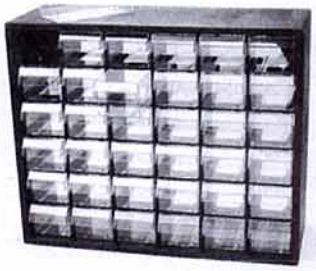
COUPLE AN IBM-PC to your HF communications receiver, and you're ready to receive Facsimile transmissions from around the world. The ICS-FAX provides hardware and software for reception of weather maps, satellite cloud cover pictures, amateur radio transmissions and press photographs.

A special lead connects the computer's serial port with the extension loudspeaker socket of your radio receiver, and an on screen tuning aid is provided.

You can scroll around the image, zoom in on tiny detail, store the pictures on disk, or print them on your printer. This professional but user-friendly, British designed system is now available at £99.95 inc VAT.

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

HANDS UP ALL THOSE READERS who keep meaning to 'organise' their components or nuts and bolts, but never quite get round to it. According to Maplin, "there is now no excuse for an untidy workshop", now that they have introduced a comprehensive range of component storage containers from self seal polythene bags (£1.51 for 100; ten or more packs £1.30 each) to a 60-drawer storage cabinet at £35.65.



Leading the range is the 'All-in-One Workshop Storage System' comprising a 36 drawer plastic cabinet plus a 405mm by 330mm tool panel with assorted hooks and clips for attaching tools, plus nine storage bins in three sizes. All for £40.75 (two or more units at £37.90 each).

Full details are in the Maplin catalogue available from Maplin shops, W H Smith or from the address below.

Maplin Electronics: P O Box 3, Rayleigh, Essex, SS6 8LR. Tel (sales) 0702 554161; (enquiries) 552911; Telex 995695; Fax 0702 553935.

IT'S ALWAYS NICE to see British designed and built equipment, amongst the avalanche of imports. Such a product is the new AKD Model 2001 144MHz FM Mobile Transceiver. This budget-priced unit features Power Outputs of 5 and 25W (switchable), repeater shift with input monitoring, special facilities for packet and RTTY operation, and a forward-facing speaker on the front panel. Similar transceivers for 4m and 6m will be available shortly. The price of £193.75 plus £5 p&p includes a 2 year warranty.

AKD: Unit 5, Parsons Green Estate, Boulton Rd, Stevenage, Herts SG1 4QG. Tel 0438 351710; Fax 0438 357591

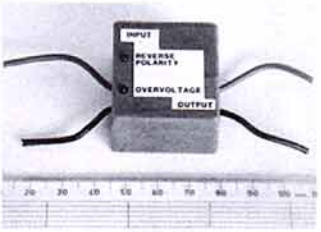
A NEW PORTABLE OSCILLOSCOPE, the Model 300, has been launched by Leader Instruments (Europe) Ltd. Not only is this instrument very small and portable (240mm x 165mm x 44mm) but with it's high speed sampling rate of 30 million samples/sec and a bandwidth of 10MHz, the unit permits the observation of signals well into the video frequency bands. The 300 uses a 113mm x 60mm Liquid Crystal Display to minimise current drain from its battery power source, and unlike traditional CRT oscilloscopes it is not affected by adjacent electro-magnetic fields.

Leader Instruments (Europe) Ltd: Raglan House, 8-24 Stoke Road, Slough, Berkshire SL2 5AG, England. Tel 0753 38022; Fax 0753 38528

SPECTRUM COMMUNICATIONS offer a range of kits and ready built products which include transverters, linear amplifiers, receive preamps and converters for the 2, 4, 6 and 10m bands. Many other kits and components are listed in their catalogue which is available on receipt of an SAE.

SPECTRUM COMMUNICATIONS: Unit 4, Grove Trading Estate, Dorchester, Dorset. Tel 0305 262250

TWO NEW PRODUCTS from Communication Development Specialists Ltd, may well be of interest to readers. The first is a compact, cost effective, conversion kit to transform two standard mobile radios into a full function talkthru base station. The TT4 replaces the control head with an audio interface PCB, and the kit includes metalwork and a fan-tray for cooling. CDS sees uses for emergency services, and many other organisations with more than one communication system.



Also on offer is an affordable (price just £3.00!) Power Protection device for any 12V equipment. The RP2 offers overvoltage and reverse supply protection through the use of an 'intelligent' relay, and could well prevent expensive damage to that new rig.

CDS Limited, PO Box 83, Basingstoke, Hampshire RG25 2PX. Tel 0256 83528/83656. Fax: 0256 83571.

CIRKIT has released a new catalogue of components, kits, and test equipment. The Summer 1991 edition features a comprehensive range of components for the amateur radio enthusiast, and home constructor. Included for the first time are two new scanning receivers, an HF Wavemeter, and a low-cost spectrum analyser with optional tracking generator. The Cirkit catalogue runs to 192 pages and is priced at £1.70, which includes discount vouchers for larger purchases.

CIRKIT: Park Lane, Broxbourne, Herts EN10 7NQ. Tel 0992 441306; Fax 0992 464457

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DP-2HE	2m 1/4 wave	5.95
M-285	2m 5/8 wave	15.95
EL-2E	2m 7/8 wave	32.95
K-10M	Fold gut mount + cbl	32.95
K-30M	Fold hatch/bt + cbl	32.95
K-11	Gut mnt. thumbscrew	19.95
K-33	Hatch mnt. thumbscrew	19.95
K-400	Slim universal mnt	46.00
K-600	Deluxe boot mnt	39.95
K-704M	Hvy dty magmount	38.00
AM-L	Gutter mount	12.95
EC-H	Cable =AM-L K-11 etc	9.95
SP-M	Deluxe mag mount	24.95
TR-A	Hvy dty boot mount	26.95
D-505	Active rx	69.00
MB-100A	Univ. Mnt. tnc	39.95
MA-1100	2m/70cms tnc	26.95
MA-200	2m 1/2 wave tnc	26.95

FIBRE GLASS DUAL BAND

X-50	4.5/7.2dB 1.7m	59.95
X-300	6.5/9.0dB 3.1m	89.00
X-500	8.3/11.7dB 5.2m	119.00
X-700	9.3/13.0dB 7.2m	199.00
X-5000	2m/70cm/23cm 1.8m	99.95

OTHER BASE AERIALS

CP-4	10-40m vert + radials	149.00
CP-5	10-80m vert + radials	189.00
D-130N	25-1300MHz discone	82.50
CP-22J	2m 2 x 5/8	49.95
D-707	Active 1.5-1300MHz	99.00

DIAMOND VSWR METERS

SX-100	1.6-60MHz 30-3KW	95.00
SX-200	1.8-200MHz 5-200W	65.00
SX-400	140-525MHz 5-200W	79.00
SX-600	1.8-528MHz 5-200W	119.00
SX-1000	1.8-1300MHz 5-200W	159.00
SX-2000	Auto 1.8-200MHz	89.00
SX-9000	Auto 1.8-1300MHz	179.00

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20818	9 el xd. 13.1dB	65.00
20813	13 el 14dB	55.00
20817	17 el 15.3dB	64.00

OSCAR

20899	2m/70cm 9/19 el	65.00

430MHz

20909	9 el 13dB	33.00
20919	19 el 16.2dB	40.00
20438	19 el xd 18.2dB	53.00
20912	21 el 18.2dB	53.00
20922	21 el (TV) 18.2dB	53.00

1296MHz

20623	23 el 18.1dB	35.00
20624	23 el (TV) 18.1dB	35.00
20655	55 el 21.5dB	55.00
20650	55 el (TV) 21.5dB	55.00
20696	4 x 23 el kit	199.00
20666	4 x 55 el	249.00

POWER SPLITTERS

29202	2 x 144MHz	59.00

2300MHz

20725	25 el	41.00
29402	4 x 144MHz	69.00
29270	2 x 430MHz	56.00
29470	4 x 430MHz	66.00
29223	2 x 1296MHz	47.00
29423	4 x 1296MHz	53.00

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50422	4 x 1 meter alloy mast	39.00
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50442	4 x 2 metre alloy mast	59.00

Phone or write for catalogue and details of other products and accessories.

Carriage & Ins. Aerials £5.00 Splitters Free.

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We are offering free AC power supplies on most HF transceivers. Below are illustrated just a few. This represents a major saving and we guarantee the PSU against over voltage and over current problems. We now have a superb demonstration "shack" with 3 element beam at 50ft and dipoles. Come and try the gear, work the DX and experience the kind of service and deals our competitors promise but never give. We'll put you in front of your favourite DX machine, give you a coffee or tea and let you sample the delights of our products actually on the air. You might even work a new country! Similar facilities are available for the VHF enthusiast.

Kenwood TS850S

TS850S

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Kenwood TS140S

TS140S

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The Kenwood TS140S is a superb budget hf rig from the top manufacturer of hf equipment. Its size makes it ideal for mobile or base operation and it can be thoroughly recommended for those on a budget.

ICOM IC725

IC725

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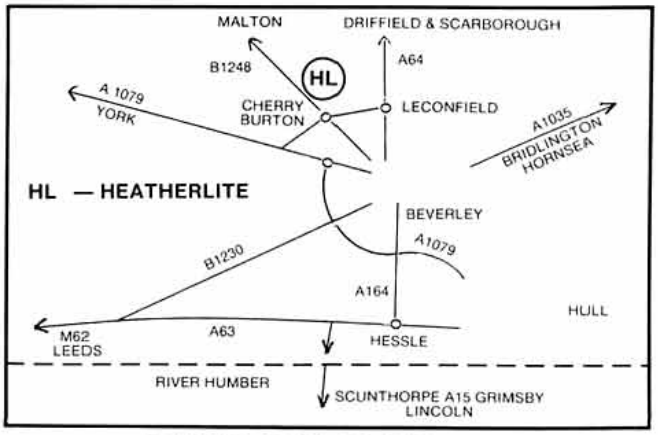

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AMATEUR RADIO SATELLITES

The Past, Present and the Future

Under this heading, AMSAT President Doug Loughmiller, KO5I, writes an editorial in a recent issue of *The AMSAT Journal*, in which he points out that 1991 marks the 30th Anniversary of the launching of OSCAR 1. As he says, the Amateur Satellite Service has come a long way in the thirty years since the events of that historic day in 1961 when amateur radio made its way into the environs of Space for the first time. He writes:-

"From the very first steps it became apparent the marriage between amateur radio and space was an ideal one, destined for a long and fruitful relationship. The pride and excitement, generated by the Project OSCAR crew and their bold endeavour to put amateur radio into space, fuelled a strong commitment from yet additional radio amateurs to ensure that amateur radio would return to space at every opportunity we could collectively muster. To this day that fact is still being proven out."

Moving from the past to the present, he outlines the problems which those who direct the policy of amateur satellite organisations have in deciding "where do we go from here?"

It so happens that the Management Committee of AMSAT-UK has itself been much concerned recently with this very topic and a very difficult problem it is to decide just what projects from amongst many possibilities, should be addressed. So often one's favoured choice has to be abandoned on the grounds of pragmatism. To continue with Doug's comments:-

"At the recent AMSAT Board of Directors' Meeting in Houston, this matter was again discussed and this time a firm decision was made. It was finally decided that over the past year or so, it had become increasingly apparent that the Phase IV project simply did not have the level of support from within the amateur community needed to ensure that we could see it through to fruition. The biggest obstacle that lay ahead of this project could be summed up into a single word - money. In the final analysis, at this point in time, we could not afford to tackle such an ambitious project. While AMSAT has been successful at finding projects at the tens of thousands of dollars level, we simply have no reason to believe that we could 'step out on faith' as we have in the past and tackle a project in the multi-million dollar level hoping that the money would trickle in after we had committed to the project. This project is simply too vast and demanding to be approached in this fashion".

So it was with this in mind, following months of efforts to try to elicit the type of support needed from the amateur radio community at large, the AMSAT Board of Directors voted unanimously to terminate the Phase IV geosynchronous satellite program. Whilst this is still a noble and worthwhile cause, now is clearly not the time to tackle such an ambitious project.

So writes Doug, "We began to turn our attention to another interesting and worthwhile project, known as Phase III D. This had been openly discussed by a number of international groups over the past several months including our colleagues of long standing at AMSAT-DL. In anticipation of our potential participation in this project, last Spring, Ron Broadbent, G3AAJ, of AMSAT-UK and I travelled to Marburg, West Germany, for preliminary discussions with AMSAT-DL President Karl Meinzer, DJ4ZC. A little over a month later, a small contingent of technical representatives from within AMSAT-NA travelled to Marburg to participate in the first 'experimenters meeting' of the Phase III D project. A follow-up meeting is now scheduled for May of this year".

Whilst this project has been tagged as a Phase III satellite project and while one of the potential orbits the satellite may be placed in is a Molyna type of orbit, this label is a little misleading. The mission objectives and engineering design parameters are yet to be fully defined. In general terms however, this mission is planned to be a super enhanced amateur satellite. Improved link performance, transponder management and attitude control are but a few of the considerations being given to improving the communications capability it will offer the satellite enthusiast. It, too, will be an ambitious project but because of the world-wide communications capability it will offer over a geosynchronous payload, the burden sharing in developing such a satellite can be spread over groups the world over as opposed to groups of only part of the world as would have been the case with a Phase IV geosynchronous bird.

Following a presentation by Karl Meinzer and lengthy discussion by the AMSAT Board of Directors and Officers, the AMSAT Board voted unanimously to adopt this internationally based project as the next major satellite construction program AMSAT-NA will pursue.

SATELLITE NEWS

RS12

This Russian satellite has been on mode KT recently, ie 15m up and 2m down. For quite some time this mode has been requested as a means of attracting more folk to get into satellites, but until now this proposal has not found favour with satellite builders. RS 12's appearance in this mode has, therefore attracted considerable interest. Being able to use a 'normal' HF frequency for transmitting the up link obviously made it much easier to get going on satellites as most amateurs already have this facility as well as 2m gear. Some interesting results have been observed. Regular users of the 15m band were somewhat puzzled at these unusual signals appearing on the band and it was indeed a novelty to hear DX signals appearing on 2 metres! A good deal of mutual QRM occurred between the satellite users and the 15m users. Also the 2m down signals clashed with Oscar 13's signals at times. All told it was an interesting experiment and I for one hope it is kept on this mode - though at the time of writing it has been turned off.

Prior to RS12 being put in this mode, an interesting phenomenon was observed which had been noticed on some other satellites at times. It is the appearance of signals some few minutes before the predicted orbital time of the acquisition of signals (AOS). This was most marked with RS12; weak signals appearing for some six or seven minutes before AOS time, from the beacon on the satellite. At AOS they rapidly came up to full strength. Similar effects have been observed before on some of the earlier satellites when the phenomenon was called 'over the horizon propagation'. Now that it is so noticeable on RS12 more interest is being taken in it, and it has been christened the 'Anomalous Signal' phenomenon. I think we shall hear more about this in future. Already L W Brown, G0FFD, is making a special study of them. He writes:-

"I am so far looking at the results in terms of the F region high latitude trough. Mid-latitude ionisation is due to direct solar radiation which is of course absent in the polar regions, varying seasonally in extent. Polar ionisation is and can only be due to high-energy particle bombardment and in between there is this trough in ionisation density. The trough should obviously be greatest in extent during the winter months and greatest in intensity around mid-day, ie when direct solar radiation is greatest. Further to this thinking, radio waves exhibit some peculiar properties close to the critical or MUF frequency. In this context, I think that *aurora* is a much overplayed word insofar as there is always a continuous bombardment, simply varying in intensity with solar eruptions.

"I suggest that the occasions on which you have noticed these anomalous signals were on a descending pass more or less close to overhead at your QTH and no doubt not too far removed from mid-day . . .". (This was the case - G2UK). "A similar ascending pass would evidently be of great interest and that is what I'm looking for at the moment, together with perhaps a little geometry and to see if I can look at the annual variation of the effect."

AMSAT-UK COLLOQUIUM

A REMINDER THAT the AMSAT-UK Colloquium is being held again at the University of Surrey from Thursday 25 July to Sunday 28 July. The International Day which has been a popular feature will be held on the Thursday afternoon, prior to the Colloquium main features which start with Registration on the Friday morning. This arrangement will, it is hoped, enable participants to get to Surrey for the main events without having to book an extra night's accommodation. We understand that accommodation is already fully booked, but there are a few day places still available. Enquiries to AMSAT-UK at the address above.

Microwaves

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

SEVERAL VISITORS TO the Microwave Committee stand at the NEC Convention asked for clarification as to which of the current microwave designs, supported by the Microwave Components Service, does what! Here is an explanation.

G4DDK-001 (*RadCom*, Feb/Mar 1987): Crystal controlled signal source covering approximately 1000 to 1400MHz. Designed as a local oscillator source for a 2m to 23cm transverter, it has two outputs at +10dBm (10mW) or, by cutting a track, one output at +13dBm (20mW). Can be used as a low power FM (or FSK/AFSK) transmitter.

G4DDK-002 (*RSGB Microwave Newsletter* 07/87 - Oct/Nov): a linear power amplifier covering the same frequency range as the G4DDK-001. Requires 10mW input for 1W output. The bandwidth is such that this amplifier can be used for ATV.

G4DDK-003: doesn't at the moment exist - possibly a receive mixer for the 23cm band.

G4DDK-004 (*RadCom*, Aug 1990): Crystal controlled signal source designed to cover approximately 2.0 to 2.6GHz. Suitable for the LO of a '13cm' converter or transverter or as a low power transmitter. The power output of the original design was about 7mW. With recently published modifications, this is now in the range 10 to 20mW. Although designed for the '13cm' band, the unit will tune down to the 1.3GHz band and give about 70 to 80mW output, so it could be used as a 23cm transmitter as well as in the 13cm band. The unit was originally designed to be multiplied to 10GHz using a varactor multiplier or active (transistor) multiplier -see next!

PCBs and the more 'difficult' components are obtainable from the components service (see later) and all three designs are described in full detail in the newly published *Microwave Handbook, Volume 2* [See this month's *Bookcase* pages - Ed].

None of the next three units, all for the 10GHz band, has been published either in *RadCom* or the *Microwave Newsletter*, other than brief circuit descriptions. Full descriptions are to be found in the construction booklets issued as part of the 'mini-kits' for these advanced designs.

G3WDG-001: An advanced GaAs FET/microstrip PCB transmitter design for the 10GHz band. Needs 10mW input at around 2.5GHz from the G4DDK-004 source. It consists of an (optional) MMIC amplifier at 2.5GHz followed by a GaAs FET x4 multiplier, filter and amplifiers. The output is at least 50mW, and usually nearer 100mW, anywhere in the 10GHz band. Ideal for learning to use Surface Mount Devices (SMDs) and for use as a signal source, CW, NBFM or beacon transmitter.

G3WDG-002: A 10GHz to 144MHz receive converter, also using SMD technology. Requires local oscillator input from the G4DDK-004 source.

G3WDG-003: A 144MHz to 10GHz linear transmit converter, again requiring input from the G4DDK-004 source. The design contains a 2.5GHz amplifier and power splitter, thus enabling both the G3WDG-002 and -003 designs to be driven from a single G4DDK-004 oscillator source, requiring only suitable switching to build an advanced 10GHz linear (all mode) transverter system.

'Short' or 'Mini-kits' - ptfe board, regulator board, critical (SMD) resistors and capacitors, filter(s), circuit pins and comprehensive instructions booklets are available for the 'WDG-001 and 'WDG-002 now. G3WDG-003 should be available by the time you read this. Keep your eyes open for further developments, other modules are planned!

For more details and current prices/availability send an SASE to Mrs P Suckling, G4KGC, 314A Newton Road, Rushden, Northants NN10 0SY, or ring (at sociable hours please!) 0933 411446. *Please do not ring, or send orders to RSGB HQ.*

BEGINNERS CORNER

Power measurement

This month I'd like to discuss a few ideas for simple, low-power measurement in the lower microwave bands - the kind of measurement which you will need to make on signal sources and low power transmitters such as the G4DDK designs. Some of the ideas are due to Mike Scott, G3LYP, who had obviously been through the process of making many of the items of test gear when we met at the VHF Convention recently, where he gave me a quite comprehensive write-up of some of his designs and experiences.

Thanks to Mike for many of the practical designs to be described here, some derived from ideas published either in this column or in the *RSGB VHF/UHF Manual*. Others are derived from G4DDK's Test Equipment chapter in Volume 2 of the *Microwave Handbook*. As a result of using these combined ideas and newer components, the range of usefulness has been extended.

Fig 1 (reproduced from Chapter 10, Test Equipment, of the *Microwave Handbook*, volume 2) shows the circuit and layout of the simplest VHF/UHF milli-Watt power meter. This circuit and layout works well to about 400 or perhaps 500MHz, after which stray inductances and capacitances, arising from the lead-length or the size of the components, limit its usefulness.

The meter measures the peak RF voltage across the load (R1 and R2), minus the forward voltage drop across the diode. Divided by $\sqrt{2}$, this gives the RMS (Root Mean Square) value from which the power can be calculated using the equation:

$$P = \frac{V \times V}{2 \times R}$$

where V = Peak Voltage = RMS volts x 1.414, P = power in Watts and R = Load resistance (= 50Ω here).

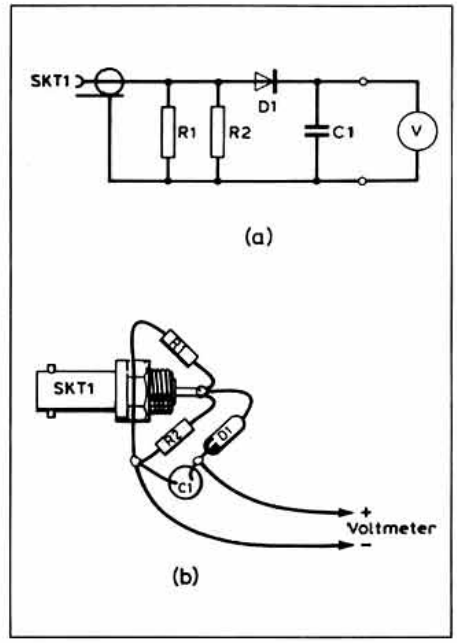


Fig 1: Circuit (a) and Construction (b) of the simple vhf/uhf power meter.

For Germanium diodes (eg OA47 or similar), where the circuit impedance is 50Ω, the relationship will be:

$$P = \frac{(V + 0.25) \times (V + 0.25)}{2 \times 50}$$ (Forward voltage drop = 0.25V)

whilst for Silicon diodes in a 50 Ohm circuit (eg 1N914, 1N916, 1N4148 or similar), it will be:

$$P = \frac{(V + 0.7) \times (V + 0.7)}{2 \times 50}$$ (Forward voltage drop = 0.7V)

Schottky barrier diodes of different types suitable for microwave use show various forward drops, the value of which can be determined from the manufacturers' data.

Using this principle, it is now easy to make up the circuit using fibreglass printed circuit board (PCB) material and modern surface-mounted resistors, capacitors and diodes to construct a load/milli-Watt power meter which can be used to at least 2.5GHz. Surface mount devices (SMDs) are much smaller than ordinary devices and are made to solder directly to microstrip tracks on a PCB. They literally have no connecting leads, connection being made by soldering to metallised areas at each end of the device and, being very small and lying flat on the board close to an earthed 'gound-plane', are less reactive than components with leads. This means that they will work better at higher frequencies. The recommended 1206 size is 0.120in (3.2 mm) long and 0.06in (1.6mm) wide - rather small compared to a standard resistor or capacitor!

A PCB layout is shown in **Fig 2**. The PCB is bigger than needed so that it will fit inside a Type 7752 tinplate box (Piper Communications) which is 37 x 74 x 30mm. This is a useful size for other small items of test-gear too!

The other side of the board is unetched to provide a continuous groundplane. The board is held in place by soldering all round the edge

of the groundplane where it meets the tinplate box sides and ends. The PCB is positioned so that the input and output connectors are soldered directly to the microstrip line.

The trick is to use a length of 50Ω microstrip transmission line from the input socket to the load, and low-inductance grounding wherever grounding is needed. The length of the line is not critical, although the width is. Low inductance earthing (grounding) for all components is provided by circuit pins fitted through small holes, very close to the component to be grounded and soldered on both sides of the board, a technique used successfully at 10GHz in the well-known G3WDG designs.

The SMD components are soldered between this line and ground, and there is a small gap in the line to allow fitting of the diode with absolutely minimum lead length (or to fit an SMD diode). The output line does not need to be 50Ω, although it is convenient to make it the same as the input line. Note that the DC output is decoupled by a couple of SMD capacitors close to the diode and by a couple more near the output socket (belt and braces!).

I'd advise the use of a coaxial output socket so that a well-screened lead can be taken to the meter, to prevent any stray RF pickup which could upset the accuracy of the readings.

Using good quality 1.6mm (1/16") epoxy-fibreglass, 1oz double clad board, the microstrip line should be 2.7mm wide to give an impedance of 50Ω. If you use standard PCB masking tape as an etch resist, the nearest size is 2.5mm. Using this will give a microstrip impedance of about 52Ω, near enough for all practical purposes! I used an SMA connector at the input (because it matched the connectors on most of the low power equipment which I wanted to test) and a Belling-Lee (75Ω) TV connector for the output, as the impedance does not matter. Alternatively, you could use a BNC socket.

First make and drill your board (Fig 2) and then fit the 1mm grounding pins with their heads flush to the ground-plane side. Solder both sides! Cut off any excess pin-length on the track side. Mark the centre-line along the box sides and ends - this is where the board will fit. At the centre of each end, mark and drill holes for the input and output sockets. The size of these holes will depend on the type of connectors you decide to use. I fixed the input socket (gold-plated SMA) and output socket in place by soldering to the tinplate box end. If you have a big enough soldering iron, you can also solder a BNC (or whatever) connector to the other end. If you use a Belling-Lee socket, this is quite easy as the insulation does not protrude behind the socket body. Either the square-flange or single hole (round flange) BNC are a little more difficult, as both have metal and insulation which protrude behind the surface on which they are mounted.

A round, single-hole BNC type is best fitted by soldering a spare socket-nut to the tinplate box end, screwing the socket into place and using another nut to lock it in place. The square flange type can be soldered directly to the box, but either type of BNC connector will need a 'notch' filing in the PCB to clear the insulation and socket body, and to allow the PCB to sit down directly on the connector spill. You will also need to file a little from the corners of the board where there is a seam in the box and it is a good idea to spend a bit of time making the board a good fit into its box. Once you are satisfied that it is a good fit and that the lids fit well, the corner seams of the box can be soldered. Then the board can be tack-soldered into the box and, again when satisfied that it is correctly fitted, solder all round the joints between the groundplane and box.

Solder the coaxial socket spills to the tracks. Next, solder the resistors and capacitors in place using a fine soldering iron, very fine solder, a pair of tweezers and a magnifying glass! Use a minimum of solder and heat (as quickly as you can), soldering one end first whilst holding the device in place with the tip of the tweezers or a wooden cocktail stick. This should fix the component in place. Then solder the other side. The diode, whatever type is used, should be fitted last of all. If you use a type with leads, use the shortest leads possible.

The DC output voltage can be measured with a multimeter set to a voltage range between 0.5 and 10V. You can construct a calibration curve for the milli-Wattmeter by calculating the voltages produced at different input powers. You can be sure that the calibration will not be far out. A typical calculated calibration curve is given in **Fig 3**. Alternatively, you might be able to get it calibrated directly (at as high a frequency as possible, say 2.5GHz) at one of the RSGB Microwave Round Tables [Watch this column and listen to GB2RS for details of future events - Ed]. Don't forget that the chip resistors forming the load are only rated at 0.125W (125mW), so that the load will operate, without overheating, to 0.25W (250mW).

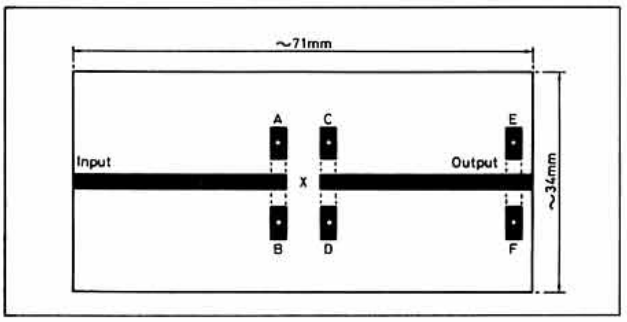


Fig 2: PCB milli-wattmeter. R1, R2 – 100Ω SMD resistors, 1206 size. C1, C2, C3, C4 – 470pF SMD capacitors, 1206 size. D1 – OA47, 1A419, etc or SM diode.

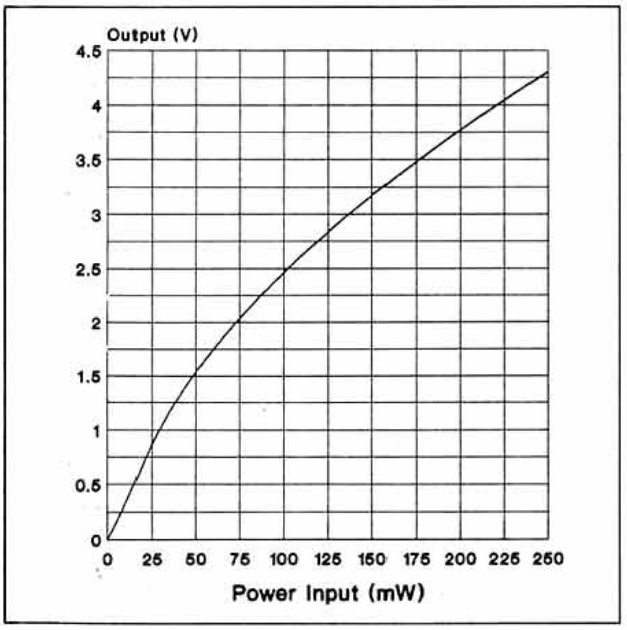


Fig 3: Calibration curve for the milli-wattmeter.

If you want to measure up to, say, 0.5W (500mW), then there are 0.5W, 50Ω BNC-mounted terminating loads rated to 1GHz or 2W BNC-in, BNC-out 'through' loads rated to 0.5GHz. Both are usable to at least 2GHz without too much inaccuracy. Both can occasionally be found at rallies or are available from RS Components (or Electromail), part numbers 456-251 and 456-150, respectively. There are similar items in the Farnell Electronic Components catalogue.

Using a terminating load together with a BNC T-piece and a BNC 'video mount' (containing a coaxially mounted diode and decoupling, sometimes obtainable cheaply from rallies), you can 'build' a power meter without having to construct anything at all! The 'layout' is shown in **Fig 4**. It is used in exactly the same way as the microstrip design just described. A 'through- load' is even easier - remove the T-piece and simply connect the power input to one end of the load and the video mount to the other. ❑

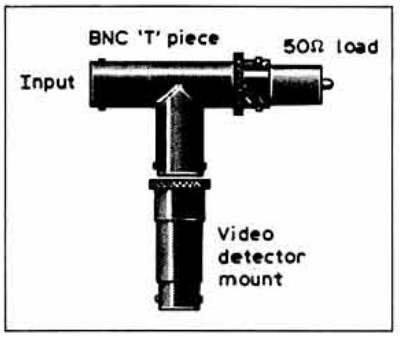
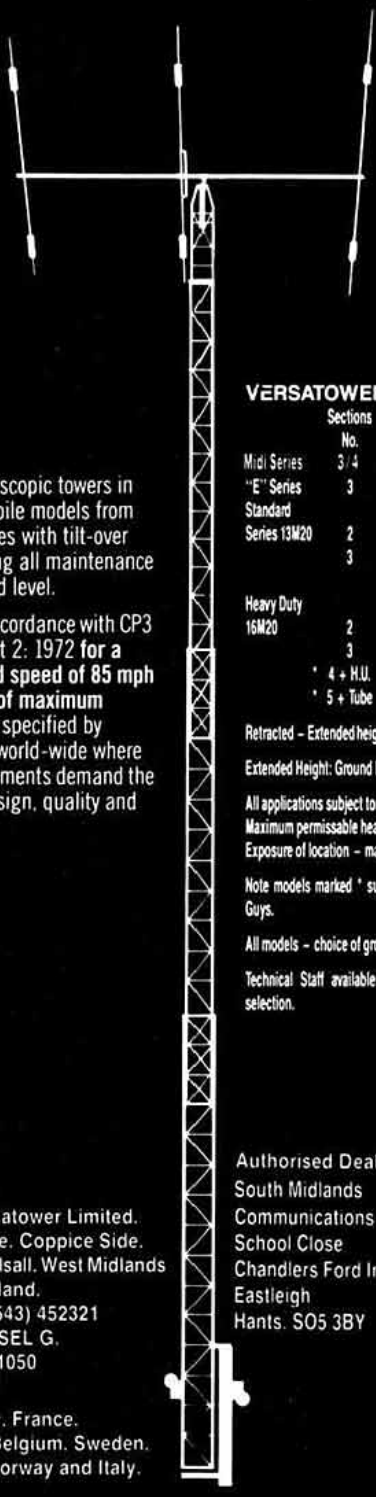


Fig 4: A coaxial milli-wattmeter constructed from 'standard' 50Ω BNC parts and a video mount.

Versatower: XXV+ Still first choice



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	3	8.0	18.0
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	3	8.0	18.0
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386sx-20	600	730	800	920	945	990
386dx-25	705	835	905	1010	1045	1090
386-25 "top-cat"	730	860	930	1035	1175	1220
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CONTEST NEWS

All rules should be read in conjunction with the General Rules published in December 1990 (VHF/UHF/Microwave) and January 1991 (HF)

RULES

ROPOCO-2 1991

1. The General Rules for RSGB HF Contests, published in the January 1991 issue of Radio Communication, will apply.

2. Date & Time. 0700 - 0900GMT, Sunday 25 August 1991.

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

4. Exchange. RST only, do not send Serial Number. **Other Data:** For the first QSO, the entrant's own postcode. For each subsequent QSO, the postcode received from the previous contact.

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

6. Address and Closing Date for logs as per General Rules.

7. Awards. Certificates to the leading three entrants. The G3XTJ Memorial Trophy to the highest-scoring entrant with a perfect (or the most accurate) log. The G5MY Trophy to the entrant with the highest aggregate score in this event and ROPOCO-1 1991.

RSGB HF CONTESTS - ADDRESS FOR ENTRIES

Entrants for all RSGB HF Contests are reminded that unless stated otherwise in the rules for a specific event, the entry should be sent to the address shown in the General Rules:- **RSGB HF Contests Committee, c/o S Knowles G3UFY, 77 Bensham Manor Road, Thornton Heath, SURREY, CR7 7AF, England.** The name of the contest should be shown on the outside of the envelope.

Correspondence for the attention of the Committee may be sent to the above address, or to the Chairman, D Lawley G4BUO, 'Carramore', Coldharbour Road, Penshurst, TONBRIDGE, TN11 8EX, Kent.

RSGB COUNTY CODES LIST - AMENDMENTS

The following changes to the RSGB County Code List (as published in January 1991 *Radio Communication*) take effect immediately:

1. **HBN** (North Humberside) is **DELETED**

2. **HBS** (was South Humberside) becomes **HumbersIde**. Stations previously giving **HBN** will now use **HBS**.

3. The Code for **Clwyd** (was **CWD**) is changed to **CLD**.

Contesters are reminded of that the Scilly Isles are no longer regarded as a separate county (IOS has been deleted) and that the Code for **Buckinghamshire** (was BKS) is now **BUX**. Both these changes were announced earlier, but BKS is still being used, to the confusion of some overseas stations.

It is hoped these changes will clear up the problems and ambiguities which had arisen with the old list.

RSGB LISTENER CONTEST 91 RULES

See page 19 for details of this contest.

RESULTS

HF CONTEST CHAMPIONSHIP 1990 - RESULTS

The rules of the LF SSB Contest 1990 were published later than was intended, and this resulted in a very small entry. Although the results from that event would normally count towards the placings in the Championship, the Contests Committee has decided that they should not be included in the 1990 listing.

Congratulations to J Cree, G3TBK, who wins the G2QT Trophy by the most comfortable of margins, and to D Thom, G3NKS, who will receive the runner-up certificate.

G3OZF

Posn	Callsign	Score	Events
1	G3TBK	11816	10
2	G3NKS	6436	6
3	G3LET	6144	4
4	G3GLL	5729	6
5	G4BUO	5481	3
6	G3NKC	5113	6
7	G3OZF	4998	2
8	G5MY	4895	8
9	GM4OBK	4894	4
10	G3MXJ	4860	2
11	G4CNY	4820	2
12	G3OXC	4433	5
13	G3VYI	4403	7
14	G5LP	4370	6
15	G2QT	4179	4
16	G3NLY	4000	2
17	G4RFR	3987	5
18	G3JJG	3757	4
19	G3BPM	3601	8
20	G4OGB	3501	5
21	G3RTE	3339	2
22	G4KGK	3174	5
23	G3JKS	3159	2
24	G4ARI	3124	5
25	G2HLU	3069	6
26	G0IVZ	2918	3
27	G3TXF	2831	2
28	G3MPB	2806	4
29	G3HKO	2750	4
30	G4HTD	2701	4
31	G0IDE	2462	6
32	G0JNZ	2427	6
33	G3JSR	2414	6
34	G2AFV	2240	5
35	G4IQM	2231	4
36	GW3JI	2195	4
37	G3SWH	2159	2
38	GM3UM	2111	6
39	G3AWR	2089	4
40	G3YEC	2024	2
41	GW3HGJ	1999	2
42	G3OLU	1988	3
43	G3GC	1854	2
44	G0CGV	1769	4
45	G4XPE	1737	4
46	G4EBK	1704	3
47	G4BKI	1700	3
48	G3WGV	1697	2
49	G4ECI	1590	4
50	G3ESF	1584	3
51	G3KKQ	1554	3
52	G3UFY	1549	2
53	G3NOM	1522	2
54	G3VHB	1510	2
55	G3SYM	1491	2
56	GM3YEH	1483	2
57	G3YAJ	1479	2
58	G3JJZ	1472	2
59	G3HZL	1438	2
60	G3GMM	1376	7
61	G0JFX	1308	2
62	G3MA	1283	2
63	G3CQR	1274	3
64	G4PTE	1269	7
65	G0CGB	1262	3
66	G2MJ	1199	2
67	GW3SB	1155	4
68	G4KLQ	1113	2
69	G3MCX	1061	2
70	G3YLC	1029	2
71	G3GMS	955	4
72	G3ZGC	850	4
73	G4CZB	816	3
74	G0LZL	766	3
75	G3WKL	752	2
76	G3FVW	626	2
77	GM4WLN	599	3
78	GM4SID	590	2
79	G3ZRZ	569	2
80	G4UZN	556	2
81	G3DYY	548	2
82	GW4KVJ	512	2
83	G4PYD	503	2
84	GM3IZD	450	2
85	G3LIK	405	2
86	GM3CFS	380	2
87	G4ZME	373	2
88	G3ZDW	333	2
89	GW4HBK	223	2
90	GM4HQF	212	2
91	GM0GNT	109	2
92	G4AGQ	82	2
93	G4OTY	47	2

The Northern Lights ARS who won the Telford Trophy, VHFCC Cup, G6ZR Trophy, 1951 Council Cup, Mitchell-Milling Trophy and the Surrey Trophy.

HF CONTESTS CALENDAR - 1991

Jul 1	*Canada Day (CW/SSB)*
Jul 6/7	*YV DX SSB*
Jul 13/14	IARU HF Championship (CW/SSB)
Jul 13/14	RSGB SWL Contest (Jul 91)
Jul 13/14	*SEANET CW*
Jul 21	Low Power Field Day (May 91)
Jul 27/28	*YV DX CW*
Aug 3/4	*YO DX (CW/SSB)*
Aug 10/11	*WAE CW*
Aug 17/18	*SEANET (SSB)*
Aug 25	ROPOCO-2 (Jul 91)
Aug 15/16	*JARL All Asia (CW)*
Sep 1	*LZ DX (CW)*
Sep 7/8	SSB FIELD DAY (inc IARU Reg 1) (Jun 91)
Sep 7/8	*JARL Asia (phone)*
Sep 14/15	*WAE SSB*
Sep 21/22	*CQ WW RTTY*
Sep	28MHz Cumulatives

RSGB VHF CONTESTS CALENDAR - 1991

6/7 Jul	VHF Field Day (Jun 91)
27 Jul	144MHz Low Power/SWL (Mar 91 + Jun 91)
28 Jul	432MHz Low Power/SWL (Mar 91 + Jun 91)
25 Aug	432MHz Fixed/SWL (Mar 91)
4 Sep	144MHz CW Cumulatives (Mar 91)
7 Sep	144MHz CW Cumulatives
7/8 Sep	144MHz Trophy/SWL (Mar 91)
20 Sep	144MHz CW Cumulatives
22 Sep	50MHz CW
29 Sep	70MHz Trophy/SWL
5/6 Oct	432MHz-24GHz SWL and IARU
8 Oct	1.3 & 2.3GHz Cumulatives

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

AFFILIATED SOCIETIES' TEAM CONTEST 1991

If your comments are anything to go by, AFS left in its wake a goodly proportion of the participants reduced to quivering, jellified messes, suffering from tinnitus and writer's cramp. Nevertheless, there were sufficient masochistic veterans of previous events, as well as an encouraging number of daring first-timers, to ensure a good scrap, with plenty of QSOs for all and a close finish at the top.

Had it not been for some urgent business abroad which demanded the attention of a number of our regulars from the Services, the entry would probably have been increased, instead of being very slightly down compared with last year.

Conditions, as in 1990, left a lot to be desired. Less than a dozen contacts *in toto* were made into Europe (far, far fewer than usual) and only those operators near the major conurbations were able to maintain high scoring rates throughout. The northernmost stations could find hardly anything to work during the first hour. It is because of this well-known "North-South Divide" that the HFCC instituted the award for the leading Scottish Club .... not on the basis of a Country award (as was queried by one hopeful GW), but in recognition of the very different conditions under which the Scots must compete, which virtually ensure that no group from north of the Border will ever win this event outright.

Propagation notwithstanding, the top fourteen individuals were all able to sustain a QSO rate of better than 1 per minute for the entire 4 hours - no mean feat, even allowing for the increasing use of computers for logging. In all, over 25,000 contacts were made, which boils down to about 4 QSOs per minute per 1kHz bandwidth in the busiest sections of the band!

Comments on operating standards were in general complimentary. Certainly the QRS Corral was treated with respect this year, and a number of the 'Big Guns' were found there picking up valuable extra QSOs.

There was one disturbing development - the 'hogging' of a frequency before the start of the contest. No-one *can* object to the carrying-on of QSOs prior to the event, and no reasonable operator would complain about the practice of sending the traditional 'test' calls for a couple of minutes beforehand. The sending of a continuous string of Vs (heard by yours truly from one station for SEVEN MINUTES before the 'off', and commented on by others) without listening on the frequency or sending any station identification is neither good operating practice, nor likely to win many friends amongst other band users, especially those already ill-disposed towards contesting. It is extremely unlikely that recurrences of this technique will be regarded as being within the spirit of the contest.

Now on to more pleasant matters. Logging standards this year were very good. There were far fewer unmarked duplicates than in previous events, possibly because almost all entrants with large logs prepared and submitted checklists. The proportion of logs, either printed directly by computer or prepared on a word-processor, continues to rise. Regrettably the HFCC is not yet in a position to accept entries on disk (sri G3KTZ) but work is well under way on a standard format for data, and developments can be expected fairly soon. G3YLC expressed concern that his computer/WP/printer could not reproduce the standard log sheet. It is not expected to! Whilst some specialised software can do an almost exact copy, it is generally enough that the log should be on the right size of paper, with the right number of contacts per page, and the columns in the correct order (see General Rules).

G3TWG asks why there is a new requirement to enter the operator's callsign by each contact. The answer is: it's not new. It has always been a requirement to indicate the operator, the same as to record the time, RST etc. **for each QSO.** Ditto marks or an arrow have always been acceptable, but if some people won't do even that, then you have to spell it out!

As usual with this event most entrants lost some points in adjudication, the majority of the errors being in reception of the other station's callsign. Another common problem is that of thinking you have made a QSO with a given station, when in fact he is working someone else. If in any doubt it is worth asking for a repeat or confirmation. A couple of stations lost 5 or 6 consecutive QSOs like this, obviously as a result of a new and louder neighbour just up the band. At the other end of the scale, a special mention is due to G3KDB, second-placed station in the individual listing, whose log recorded 270 contacts with which no fault at all could be found!

In deference to a multitude of requests, herewith are details of the equipment used by the leading stations:

G4DJX - TS830S + Half-wave Dipole at 40 ft.

G3KDB - TenTec Omni-V + Dipole at 35 ft.

G4MCC - TS930S + Inverted Vee.

G3RTE - TS930S + Inverted Vee at 60 ft over a reflector at 10 ft.

G3OAY - TenTec Omni-D + Dipole at 54 ft.

It certainly seems a good plan to have a low(ish) antenna for this event; presumably the advantages from having a more omnidirectional polar diagram and higher radiation angle offset the disadvantages of lower radiation resistance and the consequent higher losses. One wonders what would have been the result had propagation been better.

Especially worthy of note is the following:

G4RAW - Homebrew TX (5W DC in) + Homebrew D/C Rx + Inverted Vee (50 QSOs).

Step forward, Sir, and take a bow! Your log was error-free; we salute your skill and determination.

Also noteworthy is the gentleman (best left nameless) who gave his power as 100dBW RF out .... Cor !!

My thanks to the other members of the adjudication team (G3KKQ, G3SQX, G3WRR, G4RWW & G6LX) and to all the members of the various clubs who gave this event their support. I hope to meet you all again in 1992. *G3UFY*

AFFILIATED SOCIETIES' TEAM CONTEST 1991

Posn	Club	Stn1	Stn2	Stn3	Stn4	Stn5	Score
1¶	LICHFIELD ARS 'A'	G3KDB	G3LNS	G3SJJ	G3NKC	G4ZVJ	12525
2*	LEICESTER POLY 'A'	G3OAY	G3CWI	G3ORY	G3SDC	G4ARI	12162
3*	VERULAM ARC 'A'	G4DJX	G3RTE	G2BAP	G3UJV	G3HJF	11113
4	MID BEDS CA	G4MBC	G5LP	G4GIR	G4BJM	G4ALR	10467
5	ADDISCOMBE ARC	G3SJX	G3UFY	G4ALE	G3RQZ	G3VYI	10241
6	CHELTENHAM ARA 'A'	G3NKS	G3JJG	G4PDQ	G3FXA	G3JFH	9499
7	CRAWLEY ARC	G3GRO	G3JKF	G3WSC	G3TNO	G3YVR	9038
8	GRIMSBY ARS 'A'	G3TBK	G3RXP	G3RSD	G4EBK	G3JKB	8988
9	SOUTHGATE ARC 'A'	G3RWL	G3SFG	G3ZVW	G3KTZ	G4KZD	8752
10	LEICESTER POLY 'B'	G4JGV	G4EOF	G4ZFE	G4CZB	G4XEN	8693
11	GUILDFORD & DRS 'A'	G3SYM	G3YXX	G0EFO	G4HZV	G3PJX	8351
12	RNARS COLCHESTER	G3GLL	G3YEC	G3YAJ	G4LZB	G0IBN	8197
13	MARPLE CG	G4MCC	G3PSM	G0CMM	G3OWO		8079
14	HEREFORD ARS 'A'	G4CNY	G3HVX	G3FKH	G4BXS	G4JSN	7887
15	GRAVESEND RD	G4BUO	G3MXJ	G4FAM	G4IFB		7747
16	EDGWARE & DRS 'A'	G4IUZ	G3ASR	G3SHY	G4HMD	G4GKA	7530
17	RNARS PORTSMOUTH	G3LET	G3LIK	G3JFF	G3BZU	G0LKO	7417
18	FARNBORO' & DARS 'A'	G3OLB	G4BJQ	G0HIN	G4JFN	G4ISK	7263
19	SRCC (CROYDON) 'A'	G3BFP	G6LX	G3MCX	G4GTO	G4DDY	7257
20	MAIDST'N YMCA ARS 'A'	G3TRF	G3OHP	G3ZYV	G3ZSU	G4AXD	7182
21	S MANCHESTER RC 'A'	G3SVW	G3PFZ	G4HON	G0LZL	G3FNM	6745
22	RNARS LONDON 'A'	G4BOU	G3LCS	G3BBR	G4FRN	G0BDC	6534
23	NORFOLK ARC	G3PDH	G4ODC	G4DYC	G4GVR		6517
24	TORBAY ARS 'A'	G0CEL/P	G4ELZ	G3LHJ	G3HFG	G3MIR	6509
25	ECHELFORD ARS 'A'	G3KKQ	G3MCK	G4TSH/P	G4GSC	G3EAO	6207
26	RNARS BIRMINGHAM	G4SFO	G4TNI	G4IP	G4KNM/P	G4NCY	6120
27	MAIDENHEAD & DARC	G3WYK	G3TWG	G3IOF	G3PQA	G3LVW	6075
28	RAFARS YORK	G2AFV	G3JGB	G3IGU	G0BOX	G3ISL	5890
29	FLIGHT REFUELL'G ARS	G4RFR	G3VMO	G3PFM	G0NLM	G2BDV	5637
30	HALIFAX & DARS	G3IGW	G2UG	G4GLL	G3ONQ	G4RAW	5451
31	SCUNTHORPE ARC	G3PDL	G4OGB	G3KNU	G4NFX	G4WZV	5432
32	PLYMOUTH RC 'A'	G0IVZ	G0JNZ	G3ULN	G4BLI	G4OFR	5421
33	GUILDFORD & DRS 'B'	G3KZR	G5OD	G3EIZ	G4BCY	G3ZDD	5331
34	RNARS MIDDLESBORO'	G3HKO	G3AWR	G4SSH	G4FCH	G3MXZ	5270
35	STOCKPORT RS 'A'	G3HQH	G4FAS	G4ECI	G0JQI	G3GMM	5211
36	RAFARS HALTON	G3XRX	G4SQC	G3III	G4SNQ	G4PSH	5198
37	CLIFTON ARS	G3JJZ	G3BSN	G3GHN	G4TJE/P	G0HUZ	5105
38	LICHFIELD ARS 'B'	G3VHB	G0AYN	G0NXA/P	G4CBQ		5028
39	READING & DARC	G3XTT	G3WGV	G4ELY			4880
40	MARTLESHAM DX & CG	G4PIQ	G3XDY	G4HUP			4879
41	SUTTON & CHEAM RS	G4HSD	G3DCZ	G0CPE	G0GZQ		4874
42	SOUTHGATE ARC 'B'	G0IDA	G0ASA	G3YRW	G0FQT	G3GUL	4435
43	CHESHAM & DARS	G3VRY	G3XZG	G3NCL	G3AYS		4285
44	YEOVIL ARC	G3GC	G4JBH	G3CQR	G0HDJ	G3FQO	4261
45	AYLESBURY VALE RS	G3YLC	G3KLT	G0KLH	G0CUT		4220
46	AXE VALE ARC	G3HAL	G3VW	G3DIC	G3FFH	G4WBX	4200
47	THAMES VALLEY ARTS	G3OXC	G3OGP	G3GN			4108
48*	ABERDEEN ARS	GM4SID	GM3VEY	GM3DZB	GM4AFF	GM0MYV/P	4094
49	BROMSGROVE & DARC	G3MRC	G3RLF	G4IVJ	G2CLN		4064
50	RAFARS SEALAND	G0CGV	G5ND	G3LDT	G8GG		4007
51	CHELTENHAM ARA 'B'	G4ENA	G4MEM	G3ZKN	G3LVP		3898
52	RAFARS LOCKING	G8FC	G2FIX	G3FVC	G0HKC		3887
53	VERULAM ARC 'B'	G4SUP	G0NND	G4EYR	G0IAL		3566
54	HORNDEAN & DARC	G4OFG	G0MBQ	G3COO	G4BEQ		3497
55	RNARS BRISTOL	G3LZK	G3SWH				3430
56	GLOUCESTER ARS	G4YYR	G3MA	G0ECJ			3290
57	PRESTON ARS	G4KGK	G4OOT	G3DWQ			3280
58	RNARS LIVERPOOL	GW3JI	G4HWK	GW3IVX	G4RBE		3027
59	RNARS BARROW	G3IZD	G4USW	G3KKJ			2994
60	LEICESTER POLY 'C'	G5MY	G4GLC	G0BHS			2841
61	RNARS LOWESTOFT	G4KDL	G0DID	G8NT			2660
62	RNARS PLYMOUTH	G3VNG	G4AMT	G3AQM			2644
63	RNARS NOTTINGHAM	G3TTH	G4MQM	G4UUH			2630
64	RNARS SWANSEA	GW4XQK	GW4HDB	GW4KVJ			2467
65	SHEFFORD & DRS	G4DRS					2260
66	RAFARS WADDINGTON	G3FPB	G3NHF	G0KUC	G0MHP		2241
67	RAFARS CLEVELAND	G3MEA	G3ATU	G4PUI	G4XJV		2221
68	STOCKPORT RS 'B'	G4SYC	G0AMY	G0HAL	G4GRU	G0GDN	2217
69	MEIRION ARS	GW3SB	GW0MYK	GW4PHB	GW0MMW	GW3GKZ	2017
70	RNARS LONDON 'B'	G3YYF	G8IB	G3OZY			1967
71	FARNBORO' & DARS 'B'	G4IZB	G3VIR	G3AID	G0HNA		1941
72	LEICESTER RS	G3TQF	G0ATR	G3LRS			1824
73	GRIMSBY ARS 'B'	G4PYD	G4CFO/P				1781
74	RNARS ROSYTH	GM3UM	GM3HUN				1718
75	SOUTHDOWN ARS	G3AGF	G3ZFE	G3DQY			1617
76	GREENOCK & DARC	GM3YOR					1504
77	ECHELFORD ARS 'B'	G3WPK	G3XTZ	G3JUL	G0IPD		1210
78	CHESHUNT & DARC	G3TIK	G3WFM				1120
79	S. MANCHESTER RC 'B'	G3VIW	G0CBJ	G4BZO	G0NID		1111
80	STEVENAGE & DARS	G4DDX	G4ISO				1010
81	HAVERING & DARC	G3JSR					850
82	EDGWARE & DRS 'B'	G0IGP					774
83	HARWELL ARS	G0ADH					740
84	RNARS THURSO	GM3CFS					710
85	SRCC (CROYDON) 'B'	G8TB					707
86	GUILDFORD & DRS 'C'	G8GS					660
87	ARIEL RADIO GROUP	G2BCI	G3COJ				620
88	TORBAY ARS 'B'	G3SNU					570
89	HEREFORD ARS 'B'	G4UZK					280
90	RNARS PORTLAND	G4ZIY					277
91	PLYMOUTH RC 'B'	G0MQD	G0KYE				260
92	MAIDST'N YMCA ARS 'B'	G4ZXI					204
93	STOCKPORT RS 'C'	G3NOM					40

¶ Edgware Trophy
* Certificate of Merit

1	+	G4DJX	2724
2		G3KDB	2700
3		G4MCC	2677
4		G3RTE	2651
5		G3OAY	2630
6	=	G3SJJ	2614
		G3LNS	2614
8		G4BUO	2537
9		G3LET	2530
10		G3CWI	2520
11		G3NKC	2497
12		G3XTT	2470
13		G3ORY	2421
14		G4MBC	2404
15		G2BAP	2378
16		G3SDC	2330
17		G3UFY	2324
18		G3SJX	2317
19		G4RFR	2310
20		G3NKS	2281
21		G3SYM	2270

22		G4ARI	2261
23		G4DRS	2260
24	=	G4GIR	2254
		G5LP	2254
26		G4ALE	2240
27		G3WGV	2230
28		G4CNY	2218
29		G3TBK	2200
30	=	G3MXJ	2190
		G4ODC	2190
32		G3PDH	2167
33		G3KKQ	2160
34		G3GRO	2137
35		G4PIQ	2128
36		G4ZVJ	2100
37		G3PSM	2095
38		G4FAM	2090
39		G3BFP	2080
40		G3HVX	2070
41		G3JJG	2064
42		G3WYK	2047

43		G3RWL	2040
44	=	G6LX	2030
		G3OLB	2030
46		G4JGV	2011
47		G4BJM	2004
48		G3UJV	2000
49		G0CMM	1977
50		G3JKF	1970
51		G3SVW	1954
52		G3RXP	1950
53		G3GLL	1930
54		G4PDQ	1927
55		G4EOF	1905
56		G3LIK	1900
57		G3YEC	1890
58		G3PDL	1874
59		G3OXC	1860
60	=	G3WSC	1850
		G3RQZ	1850
		G3SFG	1850
63	=	G4ZFE	1840
		G4BOU	1840
65		G3LZK	1820
66		G3XDY	1811
67	=	G4KGK	1810
		G3MRC	1810
69		G0IVZ	1797
70		G3VMO	1780
71		G3YAJ	1770
72		G0AYN	1750
73		G3RSD	1747
74		G3FKH	1730
75	=	G4IUZ	1720
		G4OGB	1720
77		G3ZVW	1718
78		G3VHB	1708
79		G3OGP	1701
80	=	G3JJZ	1700
		G3OHP	1700
82		G2AFV	1690
83	=	G3IGW	1681
		G3PFZ	1681
85	=	G3FXA	1680
		G3ZYV	1680
87		G3TRF	1677
88	=	G4EBK	1661
		G3TNO	1661
90	=	G3ASR	1660
		G2UG	1660
92		G3KTZ	1651
93		G3YLC	1640
94		G0EFO	1620
95		G4CZB	1617
96		G3SWH	1610
97		G8FC	1590
98		G3SHY	1580
99		G3GC	1557
100		G4ALR	1551
101		G3JFH	1547
102		G3VRY	1540
103		G0HIN	1534
104		G4HZV	1530
105		G3YXX	1524
106		G3XRX	1520
107		G3DCZ	1517
108		G3VYI	1510
109	=	G0IDA	1504
		GM3YOR	1504
111		G4KZD	1493
112		G3RLF	1484
113	=	G4TNI	1470
		G4HSD	1470
115		G4LZB	1457
116	=	G4SFO	1440
		G3IZD	1440
118		G3XZG	1437
119		G3JKB	1430
120		G3YVR	1420
121		G4SQC	1410
122		G3PJX	1407
123		G3KZR	1397
124		G4YYR	1390
125		G4ELZ	1387
126		G0CEL/P	1382
127		G3HJF	1360
128		G4BJQ	1349
129		G3ZSU	1344
130		G3JFF	1340
131		G3MCK	1337
132	=	G3OWO	1330
		G3LHJ	1330
134		G4XEN	1320
135	=	G3JGB	1300
		G4JFN	1300
		G4HMD	1300
138	=	G3IGU	1290
		G4FRN	1290
		G3MCX	1290
141		G3HQH	1287
142		G4GKA	1270
143		G3BBR	1267
144		G4SUP	1261
145	=	G4DYC	1260
		G3HAL	1260
147	=	G5MY	1250
		G3HFG	1250
149		G4BXS	1242
150		G3AWR	1220
151		G4OFG	1210
152		G3BSN	1208
153		G3LCS	1200
154	=	G4ENA	1190
		G3TTH	1190
156		G4FAS	1187
157		G3EIZ	1180
158	=	G0JNZ	1170
		G3KLT	1170

160		G5OD	1167
161	=	G3TWG	1160
		G3MIR	1160
		G4HON	1160
164	=	G3GHN	1150
		G0IBN	1150
		G3HKO	1150
167	=	G4GTO	1137
		G3ULN	1137
169		GM3UM	1130
170		GW4XQK	1120
171		G3BZU	1117
172	=	G4KDL	1110
		G3IOF	1110
		G4TSH/P	1110
		G3AGF	1110
		G4IP	1110
177		G4SSH	1100
178	=	G0CGV	1090
		G4ECI	1090
180		G4KNM/P	1080
181		G3VW	1077
182		GM4SID	1070
183		GW4HDB	1060
184		G3KNU	1057
185	=	G4FCH	1050
		G4ISK	1050
187	=	G0LZL	1030
		GW3JI	1030
189		G4USW	1024
190	=	G4NCY	1020
		G0NND	1020
		G4GLL	1020
193		G4MEM	1014
194		G3MA	1000
195		G0CPE	997
196		G0CUT	990
197		G4PYD	981
198		G3LDT	980
199		G5ND	970
200	=	G4HWK	967
		G8GG	967
		G3PQA	967
203		G2FIX	960
204	=	GW3SB	950
		G4JBH	950
206		G4HUP	940
207		G0BDC	937
208	=	G4IFB	930
		G3PFM	930
		G4BLI	930
211		G3FNM	920
212		G3VNG	914
213		G3FPB	901
214	=	G4GVR	900
		G0ECJ	900
216	=	G4MQM	890
		G4AMT	890
		G0GZQ	890
		G0NXA/P	890
220		G4BCY	887
221		G0DID	880
222	=	G3CQR	874
		G3ZKN	874
224	=	G4GSC	870
		GW3IVX	870
		G3YYF	870
227		G0MBQ	860
228	=	G3III	857
		G4EYR	857
230	=	G3JSR	850
		G4SNQ	850
232		G4GLC	844
233	=	G3FVC	840
		G0BOX	840
		G3AQM	840
236		G0ASA	837
237		G4IZB	831
238	=	GM3VEY	827
		G0JQI	827
240	=	G3GMM	820
		G3LVP	820
242		G3TQF	817
243		G3YRW	807
244	=	G4CFO/P	800
		G8IB	800
246		G3LVW	791
247		G4AXD	781
248	=	G4OOT	780
		GM3DZB	780
250		G0IGP	774
251		G3ISL	770
252	=	G3MXZ	750
		G3COO	750
254		G0BHS	747

255	=	G3ATU	740
		G0ADH	740
257		GM4AFF	737
258		G3EAO	730
259		G4DDY	720
260		G3DIC	717
261		G3MEA	711
262		GM3CFS	710
263		G8TB	707
264	=	G4SYC	700
		G3ZDD	700
		G0FQT	700
267		G3DWQ	690
268	=	GM0MYV/P	680
		G4CBQ	680
270		G4BEQ	677
271	=	G3NHF	670
		G8NT	670
273		G8GS	660
274		G3NCL	658
275		G3AYS	650
276		G0ATR	640
277		G3FFH	630
278		G4JSN	627
279	=	G4TJE/P	620
		G4DDX	620
281		G4NFX	614
282	=	G3ONQ	590
		G3TIK	590
284		GM3HUN	588
285		G3GUL	587
286		G3SNU	570
287		G4PSH	561
288	=	G4UUH	550
		G0KUC	550
290		G3GN	547
291		G3VIR	540
292	=	G3KKJ	530
		G4PUI	530
		G0AMY	530
		G3WFM	530
		G0LKO	530
297		G4WBX	516
298		G3AID	510
299		G4RAW	500
300		G0HKC	497
301		G4IVJ	490
302		G3FQO	450
303	=	G0HAL	430
		G0HDJ	430
305		G0IAL	428
306		G0HUZ	427
307	=	G3VIW	420
		G0KLH	420
309		G4ISO	390
310		G4OFR	387
311	=	G2BCI	380
		G3XTZ	380
313		GW0MYK	377
314	=	GW4PHB	370
		G3WPK	370
316		G3LRS	367
317		G4GRU	347
318		G0NLM	320
319		G0CBJ	311
320		G3JUL	300
321	=	G2BOV	297
		G3OZY	297
323	=	GW0MMW	290
		G3ZFE	290
325		GW4KVJ	287
326	=	G4UZK	280
		G2CLN	280
328		G4ZIY	277
329	=	G3COJ	240
		G4XJV	240
		G4BZO	240
332		G3DQY	217
333		G0GDN	210
334		G4ZXI	204
335		G4ELY	180
336		G4WZV	167
337	=	G0IPD	160
		G0MQD	160
		G4RBE	160
340		G0NID	140
341		G0MHP	120
342		G0KYE	100
343		G0HNA	60
344		G3NOM	40
345		GW3GKZ	30

+ Marconi Trophy
Checklogs received with thanks from G3SXW and G3BPM

BANBURY QUALIFYING EVENT

Date: 14 July

Map: 151 (Stratford upon Avon)

Assembly: 1300 for start at 1320BST

Location: Kineton High School, NGR 342510

Competitors requiring tea should notify Graham Nicholls, 64 Mascord Road, Banbury, Oxon, OX16 0NB; Tel: 0295 265492, no later than 7 July.

MID THAMES QUALIFYING EVENT

Date: 28 July

Map: 153 (Bedford & Huntington)

Assembly: 1300 for start at 1320BST

Location: Maulden Woods (Lay-by on A6) NGR 073395

Competitors requiring tea should notify Peter Lisle, tel: 0234 267000, no later than 21 July.

LOWE-FLYING AT CUMBERNAULD
All day - every day!

We are very pleased to announce that we have now moved our Glasgow shop from Queen Margaret Road to a new centre at Cumbernauld Airport. It is a sparkling new showroom inside the main airport terminal building in which there is also a restaurant and bar on the first floor where the family can enjoy some refreshment whilst watching the aeroplanes; an excellent way of allowing you to browse around and try out the rigs at your leisure in a superb noise-free environment.

Now here's something we know that many of our customers will really like!! **We are open seven days a week!!**

Great products - unequalled service - open countryside!

So a visit will make a great weekend outing in lovely country surroundings. The centre will be run by Sim GM3SAN but he's going to need some help from one or two part-time enthusiasts to maintain the 7 day service! If you are interested, please give him a call on 0236 721004.

We've left the best 'til last! **Come and fly Lowe at Cumbernauld. As a special offer to celebrate our move, we will give a free trial flying lesson to all customers spending over £300 in a single purchase during the first two months.** That's an offer you will not find anywhere else!

How to find us

Just follow the signs to Cumbernauld Airport from the main A80.
Our shop is the first thing that you see as you walk into the main airport terminal building. It's that easy!

LOWE ELECTRONICS LIMITED

Cumbernauld Airport Main Foyer, Cumbernauld, Scotland Tel: 0236 721004

S.E.M.

UNIT R, UNION MILLS, ISLE OF MAN
Telephone: (0624) 851277

S.E.M. Q.R.M. ELIMINATOR MKII. This device can phase out completely local interference of any kind. Connects in your aerial feeder and covers 100 KHz to 60 MHz, you can transmit through it, £98.50 incl. Ex-stock.

HI Q RECEIVER AERIAL MATCHING UNIT. Provides a high selectivity impedance match for wire or co-ax aerials to your receiver £66.50 incl. Ex-stock.

S.E.M. TRANZMATCH MKIII. The only Aerial Matcher with UNBALANCED and TRUE BALANCED OUTPUTS. 1kW 1.8-30 MHz, £165.00 Built-in EZITUNE (see below), £55. Built in Dummy Load, £10.90.

EZITUNE. Allows you to TUNE UP on receive instead of transmit. FANTASTIC CONVENIENCE. Stops QRM. Boxed unit, £59.50 P.C.B. and fitting instructions to fit in any ATU, £55.00.

FREQUENCY CONVERTERS. V.H.F. to H.F. gives you 118 to 146 MHz on your H.F. receiver, Tune Rx, 2-30 MHz, £77 ex stock. H.F. to V.H.F. gives you 100 kHz to 60 MHz on your V.H.F. scanner, £66.50 ex stock. Plug in aerial lead of any receiver. Tuning from 100 MHz up.

2 or 6-METRE TRANSMATCH. 1kW, will match anything, G2DYM or G5RV? on VHF. £55.00 ex stock.

DUMMY LOAD. 100W THROUGH/LOAD switch, £38.00 ex stock.

VERY WIDE BAND PRE-AMPLIFIERS. 3-500 MHz. Excellent performance. 1.5 dB Noise figure. Bomb proof overload figures. £45.00 or straight through when OFF. £55.00 ex stock.

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FOR SALE

160M dipole possible! .5 acre QTH with 42ft mast, trap dipole and rotator overlooking farmland. No neighbours, TVI or mains interference. Large 3/4 bed bungalow 3 miles station, 55 mins London. No chain: £125,000. G3PAL QTHR (Colchester) 0206 270370.

20 YRS Radcom 1971-1990 complete. Also Ham Radio Today Jan 86 - July 90. Offers. (Battle) 0424 893078.

ATU L-coupler 80-10m well made: £35. QRP Tx/Rx 1-2W CW O/P single band 3.5, 7, 14MHz: £35. G3KZU QTHR (Oxford) 0865 63000.

BARGAINS, bargains, bargains. I have 2 garages full of electronic components, valves, chassis, PCB's equipment, cable, hardware etc. Lots brand new. Far too much to list and no free time to do so anyway. Call to view, browse and get loads of bargains. Must be millions of items. Cash and carry for callers only or sell lot for £2,000. (Birmingham) 021 472 3688.

BNOS 432MHz 100W linear 10W input with preamp: £185. Also microwave modules 144MHz 200W linear with preamp 3, 10 or 25W input: £225. G4NTY QTHR (Manchester) 061 790 7673 (after 6pm).

BUTTERNUT HF6VX 12 mnths old: £105. Diamond CP5 HF vertical with radials: £80. Morse key and oscillator: £15. Datong FL3 m/mode filter as new with MPU mains adaptor: £120. G0OPG (Wilmslow) 0625 531154.

BUTTERNUT HF6VX 6 band vertical antenna as March RadCom, vgc: £125. Hewlett Packard 2392A terminal VDU complete with keybd: £25. Hi-Mound autokeyer UFO-001, variable speed/volume, mains or 12V DC, dot memory, monitor, circuit etc, new: £30. 5-ele 2m Yagi antenna: £15. Cushcraft 10-3CD 3-ele IOM monobander, as new: £75. Ray G0JOD QTHR (Lincoln) 0522 750316.

CAPACITORS, paper dielectric 350V or higher. Sufficient qty to total about 1000MFD. Chris 4GDW QTHR (Hemel Hempstead)' 0819 501108 (W) 0442 242817 (H).

DATONG Morse tutor plus four books: £39. Lake DTR7 40m QRP rig, works a treat: £55. Unbuilt Howes kits - AA4 scanner antenna: £15, ST2 sidetone: £5.50. CVF20 VFO: £7.50, HC280 2m to 80m tnsvtr incl case: £42, unbuilt Spectrum PT1000 piptone: £2.50, HC25V xtals, 3560, 7030, 10106kHz: £2.50 each. W+D 50MHz Tx, xtal and main components: £15. G0OIW (Reading) 0734 483593.

DENTRON tcvr HF200A: £275. Heathkit linear amp SB200: £250. Trio 700G 2m base station: £250. Daiwa CNW419 ATU: £100. Icom IC505 50MHz tcvr: £300. Jaybeam TB3 tribander: £250. Daiwa rotator: £150. All in ex cond and with manuals. G4VNG QTHR (Peterborough) 0733 231639.

EX-RAF aircraft Morse key circa 1922, has spark gap window Ref No RAF1969 - offers. G3JFC 0474 872743.

FT980 tcvr, ex condx: £800ono. Buyer invited to check and collect or carr extra. GW0KYY QTHR (Swansea) 0792 794667.

IFT101ZD fan, mic, manual, WARC, looks like new, used as driver for linear on 25W CW mostly: £400. G4YNG QTHR (Kettering) 0536 524577.

FT101 Mk2 10-160m G3LLL RF clipper new matched pair 6JS6C's also NEC 12BY7A driver, gd condx: £325. 10m FM spectrum conversion 4W: £35. G4PAC QTHR (Kingsclere) 0635 298537.

FT101ZFM MkIII WARC CW(N)/FM filters mic manuals bxd fan, immac: £390. M/mode FTV901R tnsvtr matches above 6/2/70cm immac manuals: £420. IC2E 2m h/held mint: £90. Scanner SX200N vgc: £150. Commodore C128 computer 1571 d/drive 1901 monitor (with £300+ programs): £290. MPS802 printer: £70. MPS801 printer: £40. All wking perfectly. All ono. RTTY/TU ST5: £30. Conversion pack FTV901R for FT980: £10. (Buckie) 0542 32093.

FT757GX Tx/Rx: £500. FTV107R tnsvtr 2m fitted, all leads to run from FT757GX: £110. FT290 Mk1 SP/mic new ni-cads 25W linear and pre-amp: £245. TAU SPC3000 ATU large and heavy: £85. Two Pye signal generators SG3V VHF SG5U UHF. Carr extra on all items. (North Walsham) 0692 402479 (after 6pm or wkends).

ICOM 725, nearly new, perfect, used only short /P trips last year: £600ovno. Mike G4WQL QTHR (nr Redruth) 0209 890450 (eves).

ICOM 751 built-in power supply mic and manual: £550. Linear amp Tokyo Hy-Power HL-1K 1kW input, recently serviced: £350. (Reading area) 0734 693284 (eves).

JST135 HF tcvr: £795. Icom 275H 100W base 2m: £680. 160m adaptor for Butternut HF6V: £40. Malcolm G0HOG (Ruislip) 0895 676919.

KENPRO KR-400 antenna rotator, as new, bxd and unused: £100. Would prefer buyer collects. Mervyn G6AGI QTHR (New Romney) 0679 64060.

KENPRO Rotator 600RC, all fittings, top support bearing, gwo: £95. 2m xtal h/held 6xtals, works well, 2W chgr: £50. (New Brighton) 051 639 5922.

KENWOOD TS520 with 500Hz CW filter and matching TV502 2m tnsvtr: £350ono. Jim G4MEZ (Newport Pagnell) 0908 611810.

KENWOOD TS530S, mint condx, handbk, orig packing, one owner: £525. G3YNC QTHR (Romford) 0708 749175.

KENWOOD TS940S mint mic boxes etc: £1400. Drake TR7 RV7 PS7 mint: £600. Mosely Mustang 3el tribander: £95. 0566 773010.

RACAL RA17L comms rcr 0-30MHz in matt black steel case, C/W manual & cct diag: £200. Tektronix 581A Scope dc-100MHz dual trace, works but needs attn: £50. Mike G4THN QTHR (Wokingham) 0734 774042.

RECEIVERS' NRD525: £625. Drake R7A: £595. Icom scanner IC7000: £675. Pocom AFR 1000 radio-teletype decoder plus Hantarex VDU: £325. (Northampton) 0604 718707.

SCANNING monitor Rx SX200: £100. Trio communications Rx JR60: £60. 0278 426991.

SILENT Key FT102 BNOS 2m power packs test equipment etc. Mrs Laurie (St Austell) 0726 822734 (eve).

SONY ICF2001D, as new: £200. Trio 7200G 2m tcvr: £70. Trio JR310 HF Rx: £70. Electron computer: £25. Spectrum 48K computer: £25. 9in green screen monitor: £15. G3VXI QTHR (Lincs) 0507 480382.

STAR Masterkeyer MkII: £40. AEA micropatch MP64 TU, suit C64 RTTY CW ASCII Tx/Rx: £75. Kenpro KT22E h/held 2m only 5 mnths old: £120. Himound paddle, marble base: £20. All with boxes, mans, etc. G4ZVS QTHR (Birmingham) 021 444 7804.

TRIO TS830S HF tcvr, new valves, ex cond. AT230 ATU and MC50 mic, new spare set valves: £875. G0IXR QTHR (Nottingham) 0602 212967.

TWO BED semi cul-de-sac, lge gdns, gas ch, CW 60ft tiltover tower, planning perm any size aerials, St Helens Warrington area. (Newton-le-Willows) 0925 225829.

WIRELESS World 1949 to 1982, fantastic radio history. 19 set mains internal PSU TS940 voice synthesizer. Antenna bits - Hatfield 6-way coax switch. HQ1 minibeam damaged for spares/rebuild. Dipole 'T' piece baluns. FT290 rubber duck. 70cm triple 5/8**LAMBDA**, gutter mounts. QQV06-40A with base, Sinclair Z12 amplifier, LP1156 IF Unit. Trnsfmr 2 x 6.3V @ 15A. 1000KHz crystal, 1000KHz oven, 8MHz crystals. Offers please to Tim Price G4YBU (Epsom) 081 393 9691.

YAESU FRG9600 MKS Rx 100kHz 950MHz no gaps all mode 100 memories, ex cond: £425ono. Will deliver. Chris G4EJD not QTHR (Stone, Staffs) 0785 81179.

101ZD MkIII WARC bands mic manual bxd ex cond: £445ono. G0GUL QTHR 0203 450476.

122 YEAR Lease. 3ele Jaybeam on top 6-storey purpose built ground floor 2-beds close Putney Heath: £63000ono. G4YMK not QTHR 081 785 7058.

12AVQ 10-15-20m vertical: £37, buyer collects. YK88C CW filter Kenwood Trio: £35. G3VWH (Shrewsbury) 0743 365061.

132FT long wire possible! QTH 3-bed semi, cnsvtry, long garden, urban setting, fertile soil, rotovator, garage, sea! G3DGT not QTHR (Portchester) 083 483 369.

2M CLEAROUT. 3x5/8 colinear: £15. Revco 5/8 whip/base, new: £10. 7/8 whip/mount: £10. 3/25W PA module, unused: £10. Ambit monitor Rx module (xtal), circuits, new: £15. 70cm 2x5/8 colinear, new: £10. Small rotator, new: £25. UHF 6-way remote antenna switch: £25. RT1A RTTY/CW terminal, self-contained, vgc: £49. N-type coax relay 26V: £10. Post extra or local delivery. Jeremy G8MLK QTHR (Virginia Water) 0344 842275.

30FT FIXED lattice tower: £120. Heathkit RLC bridge: £30. MM70MHz cnvrtr with LO: £20. 444 teleprinter: £20. Prefer buyers collect. (nr Grantham) 0400 73185.

3ELEMENT HF tribander, Jaybeam TB3, ex cond, used one year only. G3SJH QTHR (Birmingham) 021 427 111.

40FT self supporting, two section galvanised steel tower. Tapered, very sturdy, with steps etc: £150 or offer. Must sell. (Stowmarket) 0449 675330.

600FT ASL, Dartmoor National Pk, 3 miles A38, 5-bed, 3 recept period stone cottage, old fireplaces and features, half-acre gdn, dble garage, separate shack ex newsreader's QTH, one of the best VHF/UHF locations in Devon. £145,000. G3PBV QTHR (Totnes) 0803 864569 (day).

A BARGAIN here. Icom IC-255 2m 25W 2W tcvr 144-145MHz Tx 143-148MHz Rx: £140. QTH Kirkham, Preston 0772 683098.

ALTRON 45ft tilt over wall mounted tower: £300. Good cond, buyer collects. Sorry no offers please. (Epsom) 081 330 0142.

ALTRON AQ6-20 3ele 4 band HF beam: £120. FT290R C/W ni-cads chgr case etc: £175. Both gd condx. Ron G4YYH QTHR (Camborne) 0209 718021.

ANTENNAS 160-2m and Icom station optional with 3-bed modern detached bungalow, 26ft lounge, bthrm with shower, 2nd WC, gch, dg, 25ft grge, consvtry, nr golf crse, 12 mins promenade, Gorleston, Great Yarmouth: £89,000 onr. G4OWV QTHR (Gt Yrmth) 0493 663195.

ANTENNAS 2nd hand 18AVT vertical, orig box and instructions, perfect when taken down. New, boxed 6m Tonna, never used. Ken G0HJA (Horsham) 0403 52023.

APRICOT software - Datamaster relational database package (create your own log!), trans-send comms package (ideal for packet), Zorland C, Borland turbo pascal, Borland turbo tutor, Borland database toolbox, iankey (keybd skills trainer) plus 3 games incl Othello, Hitchhikers Guide to the Galaxy and Adventure. All orig with appropriate documentation. No splits: £49.95. Datong D70 Morse Tutor as new: £35. G7BFC not QTHR (Okehampton area) 064 723 423.

ATLAS Z10. 3.5-3.8 7.0-7.2 14.0-14.35 21.0-21.375 28.4-29.6 tcvr with h/h mic. Also Atlas digital dial. No split: £300. G4AKD QTHR (Cambridge) 0954 782974.

BBC-B: £175. Apple II with FDD: £85. Spectrum 128: £75. Amstrad 1640: £325. IBM Displaywriter complete: £190. Drake TR4-CW tcvr: £325. (Rotherham) 0709 554665.

BUTTERNUT HF6V antenna: £95. Complete Packet stn - C64, ICS s/ware cartridge, PK88 TNC, Westminster 2m FM tcvr, cables: £225. Superscaf audio filter kit, unbxd: £85. Palomar tcvr preamp: £95. SB220 amplifier: £650. TS930 YK88C-1 YG455C-1 500Hz CW filters TS930 standard 2.7KHz SSB filters - offers. IC551 50MHz tcvr: £350. TS440S, 270Hz filter: £850. MFJ482 keyer: £50. Triband Yagi traps - offers. G4BUE (Brighton) 0903 814594.

C500E Standard 144MHz/430MHz h/held dual bander soft case spare nicad bttry pack desk top chrgr tone coded squelch and touch tone unit built in as new, 130/169.9 and 414/469.9 on receive, licensed amateurs only: £325. 081 669 5926 (after 6pm).

CAPCO loop AMA3: £200. Star masterkey MkII: £35. Trio 9R-S9DS Rx: £50. Datong FL3 filter: £80. (Stockport) 061 477 3912.

CAPCO magnetic loop AMA6 6-9-26.8MHz complete with control box, cable etc: £220. Dipole GM4HAT 4 band DD7/14/21/28MHz with incorporated capacitive balun 2kW PEP: £40. G0OPG (Wilmslow) 0625 531154.

CLEARANCE Sale: Trio R600, vgc: £160. Tronix 13.8V 5-7 amp PSU: £30. DTR-3 homebrew 80m QRP rig: £30. TU2 QRP ATU (HF) with built in SWR meter: £20. Datong D70 Morse tutor (ideal for novice): £40. Kent straight key: £25. V-1300 scanner antenna plus 30m low-loss co-ax: £50. The Lot: £325. D.L. Scott-White G6JOI (not QTHR) (Henfield) 0444 881520.

CLEARING load of junk. FR400 Rx: £40. FL400 Tx, output from driver, fault on PA: £40. Spkr: £10. Old 444 mic works superbly, looks awful (50K: £15. MX4 four metre QRP Tx/Rx fair cond: £50. Prefer buyer collect. GW4HBK QTHR (Blackwood) 0495 228516.

COLLINS KWM380 tcvr with most options fitted: £1750. Linear for serious DXers ETO Alpha-78 broadband linear. No tuning when

changing bands and 2KW output to put you on top of any pile-ups: £1750. The pair for £3250. KLM KT-34XA 6-ele tribander: £450. CDE Ham-III rotator: £150. Clarkes 50ft pump-up mast: £450. Going QRT due to pressure of work. (Kingston-on-Thames) 081 390 4817 (eves).

COLLINS MP-1 brand new R/E but 20 years old. Run 'S' Liwe or KWM2A mobile from 12 volts. Power unit. Offers. (London) 071 736 6581.

COMMODORE 64 plus 1541 disk drive, C1084 colour monitor, interface/software supporting PK232 varied data/satellite software: £250ono. G3POX QTHR (Huntingdon) 0480 811549.

COMPLETE stn. Kenwood TS830S ant tuner AT230 remote VFO240 ext spkr SP230 manuals spare valves 3x6146B ant selector switch long wire ant for 80m aluminium pole Morse key bug key 1:1 balun various other items: £875. (York) 0904 410385.

COMPUTER systems (80286) IBM/AT 20MbHD, Hercules monochrome: £450. Philips VGA monochrome, 46MbHD, 1MbRAM: £550. VGA colour system also available (IBM). (St Albans) 0727 865402.

CREED manuals & parts lists, IEEE "Spectrum" & "Proceedings". I will donate to genuine training scheme or technical library. Too good to recycle yet! G8LT QTHR (Towcester) 0327 860321.

DATONG ANF automatic notch filter: £54ono. Datong SRB2 woodpecker blanker: £69ono. Both mint, bxd, with instructions and psu's. (Cardiff) 0222 465463.

DRAKE TR4-CW HF tcvr, matching spkr, desk mic, speech processor, perfect order: £325. BBC-B computer: £150. Apple II computer with extras: £85. Spectrum Plus 2: £75. Commodore 64 with d/drive, printer, light pen and more: £250. All perfect order, with manuals. G4NMP (Rotherham) 0709 554665.

DRAKE TR7, PSU PS7, SP75, speech processor, Drake desk mic, all manuals incl wkshop man, all bxd and in vgc: £750ono. 0895 630627.

DUE TO time wasters FT102, pristine cond with CW filter, bxd: £600. FC102 tuner, bxd, both with manuals. Trio TR7730 25W FM mobile + mobile mount, h/bk: £150. (Standish, Lancs) 0257 421442.

EI SALE TH3 beam rotator 75A4 Rx Trio 599 Tx Tower 40ft Tower 70ft Datong RF clipper D75 manuals. EI8BD QTHR 0503 41915 (day).

ERA microreader MkII decodes Morse and RTTY on screen, built-in Morse tutor, with full instructions, percfect: £100. G0LFD QTHR (Durham) 0388 720677.

FC757AT automatic antenna tuner box and manual: £199. No scratches or marks, gd cond. David G0KJP QTHR (Stone, Staffs) 0785 818422.

FL2100Z linear, mint: £525. YE7A mic, new, bxd: £10. Yaesu 24hr clock: £10. CDE AR40 rotator: £40. 4CX350 ex-eqpt: £15. (Staines) 0784 450947.

FR DX400 Amateur bands Rx: £90. Altron AQ6-20 4-band 3ele mini beam: £110. All ono. Barry G1VZW QTHR (Blackburn) 0254 581949.

FT101D mic fan FM board CW filter FV901DM FL2100Z not WRAC SEM Europa C 2m tnsvtr: £1000 the lot. Prefer not to split. GW3YTJ not QTHR (Gwent) 0633 255137.

FT101E MkIII tcvr, spare valves, DC lead, Fan mic. FV101B Ext VFO. Land-liner patch SP, YP601 digital meter readout or bench, m/mount, new unused, all with hd/books: £400. No split. John G0GPA QTHR (Doncaster) 0302 841530.

FT101ZD with FV101Z ext VFO, spkr, ATU and many other items, little used, bxd, mans etc: £600 the lot. G4VHW (Croydon) 081 657 0688.

FT227ZD FM MkIII (FT101ZD), all options fitted except DC/DC cnvtr, ex cond, little used, fist mic and Shure 444D desk mic AM board: £500. Yaesu FV101DM digital memory VFO, ex cond, matches above: £150. Yaesu FC902 antenna tuner, ex cond: £110. Yaesu FT280R similar to FT480R but with pip tone, fair cond, works vy well: £210. Microwave modules MML144/100S linear amp: £100 or PX MML144/100LS 3W in 100 out linear or similar. Marconi TF801 signal generator 10 to 400MHz with manual working: £25. Sinclair Spectrum 48K, Elite 3 keybd, disciple disk interface, amateur radio s/ware, lots of games, joystick, BREMI 3amp PSU, monitor output: £130. Green screen monitor: £35. Storno BU802 bttries: £3. Alex G0HWL QTHR (Farnborough) 0252 520227.

FT23R 2m FM h/held tcvr, 2.5W output, virtually unused, incl rechargeable bttries and chrgr: £150. G6ITY QTHR 0223 891997.

FT2700RH VHF/UHF dual band FM mobile tcvr, voice synthesiser, orig cond: £325. Dual band aerial with duplexer: £25. (Plymouth) 0752 775375.

FT290 R11 nicads chrgr case FL2025 25W amplifier, mint cond, all bxd, whip antenna isopole 2m vertical antenna: £420. G0NCV (Northumberland) 0434 632837.

FT290R nicads chgr .25 wave soft case, bxd as new: £210 incl post. Paul Albone G6DSM (Hitchin) 0462 435999 (eves only please).

FT707 HF mobile C/W Shure 401B mic, works well, ideal first rig: £300. Inspect/collect. Dave G0MJK QTHR (Northampton) 0604 711647.

FT727R dual band h/h 5W FNB4 nicad, chrgr, case, mobile whip and gutter mount, post paid: £280. (Bracknell) 0344 867406 (after 7.30pm).

FT747GX, two yrs old: £400. MFJ 949C tuner: £100. FT480R 2m m/mode: £250. TR2200GX: £60. All ono or possible exchange for photographic equipment. (Dynax compatible). G0JCN QTHR (Telford) 0952 616166.

FT767 HF tcvr as new, reluctant sale: £975. Also pair of 31 sets with handsets: £35. (Stanmore) 081 206 1390.

FT77 80 to 10m FM 100W: £325. TS9130 2m m/mode: £250. CapCo magnetic loop 10 to 20m: £160. (Barnsley) 0226 289578.

FT980, all mans: £900. FT209RH: £150. Dressler D200S: £750. Tonnas, new, bxd 2m.17ele: £50. 70/21: £40. MMTRV's 2m: £70. 70cm: £70. E6ZWS (Windsor) 0753 584003.

G-WHIP HF mobile antenna 20,15,10m auto band selection incl base mount with coils and whip for 40/80m, vgc: £60. G4TCQ (Worcester) 0905 641328.

GENERATOR Honda E2500 240V very little use, gwo: £250. Zetag-1 B132 3-30Mhz mains powered transistor linear 200W SSB, gwo: £70. (Worthing) 0903 40147.

GOING QRT. Yaesu FTONE, Yaesu SP767. Comax CD660, Marconi Marine Key, G Whip G8100 Antenna, 60 RadCom. No split: Offers around £1250. I am a swl only. (Taunton) 0823 254685.

HEATHKIT HW101 tcvr with power supply, gwo, complete with original papers and spares: £150ono. Gordon G8AKB QTHR (Wokingham) 0344 779135.

HEATHKIT HW8 Tx: £90. AR900 h/held scanner: £120. Military pattern Morse key: £15. Olympus micro cassette memo recorder: £25. Sinclair programmable calculator: £12. Rx cnvtr 28/144: £15. Howes 20m Tx. All PCB's built, incl sidetone, SWR-D.load, 10W CW: £50. Howes TRF3 Rx, fully built, cased, working: £27. Chassis punch set: £15. EK150 iambic keyer: £75. GDO: £25. G0MHQ QTHR (Cambs) 0733 230088.

HEATHKIT SB200 5-band linear 1200W PEP, mint, very little used: £305. G4DPY (Retford) 077 784 560.

HF MINIBEAM 5 bands 10/12/15/17/20 HF5B Butternut. Prefer buyer collects: £110. 081 942 1761.

HOKUSHIN HS-HF-5 5-band trap vertical antenna with ground plane, gd cond: £35. 2m 8ele cubical quad, gwo: £30. Straight brass key G4ZPY little used, bxd: £18. G0JTD QTHR (Swindon) 0793 823973 (eve/wkends).

HUSTLER mobile antenna C/W mount 10/80m: £65. BARTG ST5MC fitted C/W option: £60. BSR Monarch turntable 3 speed: £25. Audiotronic AM/FM stereo tuner: £20. Audiotronic amplifier (needs attn): £10. Two Wharfedale hi-fi spkrs: £25 offers considered. (Doncaster) 0302 857339.

IBM PC model 5150 with PK Fax and PC Pakratt green mono monitor: £250ono. G3JXR (Bletchley) 0908 642398.

IC ZZA FM tcvr, 22 chnnls, mic, mobile mount: £75. 075 486 452.

IC751A, never used, C/W, manual, receipt etc, still under mkrs guar, genuine reason for sale: £1350. (Maldon) 0621 855648.

ICOM 735 Tx/Rx with mobile AH2B Ant & tuner, all complete. Also matching indoor ATU - AT150, PS55 PSU, mint condx, with manuals & boxes. Operator now silent key: £1550ono. R Riddington G4IHT, 22 Knighton Grange Road, Leicester.

ICOM 745 tcvr: £600. AT500 ATU: £400. Ameritron AL84 HF linear 600W: £400. All mint. (Harrow) 081 907 7977.

ICOM AT100 ATU: £230. Ham Concorde II 10m conversion DTI approved: £130. SEM tranzmatch ATU: £75. All mint. GW1SSQ (Pontypool) 0495 757221.

ICOM IC22 XTLD 15 channels 7 rptr 6 simplex: £65ono. FDK multi palm sizer 2m PLL h/held 145 146MHz 25kHz channel steps +/- 600kHz t'burst C/W chrgr nicads, orig packing. GM8GCY QTHR (Fraserburgh) 0346 26111.

ICOM IC2SE extra bttry holder and comprehensive manual, bxd: £195. Peter (Portsmouth) 0705 596087.

ICOM IC4GE 70cm h/held: £150. CTE CT1600 (ICZE) 2m h/h: £100. Mizuho MX75 40m mini SSB/CW tcvr + CW mon: £70. SEM QRM eliminator: £30. Farnell 30A 13V Stab PSU: £50. 4CX250B bxd: £20 inc Collins "S" line. G3MBN QTHR (Bath) 0225 810621.

ICOM IC735, matching SP7 spkr, very little use, orig packaging, mic, manual, pristine cond: £750. Yaesu FT101ZD Mk3, FM, CW, filter, mic, service man, mint cond: £450. FV101DM external VFO, mint cond, manual: £165. Yaesu Y844 desk mic: £25. 10FM base station with 40W amp: £50. 10FM mobile: £30. All items in mint cond, most items orig packaging. G0NMP QTHR (Dereham) 0362 691099.

ICOM IC740 HF tcvr + FM unit, vgc, mic, manuals, boxes. Yaesu IP12 12amp PSU/spkr incl: £500. GW4RLP QTHR (Caernarfon) 0286 5264.

ICOM IC740, FM board, Curtis keyer, 4m tnsvtr: £430ono. Sony Air 7 scanner: £140. 4m PF2UB: £30. F9U UHF base station: £40. 432-28MHz cnvtr: £10. 300W (continuous) dummy load: £30. 70cm 48-ele: £30. 26-ele: £20. 2m 9-ele crossed: £20. Teal 144 portastudio: £320ono. RS coax relays: £5 each. Storno synthesised tcvr: £30. 70cm TV Tx/Rx: £30. 0749 840468.

ICOM ICR7000 scanner Rx: £650. IC726 hf+6m: £875 PX IC735. IC-3210E dual band: £350. SX62 rx: £75. FT-102 hf: £485. FT-227 2m fm: £100. CTE-I600 (IC2E) and IC4E: £130. Burndept BE-470 h/h 70cm working RB2: £45. TRI2E manual satellite rx: £100. NEC 60cm dish/1nb: £125. Alcoa 1.8m dish and mount: £250. Pye R-414/T-414 base 70cm solid state 230v psu: £35. Ringo Ranger 2m co-linear: £35. Consider PX WHY? G4AFY (Kidderminster) 0562 747480.

IRCs 40p each plus sae please. G4EZA, PO Box 2, Mablethorpe, Lincs LN12 1ND.

KENWOOD 215E almost new, three bttry packs plus chrgr, soft case: £190. (Greenford) 081 575 2671.

KENWOOD 2m h/held tcvr, new/bxd: £165. Racal RA17P Rx: £85. Hammarlund SP600 Rx: £75. Murphy type 618 Rx: £50. (Stevenage) 0438 813345.

KENWOOD TL922 linear, as new: £900. FT10Z FC102 SP102, all gd condx: £600. G0IBS QTHR (Bradford) 0274 835323.

KENWOOD TS-830S 9-band MC50 mic Kenwood AT-230 and SP230, all bxd, ex cond: £800. HF-125 Rx: £250. DL-1000 dummy load: £20. Hy-gain TH3JRS antenna C/W Daiwa DR-7600 rotator and Daiwa DC-7055 round preset controller. All hardly used: £400. c/o John G4WVV 0257 279762.

KENWOOD TS-950S, mint, as new cond, excellent performance: £1850. Reason selling given. Icom SM8 mic: £50. RF dummy load 20-120W 3in meter: £40. Drake 1kW low-pass filter: £10. BW model 371.1 wide range attenuator new: £10. Please no time wasters. 0386 41951.

KENWOOD TS140 + CW filt: £550. BNOS PSU: £100. Heath SB200 linear: £200. Butternut HF2V + 160m coil: £100. KW EZ1 match: £40. MM2 keyer: £30. Datong RFC: £30. Hansen FS5E power/SWR meter: £30. DNT 10/FM: £30. G4AMT QTHR (Cornwall) 0736 871560.

KENWOOD TS430 FT209RH h/held microwave 2m amplifier 10W in 100W out 2m to 10m tnsvtr Dawe output meter Capco ATU 2m super Rod 2 XLP-150 low pass filter atten. 70dB down & 54MHz above. 144MHz switched pream by microwave, all first owner. G4YUG (Ipswich) 0473 830147.

KENWOOD TS430S HF Tx CW SSB filters FMBD PS430 SP430 bxd manuals: £750. Will deliver reasonable distance. Mark G0LGJ (East Dereham) 0362 691099.

KENWOOD TS530S tcvr, gd cond: £550. Yaesu 2m m/mode FT290R, little used, nicads chrgr: £230. G0HRL QTHR (Kidderminster) 0562 850829.

KENWOOD TS530s. narrow CW SSB filters, Dewsbury FM fitted, de-luxe VFO KNOB: £595. HQ1 mini beam recently overhauled: £90. Stolle rotator, bearing: £80. 17over17 70cm antenna: £16. 8ele 2m antenna: £15. PK232 with mailbox as new: £280. TRS80 model 100 ptble computer, internal display, manuals, case: £99. 35ft steel and aluminium mast (buyer collects): £75. John G4MTR QTHR (Birmingham) 021 430 6764.

KENWOOD TS680 few hours use, as new: £750. Collins 7551 3251 516F-2: £500. KWM2A PM2 312B5 round emblem: £650. G4LW (Trowbridge) 0225 753166.

KENWOOD TS830S CW filter, VFO 240, AT230, Shure 444, mic, all first class condx with manuals: £900. Buyer collects. G3BII QTHR (Beaconsfield) 0494 675528.

KENWOOD TS930S, gwo, desk mic, bxd, books: £950. MFJ roller inductor 989B: £250. G4YIT QTHR (Peterborough) 0731 20268.

KEYER with two 1024 bit memories Kent twin paddle and nicad chrgr: £60. G3MEA QTHR (Durham) 091 373 4560.

KW2000B, PSU/LS, E-Zee Match, SWR meter, LP filter, mic, gwo: £250. Spectrum Rx/Tx - RTTY, SSTV, CW: £20. G3XON QTHR (Guildford) 0483 36953.

LOGIC analyser LA160 3X 8-bit variable voltage probes 4X 8-bit grabber sets. RS232 lead etc: £250 (as new). Signal generator LSG-17 to 450MHz: £50. Type II sound level meter (as new): £125. Baby Eddystone: £50. Chris Robinson G8BAL. (Lyndhurst) 0703 282366.

MARCONI CR100 Rx, wking order, spare valves, resistors, spkr: £35ono. Icom h/held IC-2E chrgr and case incl, also hd/book: £125ono. (Birmingham) 021 444 3114.

MICROPHONE Adonis compressor type AM-503G base stn model, high performance amplifier, SSB/FM, freq control, PTT, cable and info, mint: £25. (Barnet) 081 449 0877.

MICROWAVE modules 144MHz trnsvtr: £60. Datong RF clipper: £10. Howes CVF80 VFO unbuilt kit plus capacitor: £10. KW204 Tx SSB all band: £75. (Derby) 0332 834228.

MIZUHO QRP rig MX14S plus 14MHz whip extra XLS brand new unused, Silent key. Prefer buyer collects. (Gateshead) 091 4923862.

MODERN detached freehold 3-bed CHDG side double garage take 3 cars access boat caravan .75 acre landscaped, westower tribeam brick shack. (Sutton Coldfield) 021 353 1733.

MULTIBAND AQ 6-20 spacesaver beam complete with full assembly and tuning instructions: £50ono. G3MFU QTHR (Wisbech) 0945 589669.

PAKRATT 232 TNC no mailbox C/W cables manuals etc, ex cond, hardly used: £230 incl carr. (Alloa) 0259 213777.

PK232 USA model: £150. BBCB PK232 Eprom cassette joystick: £120. Dragon 32K cartridge G4BMK A'MTOR/RTTY: £40. Maplin satellite VHF Rx: £50. (Bletchley) 0908 642398.

PROPERTY late G4OOT. Uniden 2020 HF tcvr: £225. BBC Model 'B', DFS, Aeries B32 RAM. Cumana 5.25 drive, cased, PSU. Data recorder, JP101 printer, G3LIV RTTY int'face, b/w monitor: £225. ZX Spectrum, int'face 1, microdrive, wafadrive: £60. Tokyo hypower HC150 ATU: £60. Racal RA17 slight fault: £60. Heathkit 10-18U scope: £25. QMAX GDO: £10. Sky King rotator controller: £20. Contact G4KGK QTHR (Southport) 0704 24700.

PYE Europa 25W 3ch fully modded 4m, complete m/mount, .25**LAMBDA**.whip: £55. G4PWD QTHR (Rugeley) 0889 578981.

PYE SSB130 HF tcvr VFO fitted for 40m & 80m USB/LSB/CW 100W PEP power units 12VDC 24VDC 240VAC service manual: £165. 10m m/mode Midland 7001 full coverage no gaps frequency readout AM/FM USB/LSB DTI permit usual accessories: £130. G4ULR QTHR (Norwich) 0603 51656.

PYE Westminster 70MHz FM, crystalled 70.26/45: £30. A200 linear 70MHz, brand new: £45. Pye MF6AM reporter 70MHz: £20. 28/29MHz m/mode RA permit: £75. SEM 28/144MHz Europa tcvr: £30. Ditto 28/70MHz PSU: £20. Minolta EP300 modern photocopier, wking: £175ono. Collectors item, AN/GRC-9 US Army Tx/Rx 1950 vintage, all main accessories, full manuals: offers over £200. G3VKM QTHR (Norfolk) 050277 622.

RACAL Speedrace (plus spares) HF synthesizer tcvr: £300. 10m 4ele vertical and horizontal beam: £70. Racal RA17: £160. (Notts) 0602 732121.

RADCOMS, immac cond, Jan 70 April 91 (256 copies): £10. Buyer collects. G8EVK QTHR (Worthing) 0903 501502.

ROLLEIFLEX SLR camera, 50mm standard and 80-210mm zoom lenses: £165 or swap 70cm FM mobile rig or WHY? G3HCM QTHR (York) 0759 318408.

ROTATORS suitable VHF Hirschmann C/W controller and cable, bxd: £30. King-Rotor C/W controller and support bearing, bxd: £35. Hembro S/S discone, as new, bxd: £35. 6m 3ele beam, folds ideal portable: £15. VTX5000 modem for spectrum, bxd: £20. G1GQL QTHR (Hants) 0425 654946.

SEM iambic keyer: £37.50 incl carr. Ted G0LMJ QTHR (Horncastle) 0507 588219.

SHACK clearance. Yaesu FT101ZD FV101Z SP901: £400. SSTV scan tnsvtr, camera: £100. Wayne-Kerr LCR bridge: £50. QRO linear unfinished project: £75. QRO power supply complete: £125. 3x4-250: £30 Professional Rx (not working), Data: £50. Large oil-filled capacitor: £20. 70cm cnvtr: £20. 4m cnvtr: £10. 3x80MHz cavity filters: £15. 3x2MHz SSB crystal filters: £15. 2x30MHz crystal filters: £15. G4ACI (nr Wigan) 0695 622754.

SIGNAL R-532 airband scanner 100 memories plus 12V supply and discone antenna (new). Scanner mint cond: £130. Heathkit Osi scope factoryy built: £85. G3OJA QTR (Manchester) 061 445 1026.

SILENT KEY sale - offers invited for Kenwood 930S tcvr, built-in auto ATU and CW filter, purchased new August 1988, receipts available. Katsumi electronic keyer EK150. Yaesu FT 902DM tcvr. Ex GW0KFK. (Menai Bridge) 0248 712532.

SILENT Key sale G4PJM. Corsair 2 with 250Hz filter CPTE with Tentec PSU260 + remote

VFO263: £950. Yaesu FT102 (MD-1 desk mic) WARC and Yaesu FC102 ATU: £650. Oscilloscope Hung-Chang OS620 20MHz, dual beam: £140. AMT1 with BBC ROM chip CWRX option fitted: £150. BREMI PSU 13.8v 3amp regulated: £20. Kenpro KP200 memory key: £80. 2-tone oscillator homemade: £7. (Broadstone) 0202 695873.

SILENT KEY sale, property of late G3LWV. Trio TS130S incl WARC bands: £395. Yaesu FP707 PSU: £90. AR88D Rx: £45. Osker SWR200 SWR power meter: £25. 30ft sectional mast: £20. ZVC tcvr 80m and 20m 6146 PA's plus large asstmt of components, ideal for homebrew - offers. 2m 4ele Jaybeam aluminium quad: £25. G3TKN QTHR (Waterlooville) 0705 265101.

SILENT Key sale. Drae VHF wavemeter: £15. JRC spkr, JRC NDH518 memory unit, JRC NRD515 Rx - £375. JRC NRD525 Rx: £675. Trio R1000 Rx: £180. Trio SG402 RF signal genrtr: £50. Trio V/UHF TS-780 tcvr, Trio SP100 spkr: £550. Daiwa CN620A 1.8-150MHz SWR & PWR meter: £35. Daiwa CN630 140-450MHz SWR & PWR meter: £35. Mizuho KX2 ATU sky coupler: £25. Kent Morse key: £30. Turner +3B: £5. CB Master 75 SWR/Field strength meter + matcher: £2. Aerial 8ele 2m beam: £30. Contact G4YWD QTHR 0244 502320 (day) 051 334 9200 (eves/wkends).

SILENT Key sale. Trio TS930S, gd cond, no mods, with mic, earphones and man: £900ono. Henry 2KD linear amp, 2.5kW input, ex cond: £900ono. FT230 2m FM 25W mobile with man, mic, bracket etc, gd cond: £170. Icom 740 HF tcvr with FM and PSU, ex cond: £550ono. FTONE FM unit, new: £40. (Gwent) 0633 880146.

SONY ICF-2001D bxd, as new: £210. Cushcraft AV3 10-20m vertical, as new, bxd: £50. Microset PSU 7A, as new: £30. (Falkirk) 0324 32594.

SONY ICF7600D ptble scanning SW/FM/LW/MW SSB/AM Rx: £150ono, incl registered postage. (Guisborough) 0287 650864 or exchange QRP Tx/Rx.

SONY Pro-8 video camera top of the range cost £2000 18 mths ago, incl Sony aluminium hard case, extra bttry, tripod tapes etc, immac cond, perfect wking order. Offers over £1000 or may PX WHY HF/VHF etc. G4REZ QTHR (Reading) 0734 311852.

ST530SP, filters, manual, mic, property of careful Divinity student. Offers? (no response to my two previous ads). GM4SVM QTHR (Stirling) 0786 75834.

TANDY PRO38 scanner, ten chnnls, low/high VHF UHF nicads, h/book: £50. Simmons G6CBE (Chipping Norton) 0608 643377.

TANDY video disc interface for 100/102 laptops: £100. SDS Archer computer with added memory board: £100. Ask for details QTHR (Bury St Edmunds) 0284 754318.

TEN metre all-mode tcvr (CB Master 3600) plus 30W amp 28.100 to 29.690, service manual, DTI authority: £110. Mark G4RGB (Medway) 0634 30822.

TEN-TEC Corsair!I, bxd, with manual and mic, ex cond, can deliver, must sell hence: £700ono. GM0HUU (Glasgow) 041 889 9579.

TFMR 240V/2.15kV @ 600mA, EHT rectifier T380-1 ceramic' base. Capacitor 4µF @ 3.15kV, bridge rectifier Si-B2250/2000-1.3, tfmr 240V/5V @ 5A/10V @ 0.5A/130V @ 0.2A, Bruel & Kjaer mV meter type 2425 dB/mV 0.5Hz - 0.5MHz, linear motor lintrol A70-B80-SC1 240V AC single phase C/W start capacitors 300N @ 18A @ 1.7m/sec, BC221F 125kHz - 20MHz, TS175A/U VHF/UHF 85-1000MHz. G3VVG QTHR (Plymouth) 0822 852867

TNC (clone) packet radio 5V 1A (slight fault) VHF/UHF: £45ono. 70MHz base antenna: £15. 16ft silver rod, new: £15. ZX Spectrum 48K computer keybd, wking order: £30. ZX Spectrum printer: £40. Antennas to be collected. The rest post paid by seller. (Ormskirk) 0704 892088.

TOKYO HT106 50MHz tcvr SSB/CW, 3ele beam, P/SWR meter: £225. BNOS 10/100W amp 50MHz: £135. Revex P/SWR meter W570 1.6-1300MHz 5/20/200W: £75. Yaesu FC902 antenna tuner: £125. (Crewe) 0270 811373.sa**TOKYO** Hy-Power HL-66V 50MHz linear 60W output: £75. AOR 800E h/held scanner: £85. G6NWF not QTHR (Birmingham) 021 471 3243.

TRIO 7010 SSB/CW condenser mic 3amp tnsfmr 13ele Tonna spare crystals with manuals: £75. G1HPG QTHR (Brierley) 0226 713854.

TRIO 9000 complete with RN Electronics 6m tnsvtr, 25W output, with external variable power. Also Adonis AM503G desk mic and 4ele 6m Yagi. Complete station for only £350. No offers. (Wolverhampton) 0902 771909 (eves).

TRIO 930 with auto ATU and CW filters, immac: £1150. Trio 751E 2m m/mode, as new: £450. Yaesu 709 with chrgr, headset, m/mount, case: £190. Altron 4ele mini beam, 20m 15m 10m 6m: £250. Malcolm (Shrewsbury) 0743 367087.

TRIO TH41E, 70cm mini h/held tcvr, inclaccessories: £120. Drake R4B Rx with MS4 ldspkr: £180. CGP115 graphics/text printer: £15. 5ft Firestick helical antenna, adjusted to 10m: £7. Pye Westminster W15FM working 2m: £25. Phil G4CBQ QTHR. (Derby) 0332 663470.

TRIO TR9130 2m m/mode tcvr, vgc, plus mobile bracket, orig bx: £300. Buyer collects or pays carr. G3KJP QTHR (Honiton) 0404 43006.

TRIO TS-430S, vgc, orig packing with FM, SSB, AM, filters fitted: £595ono plus post. Trio TS711E 144MHz 25W, with PSU, vgc, bxd, mic etc, with 12-el beam: £575ono plus post. ATU MFJ941 unused: £80. G7FHV QTHR (Brighton) 0444 417509.

TRIO TS-940S with autotune ATU and extra filters: £1400. Also Icom IC751 and IC PS20 together: £900. Tokyo Hy-Power ATU HC400L: £100. G3KLT not QTHR (Aylesbury) 0844 275255 (day) 0296 437720 (eve).

TRIO TS430S FM CW filter free Adonis AM503 mic: £625. SEM Tranzmatch with Ezitune: £110. Yaesu FP707 20amp power supply: £90. Star Masterkey MkII: £40. Yaesu G-400 rotator 8 mths old: £100. Going QRT. Must sell all. G4XEN QTHR (Wellingborough) 0933 677573.

TRIO TS520 + SP520 + mic, gwo, for sale again thanks to time wasters: £300 or exchange for dual band h/held. (Mkt Drayton) 095 278262.

TRIO TS520 SSB trans, Trio TV502 2m trans, Kenwood AT200 A/tuner, Kenwood SP520 loudspeaker, operating manual, spare o/p valves, all vgc.: £475. G1YFK (Stevenage) 0438 359427.

TRIO TS530S HF tcvr, narrow SSB & CW filters fitted, matching MC35S mic, matching Trio AT230 ATU & Trio SP230 loudspkr, gd cond: £695. Technics GX3 organ with stool, as new, hardly played, must sell, make me an offer! S Clifton GW4WBT (Llandudno) 0492 878107.

TRIO TS530SP with CW filter, all HF bands, ex cond: £350. G3STB QTHR (Preston) 0772 35049.

TRIO TS711E base station m/mode, bxd, manual, ex cond: £550ono. G4SKX QTHR (Cleveland) 0642 676477.

TRIO TS830S, SP230, VFO240 MC50: £750. TS700S, SP70: £350. Hammarlund SP600: £65. ST5C RTTY: £60. Microwave modules 70cm 50W PA: £60. Microwave modules 432/28 txverter: £75. 29MHz FM with 25W PA: £40. Datong FL1: £40. Daiwa infra red mic: £25. Shure 444: £50. (Newbury) 0635 43048.

TRIO TS930S with YK88C-1 YG455C-1 500Hz CW filters MC60A mic, superb immac rig, 2 manuals, any test, no tuner, no box. No offers. Serial No 5090068: £995. G3RHM QTHR. (W London) 081 423 2329.

TRIO/KENW TS940S with auto/ATU, 500Hz CW filter and SP940 spkr with audio filters, hand mic, mint condx: £1400. Complete station comprising following items: Icom IC725 with AM/FM module and 500Hz filter, G3JMA heavy duty PSU 40 amps continuous, accessories box with built-in AMT-3 AMTOR, RTTY, modem, EL Key and serial interface for AMT3, Samsung IBM/PC/XT computer with twin 5.25in drives, 14in amber cga Hercules monitor and Citizen LSP100 printer inclusive bargain at £1000. G3WPO audio processor parametric equaliser: £25. Howes (ready built) 10W s/state PA for 21/28MHz: £25. A. Smyth G3XNE QTHR (Bude) 0288 354564.

TS120V C/W filter: £295. TL120 linear: £95. FO120 VFO: £55. TS120 mobile rack: £19. Kent electronic keyer: £29. TE15 GDO: £25. Pye B/W TV camera + zoom lens: £35. G3LDO QTHR (nr Worthing) 0903 770804.

TS530S tcvr 9 bands, as new, one owner, orig packing, h/bk: £500. Matched pair 6146B two 12BY7A, both new. G3ZLN (Ipswich) 0473 749139.

TS680S vgc, incl CW filter: £580. 60ft Westower standard lattice mast: £395. Ham 4 rotator: £200. BNOS 50MHz, 50W amp: £80. BNOS stab PSU 12/12A: £100. Bencher paddle: £10. ETM-SQ paddle: £10. Welz SP-200 SWR/PWR meter: £45. Kenwood SW-100 SWR/PWR meter: £15. 617-6B 6-ele long Yagi 14dB gain 34ft boom: £80. SU-2000-3M TV rotator: £20. Dave G4GLT (Coalville) 0530 35835.

TS711E 2m base stn: £550. vgc. ICR7000, 3 mths old: £750 (was £989 new). Kenpro keyer: £75ono. (Weston-Super-Mare) 0934 512757.

VACUUM capacitor EE, 2000pF at 3kV, minimum capacity less than 10pF, 40 turns: £40. Another 1000pF at 3kV: £35. A must for magnetic loop antennas. Buyer collects. G2HS QTHR (Ashford, Middx) 0784 258992.

WW2 Receiver type MCR1 size 9in x 2in x3in: £50. AVO valve tester: £90. GU3HKV QTHR (Guernsey) 0481 47278.

YAESU 747GX, FP700, PWR unit, purchased new July 1990. Offers. Cash sale. Diamond SX200 SWR/PWR meter, new: £50. G3FK QTHR (West Moors) 0202 873175.

YAESU FC700 antenna tuner built-in SWR/PWR meter dummy load: £80. Bricomm 1:1 balun: £7. KW20m traps: £7. G4BGE QTHR (Bracknell) 0344 421502.

YAESU FL2100Z linear, 9 bands, ex cond, lots of Watts: £450. Amstrad PPC computer, mains/ptble, colour monitor, twin 3.5in floppies, 640k co-processor, Panasonic KXP1081 dot matrix printer, WP, s/sheet, Cad s/ware, complete home and away IBM Compatible system: £395. (Bournemouth) 0202 525740.

YAESU FRG7700, memory, virtually as new, bxd, manual etc: £225ono Clayton (Newbury) 0635 68982 (eve).

YAESU FRG9600 60-950MHz m/mode Rx: £350. FT101E HF tvcr, CW filter: £350. FT101B: offers. Triumph TR7: offers. Gary G4IFB QTHR (Reigate) 0737 833050.

YAESU FT ONE gen cov tcvr all mode 1.6-30MHz Tx/Rx, vgc. Sony PRO 80 h/held 0-225MHz 40 mems AM/FM USB/LSB new: £900 and £190. (Nr Lockerbie) 057 63 494.

YAESU FT-221R 2m m/mode tcvr 240/12V, complete with YC-221 digital frequency display unit, vgc: £300. Barry G7HKI (Watford) 0923 676530.

YAESU FT-727R dual band h/held, FNB-4A nicad. CSC-18 soft case. PA-3 DC car adapter/trickle chrgr: £170. Garry G1UWM QTHR (Shifnal) 461316 0952.

YAESU FT101 tcvr, vgc, with fan, manual & cables: £200. Pye PF1 Rx & Tx, two pairs: £10 per pair. Pair PF1 for spares: £5. Connexions DBS satellite Rx, rotary tuning, 11GHz Luxor LNB, new polariser and horn: £150. Six valve radios 40's early 50's, rough, useful spares etc: £10 the lot. Oliver Rogers G1FXD QTHR (Bodmin) 0637 880404.

YAESU FT101Z FM CW filter spare valves at 200ATU SP520 spkr, all bxd with mans, ex cond: £400. G0LHM QTHR (Doncaster) 0302 859451.

YAESU FT101Z vgc fan YD148 desk mic: £375. IC260E 2m 10W m/mode: £260ono. Heathkit IP17 psu: £30ono. (Portsmouth) 0705 596874.

YAESU FT102, ex cond, manual, SP102 spkr MH-1B8 mic, mint, unmarked, bxd: circa £600. Will split. Offers. (Sturminster Marshall, Dorset) 0258 857019.

YAESU FT221R, m/mode 10/25W, vgc, bxd, little used: £250ono. Trio R1000 HF Rx incl ATU and audio filter, all bxd, ex cond: all for £200. G6ZAM QTHR (Ashford(Mx)) 0784 258196.

YAESU FT290R m/mount 2 nicads c/case manual: £230. 2m 7/8 gutter/m: £10. Mk702 manipulator key: £10. H/B iambic keyer: £5. Buyer collects. (Milton Keynes) 0908 313398.

YAESU FT301D HF Tx/Rx plus FP301 psu: £300. MMT 144/28 tnsvrtr: £80. Technical software RTTY for BBC: £10. G3YPP QTHR (Hitchin) 0462 815533.

YAESU FT480R CW mobile mount Mutek SLNA144S Yaesu SC1 station console: £325. Goose neck mic CW gear lever control: £25. MML 144/100 amplifier: £100. MML432/100 amplifier: £200. DRAE 24 amp PSU: £100. Brother EP44 printer: £75. G3UJB QTHR (Bideford) 0271 860530.

YAESU FT707, mobile mounting bracket, mic and instruction manual: £300. SEM QRM eliminator: £40. All vgc. G0IXC (Harrogate) 0423 872997.

YAESU FT708R 70cm h/held, leather case, 2 bttry packs, charger, whip aerial, spkr mic, manual, orig box, perfect condx. IOM FM, gwo,. Sony ICF-2001, PSU, h/book, gwo. Offers. G4OYY QTHR (Axminster) 0404 83616.

YAESU FT726R fitted 6m 2m 70cm CW filter: £795. MML 144/100S linear: £90. BNOS LPM 432-10-5- linear: £110. Antennas 144MHz 16ele Jaybeam: £20, 432MHz 24ele Jaybeam: £15, 50MHz 3ele Met: £20. Going QRT. Must sell all. G4XEN QTHR (Wellingborough) 0933 677573.

YAESU FT726R with 2m 70cm 6m and satellite unit: £950. John G1OAW (Gosport) 0705 586087.

YAESU FT747GX C/W FM, AM filter, mic, 6 mths old, immac, QTH is maisonette, unable to Tx: £425. G4RNI (Gateshead) 091 4690724

YAESU FT757 6X 11 tcvr, mint condx, bxd, as new: £750. Also MFJ versa aerial tuner deluxe: £75. G1EVC (Silsoe, Beds) 0525 60091.

YAESU FT767 GXII plus 2m hand mic Adonis 503G, all mint condx: £1075ono. GM0IIO not QTHR (nr Glasgow) 0360 60929.

YAESU FT767GX plus SP767, unmarked cond: £825. Kenwood TR751E, unmarked: £400. G4NVY (Gloucester) 0452 864727.

YAESU FTV707 tnsvtr fitted with 2m, ex cond: £150ono. FT790R, bxd with c/case, mic, r/duck, manual: bargain at £195. RN Electronics 6m tnsvtr 2m input 25W out: £110ono. 3ele 6m Yagi: £15. Marconi TF1417A freq counter AC to 14MHz: £20. Jaybeam MBM48 70cm ant, used in loft only: £25. Dave (Northampton) 0327 842141 (eve/wkend).

YAESU FTV901R tnsvtr 2m, 6m, fitted, mint, hardly used, manual, bxd: £299. MFJ401 econokeyer with vibroplex vibro-keyer: £50. G3AQB QTHR 0665 720116.

YAMAHA QX1 Megga midi sequencer fitted update, plus 1000's DX7 sounds on 5.25in disks (£3000 new): £400. Also Yamaha RX11 drum machine, 29 pcm sounds (£600 new): £200. Both immac cond, would consider exchange for HF tcvr. GW4LYK QTHR (Swansea) 0792 892513.

ZENITH Z-140 PC with 32MB hard disk, mono CGA monitor DOS 3.3 plus, s/ware, orig bxs etc: £400ono G4UHM not QTHR (Brentwoo) 0277 355731.

WANTED

AP1086 Issue one (RAF Radio Stores ref nos 10A-10Z). Also air publications relating to radio, radar equip. Ex prices offered. Would purchase post-war to current magnetrons, klystrons, t/r cells, TWTs, photo-multipliers, most CV types of EEV, Ferranti, Varian RCA valves. Wanted Gee radar r/x type R1355 unmodified ref: 10D/13032. M. Gee, 17 Foxley Close, Mountford Estate, Hackney, London E8 2JN 071 254 9083 or 071 790 2846.

70CM colinear, also modern medium duty antenna rotator and controller. G3POX QTHR (Huntingdon) 0480 811549.

AIRCRAFT Actuator 24V bean can size, G2LV 19 Tower Park, South Molton, N Devon EX36 4EP. 0769 52495.

ASSISTANCE and advice on design of QRO-solid state 2-30MHz linear. Does anyone have the necessary CAD facilities for circuit or PCB layout? Happy to cover all costs. G4ZOW not QTHR (Hemel Hempstead) 0442 877680 (day) If out leave name and number).

BEGINNER'S Guide to Amateur Radio by F G Rayer, G3OGR, a Newnes Technical Book Publication. G4KVA QTHR.

BOOKS: Amateur Antenna Tests & Measurements - Hooton; Antenna Engineering - Jasik; Antenna Manual - Woodrow Smith (1948); Agard Books etc. Any books on radio, propagation, antennas, telegraphy, telecommunications. All letters answered - write G3REP, 2 Saxon Road, Steyning, W.Sussex BN44 3FP.

BUTTERNUT HF5B 5 band HF compact beam or something similar, in gwo. Good price paid. G0FQX QTHR (Milton Keynes) 0908 667250.

CAPCO magnetic loop aerial 13-30MHz incl control box. G4LJO QTHR (Avon) 0934 84 3507.

CHESTER Radio Society require one HP1821A timebase -delay generator plug-in module for Hewlett-Packard HP180A oscilloscope. Alan Morris G4BDM QTHR (Mickle Trafford) 0244 301764.

COMMUNICATIONS Rx, all HF amateur bands, any make considered, must be in gwo. G3MEG QTHR (Welling, Kent) 081 312 0639.

EDDYSTONE full vision dial. Hammarlund ceramic UX6 and 7 pin valve holder. Bernard Hitherland G4IMT QTHR (Chippenham). 0225 891 254.

ELECTRONIC keyer preferably with dot dash memories. Vibroplex, bencher, Kent, single or twin paddle key. Cushcraft R5 vertical antenna. G0OPG (Wilmslow) 0625 531154.

F23R nicad pack or bttry case and Heatherlite mic required by recent stroke victim. John (Gainsborough) 0427 615266.

HEATH HW-16. Working/non working. Please write precise condition, workability and price. Marris, 35 Kingswood House, Farnham Road, Slough SL2 1DA.

HF SEPARATES or tcvr. Need not b"e working (can service/align to orig spec) "The older the better". RS90877 (Harwich) 0255 554612.

HUSTLER RM10 mobile whip with telescopic top section, could be old type to make my set complete. G3VYP (Ludlow) 056 885 296.

INFRA red image convtr cell tubular 1 7/8in x 1.75in long. Also wanted keyboard for Tektronix colour monitor 4107. John G3LMR 0533 871522.

KENWOOD 851 Tx 430MHz; must be in good cond with manual. (Nottingham) 0602 275264.

KENWOOD VFO230, SP230, wkshop manual - TS-830-S. Project Alpha parts, PCBs etc. Heathkit HW32A 20m tcvr IC R7000. G3MBN QTHR (Bath) 0225 810621.ts

KENWOOD/Trio CW filter YK-88C 500Hz for TS530S. G3IVH QTHR (Ipswich) 0473 86442.

MAG loop 40/80. G0IRY QTHR (Huddersfield) 0484 423282.

MARCONI 52 set Rx, any condx, for rebuild, also any bits etc like the original mains PSU and hdbooks. Thanks. (Shrewsbury) 0743 884858.

R1224A RAF Rx. Any cond. Also for R1155, Loop Aerial No 3 or No 4. Has anyone one of

SILENT KEYS

WE HAVE BEEN advised of the deaths of the following radio amateurs:

G0HFP	Mr JHH Jewell	26.04.91
G0JNC	Mr V Dickens	15.03.91
G3FPW	Mr SV Cleaver	09.11.90
G3JXZ	Mr HEW Reeve	13.01.91
G3LTU	Mr D Smith	10.04.91
G4CSA	Mr FF Whitehead	02.04.91
G4OOT	Mr E Davies	15.04.91
G5GH	Mr CR Emary	
G6LI	Mr AE Livesey	04.05.91
G6ZP	Mr JG Ross	15.04.91
G8AVI	Mr HD Taylor	28.04.91
G8BA	Mr JR Barnard	16.01.91
GI0EVW	Mr A Watson	27.09.90
GI3ALT	Mr JH Brooks	19.10.90
GI3BTE	Mr R Hall	13.03.91
GI3VIA	Mr W Reid	31.03.91
GI3ZAD	Mr S Jamison	01.05.91
GM0LTI	Mr JM Rae	15.04.91
RS46059	Mr LA Patterson	
RS49199	Mr AJ Albury	13.02.91

these for sale? Trevor G4OEY (Hull) 0482 867327.

SEM QRM eliminator, also tnsvtr, from 2m to HF for FT290 RII Tokyo HX240 preferred. All considered in gd cond. G0OPG (Wilmslow) 0625 531154.

SERVICE information for Racal Syncal 30 tcvr, also 100W linear type TA940B, leads and headset for above needed. (Earls Barton) 0604 810013.

SPECIAL flat blade aerial plug for pre-war HMV/Marconi TV Rx. Can you make my old set complete? G8PTH QTHR (Northampton) 0604 844130.

TANDBERG language tutor cassette deck as sold at Wimborne Hamfest (TCR5500). G4ZFQ QTHR (Cowes) 0983 294309.

TET Triband mini beam, 3ele, must be gd cond or exchange TET SB33SP triband (3ele) F size instruction manuals. G0EIA QTHR (Liskeard) 0579 63192.

TONE generator chip MO83. Pat GW1SXU QTHR (Chepstow) 02912 71532.

TRIO/Kenwood SP120 spkr. Peter G0JWV (Truro) 0872 501656 (after 6pm).

TS680S or Icom 726. Also TS120S telescopic aerial mast. Any QRP gear, valve or transistor. G2CYN 071 935 7119.

VIBROFLEX blue racer. Please telephone Ian, G4KJD (Taunton) 0823 480074.

VIBROPLEX bug key in gd wking order. G7HCA QTHR (Shoreham-by-Sea) 0273 455984.

YAESU FT7, must be in gd cond with manual etc. G4PXW.0622 691411 (eve).

EXCHANGE

1 NRD 505 with memory board and extra CW filter, cost about £2000+ when new, for Collins 51S-1 or Airbourne version. Cash adjustment if needed or WHY?(London) 071 736 6581.

CORONET Major MkIII CMB500 Universal woodworking machine, many extras, worth £1700 and quantity of timber. Wanted tilt-over mast, aerials, tcvr, meters ATU Morse tutor or other amateur radio gear, books relating to radio, QRP equipmt also considered. Cash adjustment. (Invergordon) 0349 85 2332.

COSSOR 339 double beam oscilloscope in wking order with instruction manual, a collectors item; will xchange for genuine Vibroplex bug key - please bring own truck to collect. (Bexley) 0322 525449.

HEAD unit H2 for Strumech versatower WHY. John (Gainsborough) 0427 615266.

TAIT T199 low band PMR for your T198 high band set or WHY? (March, Cambs) 0354 741168.

YAESU FT101E C/W handbook, new set of valves plus C/W filter in as new cond. Xchange for FT707/TS120 inc 10W models, WHY? Phil G4ZOW (Hemel Hempstead) 0442 877680. If out please leave mssge.

EVENTS DIARY

CLUB NEWS

DEADLINE - Items for inclusion in the September 1991 issue must be sent to HQ marked "Club News - DIARY", to be received by 15 July 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

SOUTH BRISTOL ARC - 3, talk "The Hobby of the Space Age"; 6/7, VHF NFD; 10, invitation to a Slide Show; 17, home brew for Terry Dunsford Trophy; 24, CW activity evening; 31, Fox Hunt preparations. Details Whitchurch 832222

THORNBURY & DARC - 3, Test Equipmet - Shaun, G8VPG/Ken, G4BVK; 17, HF activity evening.

BEDFORDSHIRE

SHEFFORD & DARS - 6/7, VHF NFD. Details 0763 71149.

BERKSHIRE

MAIDENHEAD & DARC - 4, talk "System X Telephone Exchanges" by Alan, G1DNP; 6/7, VHF NFD at John Hampden School, High Wycombe; 16, talk "Planning Permission for Aerials" by Peter, G3WYK; 21, McMichael Rally; Aug 1, 2m Fox Hunt. Details 0628 25952

READING & DARC - 11, talk "Electronic Warfare" by Peter Chadwick, G3RZP; 25, Project YEAR evening - John Linford, G3WGV. Details 0734 476873.

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 3, talk and demonstration "JANDEK Kits Products" by Derek Pearson, G3ZOM. Details 0296 437720 or 0908 560026.

CHESHAM & DARS - 3, VHF NFD Planning; 10, Silly Contest - see G0ETU for details; 17, technical topics - hints for 2m DF Hunts; 31, 2m Mobile DF Hunt - Freq 145MHz - meet at club for 8.15 start. Details 0923 283911.

CHESHIRE

NORTH CHESHIRE RC - 14, TALK "Scanning the Radio Spectrum from HF to UHF", part 2. Details 0625 535644.

CLWYD

DELYN RC - 3, visit to Chester Police Station; 17, Bar-B-Que at QTH of GW7AAV & AAU; 31, talk "The Work of Jodrell Bank" by a well-known scientist; Aug 14, open forum. Details 0745 336939.

RHYL & DARC - 1, home brew construction; 15, talk "Electrical Regulations"; Aug 5, annual Fox Hunt. Details 0745 336939.

WREXHAM ARS - 2, field evening. Details 0978 261482.

CORNWALL

CORNISH RAC - 8, computer section; 9, activities night; 13, CRAC Rally, Penair School, Truro; Aug 6, activities night; 12, computer section. Details 0209 820836.

DERBYSHIRE

BOLSOVER ARS - ***CHANGE OF SECRETARY/VENUE*** - J E Hart, G8EEZ, Castle Arms Inn, Station Road, Bolsover, Chesterfield. Details from J E Hart, G8EEZ

DEVON

AXE VALE ARC - 5, "Foxhunt"; Aug 2, visit to Sidmouth ARC and Planetarium. Details 0297 33756.

EXETER ARS - 8, construction contest; Aug 12, free and easy evening. Details 0392 78710.

DORSET

BOURNEMOUTH RS - ***SECRETARY*** Ian D Brotherton, G2BDV, 6 Cranfield Avenue, Wimborne, Dorset BH21 2DE; tel: 0202 886887.

PLESSEY CHRISTCHURCH ARS - 11, Annual General Meeting. Details 0425 621982.

EAST SUSSEX

BRIGHTON & DARS - 13/14 Brighton Rally; 17, debriefing Brighton Rally.

ESSEX

BRAINTREE & DARS - 1, quiz evening; 15, talk "Tools & Techniques" by David, G3PEN; Aug 5, talk "Travelling in USA and Australia" by David, G0KQV. Details 0376 27431.

LOUGHTON & DARS - 12, talk "Computers in Banking" by Mike Pilsbury, G4KCK; 26, visit by RLO Brian Gibbard, G0AZF (provisional). Details 01 508 3434.

GREATER LONDON

ACTON, BRENTFORD & CHISWICK ARC - 16, discussion & demonstration by all members "My Favourite Key". Details 071-938 2561.

COULSDON ATS - 8, 2m DF Hunt. Assemble St Swithun's Church Hall, Grovelands Road, Purley @ 7pm. Details 081-684 0610.

CRAY VALLEY RS -4, talk "Successful VHF Contesting" by G4DEZ; 18, video evening. Details 081-850 1386.

CRYSTAL PALACE & DRC - 20, social evening at the Lambeth Country Show; Aug 17, day out (provisional). Details 081-699 6940

EDGWARE & DARS - 6/7, NFD; 11, talk "Air Navigation" by Godfrey Manning, G4GLM of SWM Airband; 25, talk "Kites" by Roy Charlesworth, G4UNL. Details 081 205 1023.

GRAFTON RS - 5, talk "Detection Equipment" by Pat Brolan, G1MPU; 19, talk "WW2 Radio Interception" by Len Yeldham, G0KUV. Details 081-368 8154.

HAVERING & DARC - 10, quarterly business meeting; 24, talk "Microwaves" by Mark Robertson, G6CMS; Aug 7, talk "Raynet". Details 04022 23310.

KINGSTON & DARS - 17, talk "Telecommunications in the North Sea" by S.N. Crabtree, G3OXC. Details 081 398 1128.

SOUTHGATE ARC - 12, talk "Radio Data Service" by Alan Guard, G3LWA; 26, construction evening - Antenna Noise Bridge; Aug 9, talk "Nicam Stereo" by Gerry Meek of Fergusons. Details 081 360 2847.

SUTTON & CHEAM RS - 6/7, VHF NFD at Leek, Staffs. Details 081 644 9945 (general), 0737 355271 (membership).

WIMBLEDON & DARS - 12, talk "Weather Satellite Update" by Dave Young, G8VXB; 26, precamp briefing; Aug 3-11, annual camp - Barwell Estate, Chessington. Details 081 397 0427.

GREATER MANCHESTER

ECCLES & DARS - 2, talk "DTMF Dialling" by G7ELA; Aug 6, talk "PCB Design using CAD" by G8KRG. Details 061-773 7899.

SOUTH MANCHESTER RC - 5, contest preparation; 12, Repeater visit; 19, talk "Getting Started in Direction Finding"; 26; talk "Maritime Mobile". Details 061 969 1964.

STOCKPORT RS - 10, talk "DX Packet Clusters" by John Bell, G0CMM; 24, RSGB video "Amateur Radio for Beginners" and Stockport RS club video. Details 061-439 3831.

HAMPSHIRE

HORNDEAN & DARC - 4, TBA. Details from G3COO, tel: 0705 483676.

ITCHEN VALLEY RC - 12, Robert Mannion, G3XFD of Practical Wireless; 26, open meeting. Details 0703 736784.

THREE COUNTIES ARC - 3, talk "UoSAT and OSCAR Satellites" by Craig Underwood; 17, talk "Telecommunications in the North Sea" by a representative from BP; 31, computer night; Aug 14, video of RSGB and other Radio Activities. Details 0420 489847.

HEREFORD & WORCESTER

KIDDERMINSTER & DARS - 9, surplus sale; 23 talk "Satellites"; Aug 6, DF Hunt. Details 02993 79229.

HERTFORDSHIRE

CHESHUNT & DARC - 10, talk "After the RAE" by Derek, G0BTX; 17, portable evening, Baas Hill Common, Broxbourne; 24, junk sale; Aug 4, Woburn Rally; 7, portable evening, Baas Hill Common.

VERULAM ARC - 23, talk "What's on 80 Metres" by Mr J Allen, G4PDP. Details G0NDB or G3PMF.

HUMBERSIDE

GOOLE R&ES - 5,6,7, VHF NFD; 12, NFD logfill; 19, talk "Goole" by G6AJM; 26, social evening; Aug 2, discussion "TV Repeater Progress"; 9, video; 11, "Treasure Hunt" 3pm. Details 0472 825899.

NORTH FERRIBY UNITED ARS - 5, talk "HF Linears" by Peter, G3ZRS; 12, Extraordinary Meeting; 19, talk "A Trace of Flutter" by John, G4TGE; 26, night on the air; Aug 2, latest QSL's of Interest - Members; 9, night on the air. Details 0482 650410.

KENT

BROMLEY & DARS - 16, short talks. Details G3UMI.

DARTFORD HEATH DFC - 16, evening DF foxhunt, 2m, freq 145.325, 7.30pm start, Car Park, Heath Lane Upper, Dartford Heath. Details 0689 854089.

SEVENOAKS & DARS - 5, talk "Worked All Britain/Heard All Britain" by John Fitzgerald, G8XTJ.

LANCASHIRE

THORNTON CLEVELEYS ARS - 1, club on air/construction; 8, VHF NFD inquest; 15, Barbeque; 22, talk by Pete, G4BVW; 29, auction of surplus equipment. Details from G4BFH.

WIGAN & DARC - 4, talk "DX on 6 Metres" by Wilf, G6GVS. Details from G0DTY.

LEICESTERSHIRE

LEICESTER RS - 1, VHF NFD final arrangements HF/VHF night on the air; 8, VHF activity night; 15,22,29, HF/VHF night on the air; Aug 5, AMTOR & Packet on air activity night. Details Leicester 762241.

LOUGHBOROUGH & DARC - 2, Bar-B-Q G4RVW QTH; 9, DF; 16, night on the air from Deans Lane; 23, DF 2m. Details Lobro 218259.

LINCOLNSHIRE

LINCOLN SWC - 13, open day. Details 0522 522715.

LOTHIAN

DUNFERMLINE RS - 4, operating evening/work party; 11, test equipment evening - check your rig; 18, HF operating evening; 22, talk "Satellite Comms" by Joe Kasser, G3ZCZ from USA; 25, HF operating evening. Details 031 331 4340.

MERSEYSIDE

WIRRAL DARC - 10, visit to BNFL Capenhurst; 24, revenge DF hunt; 31, Barbeque, Heswall Beach. Details 051 677 4448.

NORFOLK

ARC OF FAKENHAM - 2, talk "My Experiences as an Air Traffic Controller" by John, G4RBJ; 16, RSGB video tape (first shown on 16 April) Part 1 - Amateur Radio - The Hobby of the Space Age; Part 2 - How to Become a Radio Amateur; Aug 6, final arrangements for GB2FSW (to be held on 19-23 Aug) with Dave, G4DCJ. Details East Rudham 633.

NORFOLK ARC - 3, evening at Happisburgh (Eastern Communications & seaside!); 10, mobile DF Hunt; 17, committee meeting; 24, talk "Keeping the Trains Running" by Mike Rowe of British Rail; 31, quiz with a difference; Aug 4, club outing to Woburn Rally; 7, HF SSB NFD/Town & Country Show briefing; 14, "Real Radio" evening. Details 0603 747992.

NORTHAMPTONSHIRE

NORTHAMPTON RC - ***NEW VENUE*** 2 Hervey Street, Northampton.- 8pm every Thursday. Details 0327 41267 (eves).

NORTH YORKSHIRE

YORK RC - ***NEW SECRETARY*** A.C. White, 6 Bedale Avenue, Osbaldwick, York YO1 3NF; tel: 0904 414189 (H), 0904 432336 (W).

NOTTINGHAMSHIRE

AMATEUR RADIO CLUB OF NOTTINGHAM - 4, forum; 6, SES at St Peters School, Ruddington; 11, talk "Ambulance Communications" by Alan, G8SSL; 13, SES at Gedling Comprehensive School; 18, 2m Foxhunt and activity on the air; 25, demonstration of mast and aerial erection by Martin, G6ABU; Aug 1, talk "AMTOR" by Alan, G3XOF; 8, forum. Details 0602 733740.

MANSFIELD ARS - 4, HF activity evening. Details 0623 755288.

SOUTH NOTTS ARC - 5, talk in 2m/open forum; 12, construction (own projects); 19, night on the air. Details 0509 672734.

SHROPSHIRE

SALOP ARS - 4, pre-Field Day get together; 18, 3rd Foxhunt. Details 0743 790457.

TELFORD & DARS - 3, NHF NFD round-up; 10, RAYNET in Romania; 17, Foxhunt - 3; 24, RAF Cosford visit (provisional); 31, Shropshire RAYNET; Aug 7, VHF on air. Details Bridgnorth 761203.

SOMERSET

TAUNTON & DARC - 5, Bar-B-Q at G3WNI QTH; 19, talk "WX Maps and Things" by Mrs Jackie Foulds. Details 0823 680778.

YEOVIL ARC - ***NEW SECRETARY and NEW VENUE*** David Bailey, G0NMM, QTHR. Club meets every Thursday at The British Red Cross Society, 72 Grove Avenue, Yeovil. - 4, talk "A Peak Reading RF Voltmeter" by G3MYM. Details from G0NMM.

SOUTH GLAMORGAN

CARDIFF RSGB GROUP - 8, talk "Amateur TV" by Bob Robson, GW8AGI. Details 0446 773212.

STAFFORDSHIRE

STAFFORD & DARS - 2, monthly business meeting; 9, night on the air; 16, demonstration of novel all-band antenna - G0BYA & G0EYX; 23, construction evening; 30, night on the air; Aug 6, monthly business meeting; 13, night on the air. Details from Bernard, tel: 0785 662350.

SUFFOLK

FELIXSTOWE & DARS - 8, 10-pin bowling (King Pin Bowl); 22, talk "Digital Communications" by Fiona Pattinson, G7ANH; Aug 5, night on the air. Details 0473 642595 (daytime).

ISPWICH RC - 10, ESWR post-mortem; 14/15, Police families day (station GB2IRC at Martlesham HQ); 24, VHF low power contest planning; 27, VHF low power contest (station G4IRC/P at Otley); 31, Barbecue; Aug 8, Morse test at Ipswich - details from RSGB. Details Mrs. S.M. Elden, G8HYE QTHR, tel: 0473 742072.

SURREY

DORKING & DARS - 6/7, VHF NFD; 23, portable activity night - Devils Dyke HF-6-4-2-70cm, assemble 7pm, Bar-B-Q BYO, talk-in S20; Aug 11, D/F Trial organisers Chris, G1PXH/Nick, G7DND, assemble 10am start venue TBA.

WARWICKSHIRE

MID WARWICKSHIRE ARS - 9, 2m DF Foxhunt, 7pm Tx, 145.350 horiz FM; 23, talk "PMR Equipment - What to Buy and How to Convert It"; Aug 13, talk and demo "Spectrum Computer SSTV & Screens". Details 0926 513073.

RUGBY ATS -*CHANGE OF SECRETARY* - Peter Wells, G0JEW, 15 Gilmorton Road, Lutterworth , Leicestershire LE17 4DY - 16, 2m DF competition, round 3; 23, final planning for Annual Car Boot Sale; 28, Third Annual RATS Car Boot Sale at the BP Truckstop on the A5.

STRATFORD-UPON-AVON RS - 8, Fox hunt; 22, construction contest. Details 060 882 495.

WEST MIDLANDS

MIDLAND ARS - 16, annual rig check. Details 021 742 8712.

STOURBRIDGE & DARS - 1, on the air evening; 15, demonstration of JANDEK Kits by G3ZOM. Details from D. Body, G0HTJ

WORDSLEY RC - 4, project construction evening - 8pm; 18, visit to Mr Disc Computer Centre - 7pm; Aug 1, talk "Novice Licence" - 9pm; 15, on the air, HF - 8.30pm. Details 0384 873666.

WEST SUSSEX

HORSHAM ARC - 4, talk "HF Aerials and Things" by Malcolm, G3TNO.

MID SUSSEX ARS - 4, preparation for VHF NFD; 6/7, VHF NFD; 11, preparation for Brighton Rally; 13, install signs and notices at Brighton Rally venue; 14, Brighton Rally - car parking duties by club members. Details from G0OIO.

WEST YORKSHIRE.

BRADFORD ARS - 11, RTTY/FAX Data talk and demonstration by Jack, G4ZVD; 25, G3NN portable operation. Details 0274 494694.

DENBY DALE ARS - 3, talk by Maplin Electronics; Aug 7, Lasers, by Bradford University. Details 0484 532371.

HALIFAX & DARS - 16, visit to Elland Power Station; Aug 20, White Rose Project, John G3TDZ. Details Halifax 202306.

KEIGHLEY ARS - 18, Packet Radio on the Air; 25, construction project G3TDZ; Aug 8, quiz. Details from Kathy, tel: 0274 496222.

NORTHERN HEIGHTS AR&ES - 3, RSGB evening, video, discussion; 6/7, VHF Field Day; 17, treasure hunt. Details 0274 673116.

OTLEY ARS - ***NEW SECRETARY*** Mr J. Masters, G0IXD, 15 Hasley Road, Burley in Wharfdale, Ilkley, W Yorkshire LS29 7PW.

WILTSHIRE

SALISBURY R&ES - ***NEW PUBLICITY OFFICER*** - Mr D A Kennedy, Celeborn, 11 Silverwood Drive, Laverstock, Salisbury SP1 1SH, tel: 0722 330971 (H), 0256 342289 (W) - 2, talk "Weather Satellites". Details from D A Kennedy.

TROWBRIDGE & DARC - 3, mobile picnic Westbury White Horse Hill; 11,12,13, GX2BQY SES; 17, open evening. Details 0380 830383 (evenings).

RALLIES AND EVENTS

This is a list of all rallies, hamfests, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Rally News - DIARY'.

7 JULY

KINGS LYNN ARC Radio Rally - The Corn Exchange, Tuesday Market Place, Kings Lynn. Opens 10am, entrance fee £1. Details from G4PYB, tel; 0553 761995 or 0553 306.

NEWPORT ARS Junk Sale - Brynglas Community Centre, Newport. Opens 10.30am (10 for disabled visitors). Talk-in on S22 from 0900. Light refreshments will be available. Details from Kevin, GW7BSC, QTHR, tel: 0633-270727 (W) or 0633 262488 (H).

YORK Radio Rally - Tattersall Building at York Racecourse. Doors open 11am (10.30 for disabled visitors). All the usual favourites; bring & buy; licensed bar and cafe; Morse Tests; Amateur Radio; Electronics and Computers; Arts & Crafts. Ample free parking. Talk-in on S22. Entrance fee 50p. Details from Dave Moreland, G7FGA, tel: 0904 790079.

13 JULY

CORNISH RAC. Rally - Penair School, St Clement, Truro. Usual attractions; refreshments; free parking; doors open 10am (9.30 for disabled visitors). Talk-in on S22. Details from Rolf Little, G0NDC, St. George's Hotel, St. George's Road, Truro, Cornwall, TR1 3JE, tel: 0872 72554.

LINCOLN SWC Open Day - To celebrate its 70th anniversary - The Grand Stand Community Centre, Carholme Road (A57), Lincoln. The event will be open to the public from 1pm. Attractions will include demonstrations on HF, VHF, Microwaves, ATV, Satellites, RTTY, CW, Repeaters and Novice Licence information. Admission free; ample free car parking. Talk-in on 145.550MHz. Details from Patrick, G0OSO, tel: 0522 522715.

14 JULY

SUSSEX AR&C Fair (formerly the Sussex Mobile Rally) - Brighton Racecourse. All usual facilities. This rally brings together the best in Amateur Radio, Components and Computer specialists. Information and booking details from Ron Bray, G8VEH (QTHR) tel: 0903 763978 or 0273 415654 (office hours).

21 JULY

COLCHESTER RA Mobile Rally - Highwoods Sports & Leisure Centre, Brinkley Lane, Colchester. 10am - 4pm. Talk-in. Ample free car parking. Bring & Buy. Details from Frank Howe, G3FIJ, QTHR, tel: 0206 851189.

McMICHAEL Rally and Car Boot Sale - Haymill Youth and Community Centre, Burnham Lane, Slough (near Burnham railway station). Opens 10.30am, admzxc ission £1. The car boot sale is £6 per pitch on the day. Free parking on site and Talk-in on S22 (145.550MHz). Details from Neil, G8XYN, tel: 0628 25952.

RAIBC Romsey Picnic - Broadlands, Romsey. Super junk sale and bring & buy. Refreshments; grand draw; all RAIBC members, families and friends welcome. Talk-in on S22.Details from John Compton, G4COM, tel: 0703 693017

25 - 28 JULY

1991 AMSAT-UK COLLOQUIUM - University of Surrey. Details from G3AAJ.

JULY

RUGBY AR Car Boot Sale - new venue - BP Truckstop on the A5, 3 miles east of Rugby, 2 miles north-west of M1 Junc 18. Talk-in by GB8CBS on S22. Opens 10am, admission 50p. Pitches only £5 on the day (no advance booking necessary). Good facilities incl cafeteria and toilets. Details from either Kevin, G8TWH, tel: 0203 441590 or Peter, G0JEW, tel: 0455 552449.

SCARBOROUGH ARS Radio, Electronics & Computer Rally - The Spa, South Foreshore, Scarborough. Many trade stands; large bring & buy; tombola; licensed bar and refreshments. Morse tests followed by a demonstration by the North Yorkshire Morse Test team. Entrance 50p incl a prize draw. Details from Ian Hunter, G4UQP QTHR, tel: 0723 376847.

4 AUGUST

WOBURN National Rally - Woburn Abbey, Bedfordshire. Trade stands housed in marquee 20,000 sq.ft. Talk-in by Dunstable Downs RC. Usual Woburn Abbey attractions. Trade stand enquiries to Norman Miller, G3MVV, QTHR, tel: 0277 225563. Organised by RSGB Exhibition & Rally Committee.

11 AUGUST

DERBY Mobile Rally - Littleover Community School, Rykneld Road, Littleover, Derby. Situated on the A5250 road, just north of its junction with the A38 on the south side of Derby. Talk-in on 2m. All usual attractions including the famous monster junk sale. The Society is 80 years old this year, so we are hoping to make this a bumper event. Details from Martin Shardlow, G3SZJ, QTHR, tel: 0332 556875.

FLIGHT REFUELLING ARS Hamfest 91 - Flight Refuelling Sports and Social Club Grounds, Merley, Wimborne, Dorset. Opens 10am. Trade stands; bring & buy sale; radio and electronics car boot sale, craft fair, field displays. Special disabled parking is available in the grounds and overnight camping on Saturday 10th can be arranged. Details and booking forms from John, G0API, tel: 0202 691649 or Rob, G6DUN, tel: 0202 479038.

18 AUGUST

WEST MANCHESTER RC Red Rose Rally - Bolton Sports & Exhibition Centre, Silverwell St, Bolton. Doors open 11am (10.00 for disabled visitors). Admission £1, children free. Usual trade stands, societies, bring & buy etc. All at pavement level with facilities for the disabled. Details from G1IOO, tel: 0204 24104.

23-26 AUGUST

OSCAR VICTOR ACTIVITY GROUP (WAB) Family Fun Weekend - Bent Rigg Farm, Ravenscar, North Yorkshire. (Midway between Scarborough and Whitby. Campers and caravanners welcome with the availability of a Bunk Barn for those wishing to have a roof over your heads. (Prices on application from the Farm). Chance of working either HF or VHF pile-ups from the Control Station on site. Car boot sale, sporting activities arranged for the Kids (no age limit to qualify as a Kid!), child minding facilities, live entertainment from SGB & The Old Crones on the Bench (New Kids on the Block eat your hearts out). Competitions for all the family. Cost for use of site irrespective of caravan/tent size including Bar B Q's: Adults & over 14's - £2.50 per day; OAP's & under 14's - free. Details from Peter Austin, G7BXA, QTHR, tel: 0532 563462 or Steve G. Bryan, G1SGB, QTHR, tel: 0709 543747.

25 AUGUST

TORBAY ARS Annual Mobile Rally - STC Social Club, Brixham Road, Paignton, Devon. Doors open 10am. Talk-in on S22. Details from W. Hipwell, G3HTX, QTHR, tel: 0803 526762.

GALASHIELS & DARS - Open Day - Focus Centre, Livingstone Place, Galashiels. All usual activities; bring & buy; traders; club stalls etc; refreshments. Details from John G Campbell, tel: 0835 22686.

26 AUGUST

THE HUNTINGDON JUNK SALE - The Medway Centre, Coneygar Road, Huntingdon, Cambs. Opens 10am. Trade stands - useful ones with junk, components, antenna bits, nicads, together with a bring & buy. Food/drink available all day; talk-in on VHF-S22, UHF-GB3OV Repeater on 433.125 RB5. Details from G1YVS, tel: 0860 433891; G8LRS, tel: 0480 456772 (eves); G7DIU, tel: 0480 431333 or G0JLQ, tel: 0480 454858.

1 SEPTEMBER

PRESTON ARS 24th Annual Rally - University of Lancaster. Details from Godfrey Lancefield, G3DWQ, QTHR, tel: 0772 53810.

TELFORD Radio Rally - Telford Exhibition Centre, Telford. Details from Martyn, G3UKV, tel: 0952 255416 or John, G0GTN, tel: 0743 249943.

8 SEPTEMBER

LINCOLN SWC 10th Lincoln Hamfest which celebrates the 70th anniversary of G5FZ - Lincolnshire Showground. Entry £1; all the usual attractions; Caravans welcome. Details from Sue Middleton (XYL G8VGF QTHR), tel: 0522 525760.

MADLEY SATELLITE EARTH STATION ARG AR & Electronics Car Boot Sale - Madley Communications Centre, Madley, Hereford. Some traders, bring & buy, incorporating a conventional car boot sale, refreshments, toilets, ample parking. Opens 8.30. Talk-in on S22 by G7BTI. Details from David Butler, G4ASR, tel: 087 387 679.

MILTON KEYNES & DARS 5th Annual Car Boot Sale - Cranfield Airfield (South Side), Cranfield, Bedford, MK43 0AL. Opens 9.30am; refreshments available. Talk-in on S22. Details from Tony, G6WXM, tel: 0908 316435, Dave, G3ZPA, tel: 0908 501310 or Ray, G1LRU tel: 0908 660798.

VANGE ARS Annual Rally - The Laindon Community Centre, Laindon High Road/Aston Road, Laindon, Basildon, Essex. The Centre is only a short walk from Laindon station (BR) on the Fenchurch Street to Shoeburyness line. Doors open 10.30am, admission 50p. Many traders, bring & buy, refreshments and a free raffle. Talk-in on S22. Approach roads will be signposted. Details from Doris Thompson, tel: 0268 552606 or Mike Musgrave, G4NVT, tel: 0268 543025 (24 hour answering service).

13-15 SEPTEMBER

WACRAL CONFERENCE - Elim Bible College, Nantwich. Details from Geoff Peterson, G4EZU, tel: 0474 533686.

14 SEPTEMBER

BALLYMENA Annual Rally - Ballee High Community School. Details from GI4HCN, 154 Galgorm Road, Ballymena.

WIGHT Wireless Rally - CEM Wireless Museum, Arreton Manor, Nr Newport, IOW. Opens 11am. Talk-in on 2m GI3IOW. Exhibition station GB3WM on 3700kHz. Details from Douglas, G3KPO, tel: 0983 67665.

15 SEPTEMBER

BARTG Rally - Surrey Hall, Sandown Park Racecourse. Opens 10.30am. Admission - adults £1, children under 14 free if accompanied by adult. Over 250 tables - many exhibitor and special interest groups will be attending. See the latest in radios, computers, computer peripherals, software, books and much more. Free parking for over 5000 cars. Easy access - well signposted. Talk-in on S22 and SU22. Details from Peter Nicol, 38 Mitten Avenue, Rubery, Birmingham B45 0JB, tel: 021 453 2676.

BRISTOL Radio Rally - Brunel's Great Train Shed, Temple Meads Station, Bristol. Doors open 10.30am; many trade stands; demonstrations including ATV; large bring & buy; refreshments; good access for disabled visitors; talk-in on S22; good parking facilities; venue is just 5 minutes from the M32. Details from David Farr, G4WUB, tel: 0272 839855.

EAST OF ENGLAND RADIO RALLY (Peterborough R&ES) - ICI Building, The East of England Showground, Oundle Road, Peterborough. Doors open 10.30am (10 for disabled visitors - toilet facilities available); admission £1; traders' main hall with bar and catering; traders' marquee with bring & buy, separate outside area with flea market plus radio and electronic car boot. Various other local attractions: Nene Park and Nene Valley Railway; golf driving range and Go-karts etc; acres of free parking. Details from Nigel, G1ARV, tel: 0733 78685 or Mike, G0CVZ, tel: 0733 222588.

PAKEFIELD Radio/Electronics Rally and Car Boot Sale - Pakefield Middle School, Kilbourn Road, Pakefield, Lowestoft. Doors open 10am; talk-in on S22; caravanners welcome from 6pm Friday until 6pm Sunday - make it a family weekend. Details from G3WDN, tel: 0502 565986 or 715537.

22 SEPTEMBER

CENTRE OF ENGLAND Autumn Radio & Electronics Rally will be held at the British Motorcycle Museum, Bickenhill nr The NEC, Jct 6 M42. Doors open 10.30am; admission £1 (concession for RAIBC members and senior citizens); over 60 traders in 3 large halls, ample free parking, bring & buy, talk-in on S22, bar & restaurant facilies. Details from Frank Martin, G4UMF, tel: 0952 598173.

28/29 SEPTEMBER

RSGB HF CONVENTION - Penguin Hotel, Daventry, Northants. Talks and events as follows: Marti Laine, OH2BH; Peter Hart, G3SJX; Al Slater, G3FXB; Roger Western, G3SXW; John Allen, DTI Baldock; Roger Ballister, G3KMA; Packet Cluster Forum; Young Amateur of the Year Award; Presentation of RSGB HF Trophies; Novice Clinic; DXpeditions (provisional); Review of High Quality Transceivers; Contesting; Pile Up Operating; What's on 80m Tonight?; IOTA. Details from Bob Whelan, G3PJT, 36 Greenend, Comberton, Cambridge CB3 7DY.

29 SEPTEMBER

HARLOW AR&E Mobile Rally - Harlow Sports Centre. Doors open 10.30am; talk-in on 2m & 70cm by G6UT; bar; hot snacks; disabled facilities; giant bring'n'buy; special interest groups; free parking; admission £1. Details from: evenings & wkends: Liz, G0MDL, tel: 0277 364742; daytime: Ken, G0HRR, tel: 0279 426647.

7TH NORTH WAKEFIELD RC Rally - Outwood Grange School, Potovens Lane, Outwood, Nr Wakefield. Doors open 11am; admission 50p; fully licensed bar; raffle; bring'n'buy; computer & electronics traders and repeater groups; talk-in on S22 club callsign G4NOK. Venue is 2 miles from M1 and M62. Details from Dick, G4GCX, tel: 0532 622139 or John, G4RCG, tel: 0924 362144.

6 OCTOBER

BLACKWOOD AR Rally - Oakdale Community College. Details from B. Matthews, GW0JWF, 25 Manor Park, Newbridge, Gwent.

GREAT LUMLEY Radio Rally - The Community Centre, Great Lumley, Nr Chester-Le-Street, Co Durham. Details from Barry, G1JDP, tel: 091 388 5936.

HORNCASTLE AR Electronics & Computer Fair - Horncastle Youth Centre, adjacent to the A128 Lincoln/Skegness main road. Opens 10.30am ((10am for disabled visitors); admission £1 per person (negotiated discounts for organised groups). Range of computer, radio and electronic components plus second hand and surplus equipment sale; flea market/car boot sale in the outside sports area. Louth & DARS will be running a bring & buy stall. Details - sae to Tony Nightingale, G6CZV, Horncastle Youth Centre, Cagthorpe Building, Willow Row, Horncastle, Lincs LN9 6HW.

13 OCTOBER

ARMAGH & DUNGANNON Rally - Gosford House Hotel, Markethill, Co Armagh. Details from T.E. Hall, GI0MSJ, QTHR GI6UMR, tel: 0861 523454.

HORNSEA Rally (ELHOEX Electronic Hobbies Exhibition) - The Floral Hall, Hornsea, East Yorkshire. Details from Jeff, G4IGY, tel: 0964 533331.

SOUTH DEVON RC Computer and Radio Rally - Hillhead Campsite, Dartmouth Road, Brixham, South Devon. Details from W.T. Trezise, G6ZRM, tel: 0803 522216.

19 OCTOBER

G-QRP CLUB Mini-Convention. Details from G3RJV.

25/26 OCTOBER

LEICESTER ARS Show - Granby Halls, Leicester. All usual facilities. Details from Frank Elliott, G4PDZ, tel: 0533 871086.

2/3 NOVEMBER

NORTH WALES 5th Radio & Electronics Show - Aberconwy Conference Centre, Llandudno. Details from N.B. Mee, GW7EXH, tel: 0745 591704.

10 NOVEMBER

BARNSLEY & DARC Rally - Willowgarth Senior High School, Brierley Road, Grimethorpe, Barnsley. There has been a rush of traders wanting space and over 580ft of table space has been booked. Details from Ernie, G4LUE, QTHR, tel: 0226 716339 (between 6pm and 8pm please).

MARS/STOCKLAND Mobile Radio Rally - Stockland Green Leisure Centre, Slade Road, Erdington, Birmingham. Details from Norman, G8BHE, tel: 021-422 9787, Peter, G6DRN, tel: 021-443 1189 or Michael, G4OMP, tel: 021-382 3606.

24 NOVEMBER

WEST MANCHESTER RC Winter Rally - Bolton Sports & Exhibition Centre, Silverwell St, Bolton. Details from Dave, G1IOO, tel: 0204 24104 (evenings only).

8 DECEMBER

VERULAM Christmas Rally. Details from G0NDB

2 FEBRUARY 1992

SOUTH ESSEX ARS Radio Rally - Paddocks Long Rd (A130), Canvey Island, Essex. Details from Dave Speechley, G4UVJ, tel: 0268 697978.

16 FEBRUARY 1992

KIDDERMINSTER & DARS Rally 1992 - Harry Cheshire School, Habberley Road, Kidderminster. Details from G4HFP, 16 Marlborough Drive, Stourport-on-Severn, Worcs. DY13 0JH.

GUIDELINES FOR USE OF THE PACKET RADIO NETWORK

Improving Operating Standards

THESE GUIDELINES have been in the making for about 18 months. They were first drafted by the then RSGB Packet Working Group as a way of trying to interpret the existing licence conditions in relation to the excellent benefits the packet network offers. An early version was published in the Society's packet newsletter *Connect International* and on the packet network itself.

This work was overtaken by events as the Radiocommunications Agency of the DTI became concerned about the content of a number of messages circulating on the network. This concern resulted in a letter to the RSGB President from the Head of UK Licensing, published in the July 1990 *Radcom*.

The RSGB's guidelines were offered to the RA, via the RSGB Licensing Advisory Committee, for comments. A meeting was arranged at Waterloo Bridge House to discuss packet radio matters, including the guidelines. The RA expressed the view that the contents 'were fine' but that they would benefit from changes in context and format.

The RSGB then re-wrote the guidelines in accordance with the RA's suggestions and re-presented them. Since that time a number of further changes have been suggested by the RA and incorporated until finally we have arrived at the present version.

The RA is happy that 'they are now much more in tune with what is required' and therefore they are being published in their current form. We anticipate that they will be somewhat dynamic and will change to reflect any changes in terms and conditions in the amateur licence. It is worth noting that they are only *guidelines*, operators will as always, with very good reason, interpret them in their own way. At the end of the day it is really down to using a bit of common sense and abiding both by the letter and spirit of the licence and amateur radio code.

Guidelines for the Use of the Packet Radio Network

THE PACKET RADIO network in the UK and throughout the world is an immensely useful tool for the dissemination of information, the seeking of help and advice and the publication of amateur radio related news. It is not uncommon to find messages giving information on Amsat, Raynet or other similar activities. The GB2RS news is also available on the network, as is local club news in the area of a particular mailbox. This use of the network is what was in many operators' minds when they spent large amounts of time and money in developing it.

Unfortunately, the very success of the network has resulted in messages appearing which are of doubtful legality under the terms of the UK licence.

The RSGB Data Communications Committee, in consultation with the Radiocommunications Agency, has devised the following guidelines with which all operators are urged to comply.

These guidelines have been split into four sections in order to reflect:

A) The need for messages to be within the terms of the licence conditions and the implications if they are not.

B) Messages which could result in legal action being taken by other amateurs or outside bodies.

C) Actions to be taken when amateurs identify cases of abuse.

D) Other appropriate items.

SECTION A:

1) All messages should reflect the purposes of the amateur licence, in particular 'self training in the use of communications by wireless telegraphy'.

2) Any messages which clearly infringe licence conditions could result in prosecution, or revocation, or variation of a licence. The Secretary of State has the power to vary or revoke licences if an amateur's actions call into question whether he is a fit and proper person to hold an amateur licence. An example of this could be unreasonable behaviour by using the packet network to carry on a dispute or to deliberately antagonise other amateurs.

3) The Radiocommunications Agency has advised that the Amateur Radio Licence prohibits any form of advertising, whether money is involved or not.

4) Messages broadcast to 'ALL' are considered acceptable but should only be used when of real value in order to avoid overloading the network.

5) Do not send anything which could be interpreted as being for the purpose of business or propaganda. This includes messages of, or on behalf of, any social, political, religious or commercial organisation. However, our licence specifically allows news of activities of non profit making organisations formed for the furtherance of amateur radio.

SECTION B:

1) Do not send any message which is libellous, defamatory, racist or abusive.

2) Do not infringe any copyright or contravene the Data Protection Act.

3) Do not publish any information which infringes personal or corporate privacy, eg ex-directory telephone numbers or addresses withheld from the callbook.

SECTION C:

1) Any cases of abuse noted should be referred in the first instance to AROS*, which is coordinated by Geoff Griffiths, G3STG, who will take the appropriate action.

2) It is worth noting that any transmissions which are considered grossly offensive, indecent, obscene or menacing should be dealt with by the police. This action should also be coordinated by AROS initially.

3) Mailbox SysOps have been reminded by the Radiocommunications Agency that they have an obligation to review messages daily and that they should not hesitate to delete those that they deem unacceptable. It is worth remembering that their licence is also at risk as well as your own.

SECTION D:

1) Do not send 'Open letters' to individuals.

2) Do not write in the heat of the moment. Wordprocess your bulletin first, then re-read it. You may feel differently after a few minutes.

3) Obey the Golden Rule - If you would not say it on voice do not send it on packet.

* The RSGB's Amateur Radio Observation Service (see RSGB Call Book or RadCom Dec 88). Write to Geoff Griffiths, G3STG, 11 The Grove, Asfordby, Melton Mowbray, Leicestershire, LE14 3UF.

PENPALS

Benito Calvar, EA1CNL, would like to make contact with an English speaking amateur, both for correspondence and radio contact. Anyone interested write to Benito at PO Box 1.110, 36.200-VIGO, Spain.

We have received a photograph from Romila Daniel, YO2LCG, a 26-year old electronics engineer requesting amateurs to send him letters or postcards in English. If you would like to contact him, send your letters to Romila Daniel, Str Circum-valatiunii, Nr.69 SCA AP 28, Timisoara 1900, Romania.

VIDEO RECORDER

Could anyone advise Ben Follows, G4FJU, of a modern video recorder compatible with the 80/40M bands. Most seem to have a play-back frequency in the 3.8MHz region, and filters do not seem to help. The problem is direct pick up on the play-back head, and short of encasing the whole unit in lead there is no cure. Any advice to Ben at 1 Avon Road, River Est, Bloxwich, Walsall, WS3 1PA.

ROYAL FREE HOSPITAL REQUEST

Alan Charles, G4ORE, has asked whether there is a retired electronics or radio engineer (or enthusiast) who would consider spending a little of his time as a volunteer in the Electronics Department of the Royal Free Hospital, Hampstead. They are looking for someone who would enjoy taking obsolete equipment to pieces and recycling the component parts, as well as finding customers for usable equipment. A canteen lunch ticket and local travelling expenses would be provided - and a friendly welcome. Please contact Alan on 071 794 0500 (Ext 3198).

AIRCRAFT MUSEUM

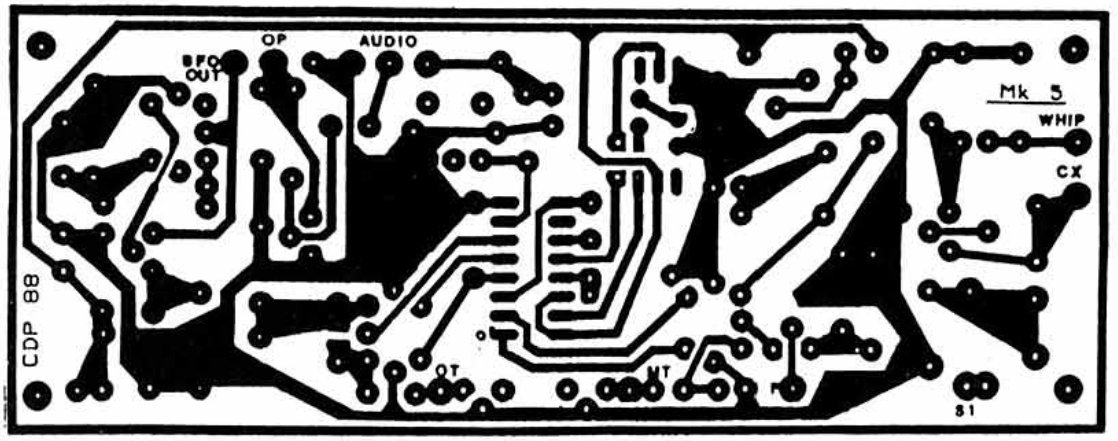
Dr Manning, G4GLM is involved in a major project in his aircraft museum and is trying to find some grey or clear/colourless embossing tape of any make or width, so as to enable him to relabel parts of the two-crew twin-jet airliner cockpit for educational purposes. All responses gratefully acknowledged and costs reimbursed. Please telephone him on 081 958 5113 (home), or 081 952 7176 (work).

Helplines is designed to help put people in touch with each other. If you have a problem, it's more likely there's someone out there who has the solution; if you are looking for an old colleague or amateur friend, there could be a reader who has some news of their whereabouts; if you have solved a particular problem, write and tell the rest of us. 'Helplines' is there to help you and to give you the opportunity of helping others. Write to us marking your envelope 'Helplines' and we'll do what we can to get the message out.

HF DIRECTION FINDING

(June)

PCB of artwork for last month's top band DF project.



The Last Word

SEVEN-YEAR HITCH?

It would appear that the new Novice Licence is unfortunately bound to fail in its aims on two counts. It would seem to be totally satisfactory for anyone aged between 14 and 21 years old, but everyone else loses out.

For the under-14's, it seems very unfair to test them and allow them onto HF as Novices, and then put them off by telling them that they can progress no further, even if they can pass the necessary exams, until they are 14.

Additionally, it seems ridiculous to try to encourage existing 'B' Licence holders over 21 to try to 'upgrade' to 'A' Class via the Novice route and then tell them that it will cost them £30 per year to hold both calls.

Surely now is the time for the RSGB to strongly urge the DTI to abolish the lower age limit for 'full' licences. After all, if a 7-year-old Novice can be allowed unsupervised on the air, surely a 7-year-old 'A' licensee, or younger if they can pass the requisite exams, also can. Look at the States - it works there!

Regarding the 'more mature' end of the spectrum, how about just adding the Novice 'A' callsign to a 'B' licence validation document on the applicant's passing the 5WPM CW test free of charge. After all, it could, for them, just be treated as a variation of licence much as 50MHz was in the early days of that band. I don't remember those applicants being charged an extra full licence fee for the extra privilege!

By taking up the above two suggestions, all 'B' Class and non-amateurs could be encouraged to qualify (in stages if necessary) to a full 'A' call, rather than an exclusive 7-year age band or those affluent or stupid enough to pay two licence fees.

Jon Carp 5B4ZL, G8XFT

[Some interesting points, Mr Carp, but beware of comparisons between the UK Novice Licence training scheme, the RAE and the US Novice licence - they are quite different - Ed]

THANKS FROM JUNO SCHOOL

I would like to take this opportunity to thank amateur radio enthusiasts in the UK for all their help, encouragement and enthusiasm during this school's involvement in Project 'JUNO' (GB6JUNO).

In particular, the support, advice and help of enthusiasts in the Devon and Cornwall area were most appreciated. Their help in keeping the frequencies clear was most appreciated. Thank you.

J Bond, Headmaster

AMBASSADOR HELEN

To be able to sit in one's home and listen on a 2m handheld to Helen Sharman transmitting from GB1MIR was a thrill in itself.

Although I could not monitor all her transmissions, the facts she conveyed (about coping with fluid in the head, seeing 16 sunrises/16 sunsets during a 24-hour period, sleeping according to her earthly clock and feeling very heavy on experiencing gravity again) conveyed more interesting information about space travel in a few words than many other astronauts have done during the past 40 years.

She should be congratulated on a job well done, and being a good ambassador for Britain and amateur radio in particular.

Brian Vaughton G0HRH

WHITE'S ALL RIGHT

May I say how much I enjoyed Ian White's two articles on the construction of RF circuits (*RadCom* Feb/Mar) - this is the best construction article for years. I hope you will publish more like it.

J S Linfoot G0CPP

[We'll do our best - Ed]

VIVE LA DIFFERENCE

Whilst reading through one of last year's *RadComs*, I found a *Last Word* letter from a gent who had a QSO with someone of his own age and their combined ages came to around 150 years. He then challenged anyone to beat this grand figure.

In contrast to this, I heard a QSO between a local special event station and W2XM. Here the American was 100 years old and the operator of the special event station was only fifteen. Subtracting their ages, there is a gap of 85 years. I wonder if anyone can beat this figure, for an age difference between two amateurs in QSO? It certainly shows that amateur radio is a hobby for all ages!

Ryan Pike G7JLF (aged 17)

RADIO ON £7.50 A SET

I'm sorry for Robert W Lucky (*Technical Topics*, May). I'm probably about the same age, but I don't share his views. My one criterion in building radios is that they should not cost more than £7.50 (it was £5 - inflation!).

Let me list them:-

1. 20m DC Receiver - pins on the map include Falklands, Australia, America.
2. All wave band Superhet from long wave to 30MHz.
3. FM Receivers (three of these - Radio 2 moved!).
4. FM Receiver varicap tuned.
5. 20m and 80m DC Receivers 'Sudden'.
6. 80m DC Receiver (*Amateur Radio Techniques*, G3VA (RSGB) 1978 edition).
7. 80m Superhets, one single conversion, two double conversions.
8. Three MW radios.
9. Found some CA3028A (3 for 50p); at present I have a short wave set working.

I've been retired three years, and have been building sets for 15, but I consider I've only scratched the surface. I fancy making a radio telescope, but so far with the Yagi pointing directly at the sun, I can't get a flicker on the needle!

I would make two suggestions to anyone who thinks home construction is dead. Get ARRL's *QRP Classics* from the RSGB (this book is an absolute dream) and send for Brian Reed's price list. Stick to £7.50 a set and you will think you are back in the old days - I do, and am loving every minute.

P McBeath RS44030.

NOSES ARE RED

As a member of the fifth year of St Augustine's RC High School, Redditch, Worcs, and a new licensee, I decided to air a Special Event Callsign on Comic Relief Red Nose Day, March 15th, and hold a sponsored QSO for the charity. I operated all day under the callsign GB8RED, making 27 QSOs in total.

The event raised £29.20 from the sponsored QSO, and a 'Dosh Bucket' that was taken around the school periodically by members of my year. Log keepers were fellow fifth formers: Richard Blundell, Marcus Chamberlayne, Philip Bogan and Steve Jeaco.

I must extend my thanks to year head, John, G1YFA, who helped to run things, to St. Augustine's for putting up with the TVI, to the RSGB for their swift action in sorting out the GB call at short notice, and also to Dave, G6FEO, who kindly lent us 100m of co-ax for the event. Thanks also go to those amateurs we contacted.

The event was great fun to work, and very satisfying to know that I was enjoying myself for charity. Several pupils had a go with Greetings Messages. For QSLs, send to G7JCG via the bureau (be prepared to wait a while).

Paul Robertson G7JCG

Please note that the views expressed in 'Last Word' are not necessarily those of the RSGB.

We reserve the right to edit letters and regret that we can no longer acknowledge them individually but will pass them on to the relevant department.

MORSE - ARCHAIC . . . .

Words of wisdom indeed from G3ENV about the ancient art of Morse (*The Last Word*, June), but what a predictable reply.

Are we to seriously believe that negotiating a 5WPM test for Class B novices was a success? Why didn't the RSGB attempt to go straight for a codeless licence and, more important, try to improve the standards of operating on all the bands? Sustaining the Morse test does no good whatsoever when it comes to common courtesy or technical ability.

I regularly hear of initiatives to encourage new blood into the world of amateur radio, so why do we persist in maintaining such an archaic ritual to join? I fear that the RSGB is becoming a dinosaur, doomed to extinction together with its members unless it can adapt to the change in environment.

I would remind everyone that having passed the Morse test there is no requirement to actually use it or even show that you can remember it. Many Class A licence holders would agree that they no longer use the code nor wish to.

I believe the way forward is for the RSGB to negotiate for a two-tier codeless licence, both having access to all bands but the junior licence having a power restriction until experience is gained.

Are we all big enough to put prejudice aside and do something really radical that might stimulate new interest in the hobby and maybe drag ourselves into the 21st century?

Graham Lindsay G8BZL

. . . . OR USEFUL?

Isn't it about time the CW knockers stopped moaning and left those of us who use A1A alone?

The trouble is that the people who knock the mode are possibly too lazy to take the trouble. There are circumstances when one has to employ CW because of QRM, early morning communication when it is best not to use phone due to the fact one may disturb the family or people in the upstairs flat. Let's face it, it's part of my hobby and I will always use A1A, particularly QRP, and I do like a change now and again. Probably some are looking for an easy path to HF.

J Caledon-Scott G4LRS.

PRESTON GANG

I would like to pass on through the columns of *RadCom* a big personal thank you to the Preston Area Morse Group who have helped me pass the Morse test. Thanks go to G0KMU, G0GVA, G4WYH, G0EHW, G3PS and G0KSH. Also a big thanks to all other stations that have popped up on frequency and given words of encouragement and to G4KGK for practice CW QSOs.

For anyone thinking of taking the Morse test, the Preston Group operates Monday to Friday from 1900 - 2045 hours on 145.250MHz and welcome all operators.

K R Mahood G1ZIR now G0OXV

DISAPPOINTMENT BUT WHAT A NIGHT

Helen, brave Helen, a lady in Space,
Helen, heroic Helen, with a smiling face.
Helen Sharman, now a famous name,
Experiments in Space is your game.

Your voice through the speaker was very clear,
All hearts missed a beat then we cheered.
But Helen, O Helen, then we were sad,
As no two way chat, on the sked we had.

Helen, bold Helen, we all heard you,
But our 80 Watt signal failed to get through.
Grown ups and children had tearful eyes,
A great disappointment, could not be disguised.

We did hear your voice so that's half alright,
On May 23rd, an unforgettable night.
The radio message we remember best of all,
Is GB1MIR to GB1JUNO, what a wonderful call.

A historic event to us came true,
Thank you Helen, a big thanks to you.
The next page of history, please make it come true,
Please come to Llanelli, please will you?

Rowland and Bigyn School Radio Club
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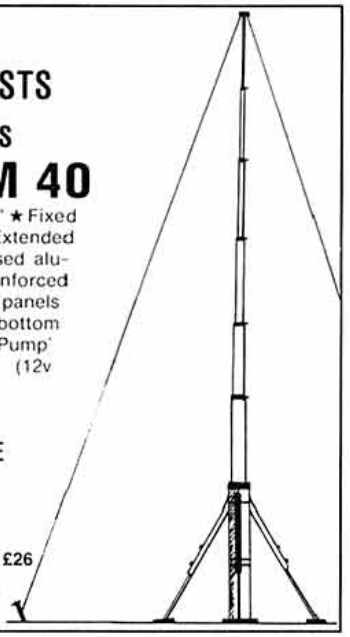

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