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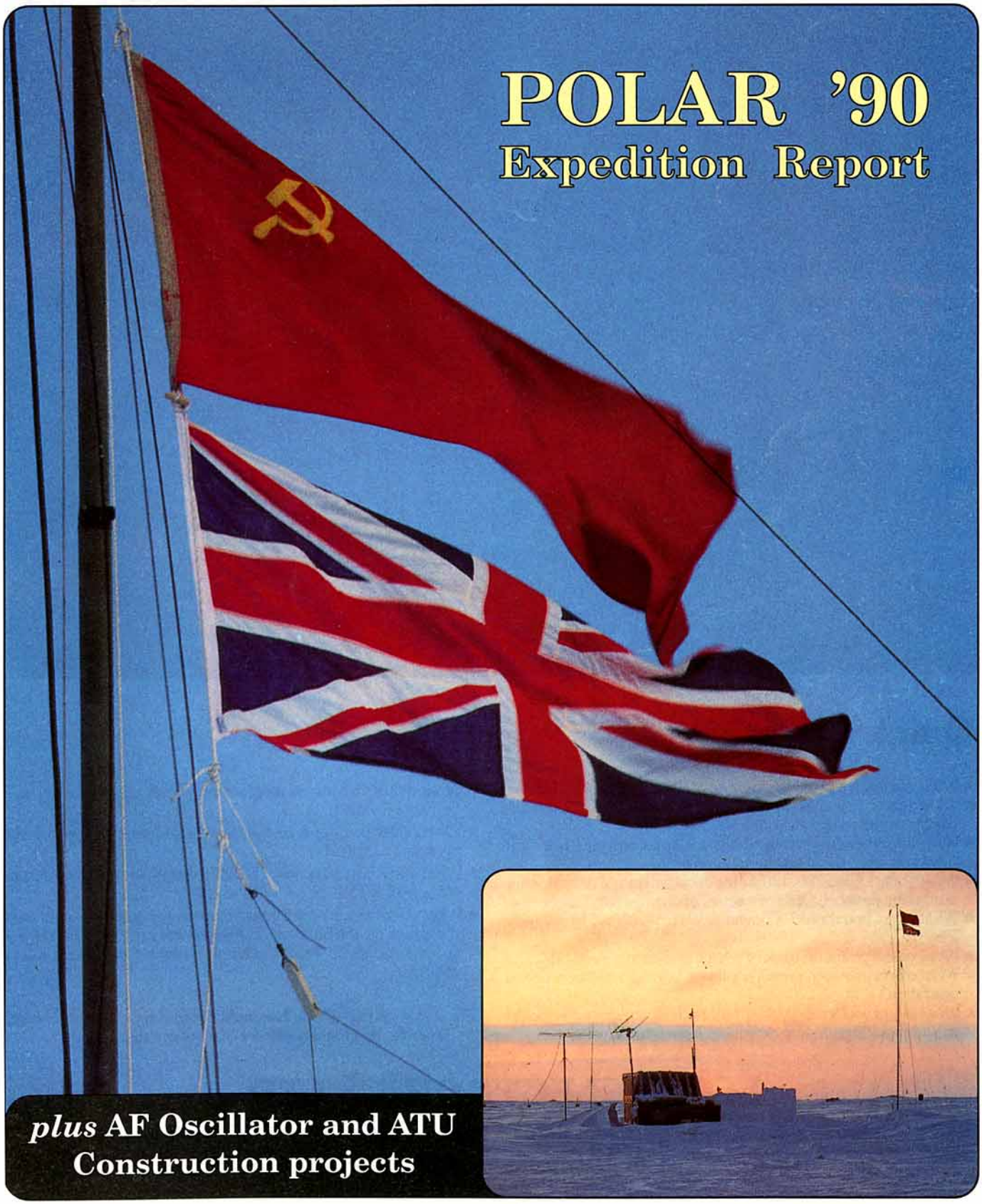
Radio Communication

The Journal of the Radio Society of Great Britain

Serving Amateur Radio

September 1990



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Radio Communication

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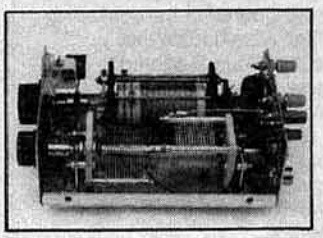

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All contributions and correspondence concerning the content of *Radio Communication* should be posted to:

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

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RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

Founded 1913. Incorporated 1926. Limited by guarantee.
Member society of the International Amateur Radio Union

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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

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Membership application forms available from RSGB HQ

Council Brief

29 March 1990

● The Secretary reported that the text of the Novice Licence had been agreed and that the DTI expected to make an announcement at or around the time of the RSGB National Convention.

● Novice Licence equipment had also been discussed with the DTI. As a result, the RSGB intended to issue some basic guidelines to Novice Equipment Manufacturers.

● The format of the Novice Licence Morse Test was discussed.

● Following the resignation of the *RadCom* Editor, temporary arrangements for the production of *RadCom*, and future arrangements were discussed in some detail. The recruitment of a new Editor would take place as soon as possible. Council agreed to reinstate the RSGB diamond logo on the front cover of *RadCom* as quickly as possible.

● The delivery time of *RadCom* was discussed in the light of the recent survey. The delivery period was slightly worse than the survey results obtained in 1980.

● To help improve local contact between the RSGB/RLO and its members, it was reported that the RLO's name, callsign and telephone number would now be printed on the membership card carrier.

● Arrangements for the QSL Bureau were discussed following the retirement of Mr. & Mrs. Allen. A retirement reception for the Allens was planned.

● Council agreed a change of Auditors for the Society. Peter Goddard and Co. of Berkshire were appointed. Cheque signing arrangements were also discussed.

● The Honorary Treasurer informed Council of the continuing very high workload on the Secretary. Council agreed to form a special President's Advisory Committee to determine how best work could be passed to other senior staff, many of whom were also overloaded, and seek additional support from volunteers.

● The common renewal date and new integrated software was discussed.

● The importance of clear guidelines for packet mailbox users was discussed. The DTI would be asked for their reactions to the RSGB draft.

● The Council agreed to form a new Committee to look after all aspects of direction finding in the UK. Its first Chairman, Brian Bristow, G4KBB, was appointed.

● Arrangements for the forthcoming IARU Region 1 Conference in Torremolinos were discussed. The Secretary of AMSAT UK and President of AMSAT USA were approved as RSGB observers at the Conference.

● Help for radio amateurs in Romania was discussed. It was agreed to find out first-hand at the Region 1 Conference how best the RSGB could continue to assist.

● A new Chairman for the EMC Committee, Bob Peace, G8SOZ, was appointed. It was stressed that there was a greater need for close links between the EMC Committee and Planning Committee. Council member G3GJW was to join the Planning Committee at Council's request.

● It was agreed that in future both Project YEAR and Committee business would be placed on the main Council Agenda. This emphasised the importance of both areas of future RSGB work.

● Other matters discussed included: draft Novice bandplan for 50 MHz; the second pilot edition of *DiY Radio*; the RSGB Green Book; repeater abuse; Raynet procedures; the RSGB at external events; public relations; reduced subscription rates; membership drives; repeater costs and the Young Amateur of the Year Award.

1991 President

At its meeting on 19 July, Council elected John Case, GW4HWR, as RSGB President for 1991. John Case is currently Executive Vice President and Chairman of the Training and Education Advisory Group which has been closely involved with preparations for the Novice Licence and Project Year.

Council Election for 1991

The Society's Articles of Association require that members who are entitled to vote be notified of those Council members who retire at the end of each year. The Council members who retire on 31 December 1990 are:-

Ordinary Members

Dr Julian Gannaway, G3YGF, who is not eligible for re-election in 1991 under Article 26.

Dr John Allaway, G3FKM, who is not eligible for re-election in 1991 under Article 26.

Zonal Members

Zone B - Mr John Allen, G3DOT, who is eligible and willing to accept nomination for re-election.

Zone E - Since Mr John Case, GW4HWR, is to become the President in 1991, a vacancy in Zone E is created.

Zone F - Mr Terry Barnes, GI3USS, who is not eligible for re-election in 1991 under Article 26.

Election of the 1991 Council

1) The role of Council and Council members.

To assist candidates and those making nominations, the following notes are intended to summarise very briefly the main functions of Council and Council members.

The size, complexity and long-term nature of the Society's activities makes it necessary for the day-to-day control of its affairs to be in the hands of a stable administration. At present, the workload is divided between the full-time staff, approximately 25 in number, and the volunteer effort represented by the 16 sub-committees of Council and its honorary officers. Of the HQ effort, roughly half can be regarded as being devoted directly to amateur radio matters, the remainder being concerned with administrative tasks. Responsibility to Council for the working of HQ is primarily with the Finance & Staff Committee, with the Licensing Advisory Committee being heavily involved with licensing aspects. The work of the other committees is mainly concerned with amateur radio matters, although there may be major financial implications.

The main work of Council is that of monitoring the work of HQ and the committees to ensure their effectiveness in handling the commercial aspects of the Society's operation (an income of over £1 million per annum), together with those matters it has identified as being important to amateur radio on both the national and international level.

The main duty of Council members obviously is to play an active part in this operation. This will involve, inter alia, the attendance at, typically, seven Council meetings each year; the critical review of the 200 or so sets of committee minutes and working documents produced during the same period; and the capacity to react constructively to this and other information. Council members are also expected to deal with individual members' problems: their duty is to ensure that these are dealt with by the responsible committee or other body.

2) Candidate's qualifications and details.

a) The candidate must have been a corporate member for at least three years at the time of nomination.

b) The candidate must submit the following:
   (i) Written, signed consent to accept office, if elected.
   (ii) If appropriate, a statement that she/he is over 70 years of age or will become so during the term of office if elected. The Society's Articles of Association requires that the Council ballot paper shall state the date of birth of any candidate who will have attained the age of 70 before the end of the term of office he/she would normally serve if elected.
   iii) A statement declaring any commercial interest in the field of amateur radio.

These declarations, together with nominations, may conveniently be made by using the "Candidate's Form for the Election of Ordinary or Zonal Members of Council" (Form CF/CE & Form NF/CE) available on request from:-

The Secretary (DAE)
RSGB
Lambda House
Cranborne Road
Potters Bar
Herts EN6 3JE.

3) Nomination procedure.

a) The nominators for each candidate, at least 10 in number, must be fully paid-up corporate members at the time of nomination. In the case of zonal members, the candidates and nominators must reside in the zone concerned.

b) Nominators may nominate only one candidate.

c) The nominations may be made on the "Candidate's Form" referred to above, the associated "Nominator's Form" or on any sheet of paper. Each nomination must be signed by the nominator, who should include the name of his/her town.

4) Additional information on candidates.

In order to assist the membership in voting, a candidate may enclose a maximum of 200 words as a CV or statement describing pertinent experience which will be circulated within the ballot forms. This must be confined to biographical facts. Clearly, involvement with decision-making in organisations of similar size to the RSGB (or larger) would be relevant, and this should be stated. Prospective candidates will find it useful to have had experience of RSGB procedures, including committee membership or other duties, writing for Society publications or organising events. This experience should be quoted together with details of participation in amateur radio at the local level. Bona fide statements will receive the minimum of editing consistent with good style and factual accuracy; however, statements exceeding 200 words will be cut to that number.

The candidate may also supply a recent black-and-white head-and-shoulders photograph for publication with the CV, if she/he wishes.

5) Information on nominators.

Nominators are required to give details of their place of residence. It is to be noted that voters may place higher value on nominations if they are seen to have come from many parts of the UK in the case of Ordinary Members, or many parts of the Zone in the case of Zonal Members, rather than a restricted area.

Nominators may also supply for publication details of how long they have known the candidate and of relevant positions that they hold or have held; for example, as the chairman of an amateur radio club, a member of Council etc, or who can indicate management experience. The standard nomination form referred to above is designed to facilitate the supply of this information.

The candidate's declaration together with the completed nominations should be sent in a single closed envelope and addressed to:

The Secretary (DAE)
RSGB
Lambda House
Cranborne Road
Potters Bar
Herts EN6 3JE

to arrive no later than 10 Oct. '90.

Mark the envelope "1991 Council Nominations". Nominations for all candidates will be acknowledged by return of post.

QSL Bureau News

There are a number of changes to the list of QSL sub managers.

A new QSL sub manager has been appointed for the G1 series. The new sub manager is Mr Ron Kingstone, G4HHB, 36 Hunters Oak, Hemel Hempstead, Herts, HP2 7SW.

There is a new sub manager for callsigns starting with G3, G4 or G5 that have two letter suffixes. This is Mr PJ Pasquet, G4RRA, 64 Bricksbury Hill, Farnham, Surrey, GU9 0LY.

A new sub manager has also taken office in Scotland. The main sub manager for Scotland is now Mr GE Bell, GM4LKJ, 21 St Andrew's Crescent, Dumbarton, G82 3ER.

In Wales, Mr D Green, GW3MRI, has now taken over the distribution of cards for the GW0 series. This is in addition to his previous duties as sub manager for Welsh Class B callsigns. Mr Green can be contacted at 4 Ogwen Drive, Lakeside, Cardiff, CF2 6LH.

Finally, Mr FG Rylands, G2VF has retired from the position of QSL sub manger for the G3W and G3X series after 21 years of service. We sincerely thank Mr Rylands and his wife for their unfailing efforts during this time. This position has been filled by Mr Ian Batley, G0IID, 3 Follden Avenue, Fulwell, Sunderland, Tyne and Wear, SR6 9HP. Ian Batley also handles cards for the G3Y and G3Z series.

An up to date list of QSL sub managers can be obtained by sending a stamped addressed envelope, marked QSL LIST, to the membership services department at RSGB HQ.

VHF Convention

The date of next year's VHF Convention at Sandown Park is 24 March 1991. For details and stand booking contact Geoff Stone, G3FZL, 11 Liphook Crescent, Forest Hill, London, SE23 3BN. Tel: 081-699 6940.

NEWS & REPORTS

More RSGB Successes

QRO on 160

At the 1979 World Administrative Radio Conference, it was agreed that 1810kHz to 1850kHz would become Amateur Exclusive when those currently sharing this part of the band were allocated new frequencies. In 1985, the DTI (now the Radiocommunications Agency) attempted at an international maritime conference to obtain this exclusive allocation for UK amateurs. Unfortunately, owing to objections from other countries, implementation was deferred until 1992. It is likely that full HF licensed power (26dBW) will be available once this part of top band is exclusive.

400W CW to be permitted on HF bands

There is an anomoly whereby higher power is permitted on SSB which is measured in peak envelope power output, than on CW where carrier power is used. This is typically 26dBW (400W) and 20dBW (100W) respectively. The Society requested that this be rectified when the major licence revision took place two years ago, but it could not be approved at the time. Following further representations from the Society, the Radiocommunications Agency acknowledges that the anomoly exists and is hopeful that the higher power can be made available to CW operators shortly. This really is good news for HF CW operators, bringing UK licence conditions into line with those in many other countries.

80m Beacon

The RA has approved in principle an RSGB proposal for a 1kW beacon just ouside the 80m band, providing propagation data for amateurs and professionals throughout Europe. More info from PSC member G3DME, QTHR.

VLF possible

Radio amateurs may soon be doing experimental work at Very Low Frequencies (VLF). The Society has long sought an allocation in this fascinating part of the spectrum and, at a recent meeting with the RA, it was revealed that special experimental permits may be granted for genuine experimental work on single frequencies between 15kHz and 120kHz approx. There is even a possibility of an allocation at an even lower frequency. Anyone interested should write to the Chairman of the RSGB's Licensing Advisory Committee, John Bazley, G3HCT, QTHR, with details of the experiments they would like to carry out.

Vertical on six

To avoid possible interference to a vertically polarised Belgian Band I TV station, horizontal polarisation was a condition of allocating the 50MHz band to UK amateurs. Now that this TV station is no longer significant, the Radiocommunications Agency expects to permit the use of vertical polarisation by amateurs later this year. It is also likely that mobile operation will be permitted, including the use of hand portables. This will encourage the use of 6m for the sort of local FM nets which currently struggle for space on the 70MHz band. There will be no provision for speech repeaters.

Geoloc reassurance

The RA has taken note of the Society's arguments regarding the Geoloc radiolocation system, and has indicated that the licence for the system will be for lower power than that on which we based our calculations (*RadCom*, August 90). Some stations will run as little as 80mW and the maximum power will be only 400mW. Furthermore, the RA has assured the RSGB that there is no intention to inhibit 1.8MHz amateur radio operation and that in the unlikely event of a case of interference to a radio amateur from Geoloc it will be looked at sympathetically.

Amateur Radio Helps Children in Need

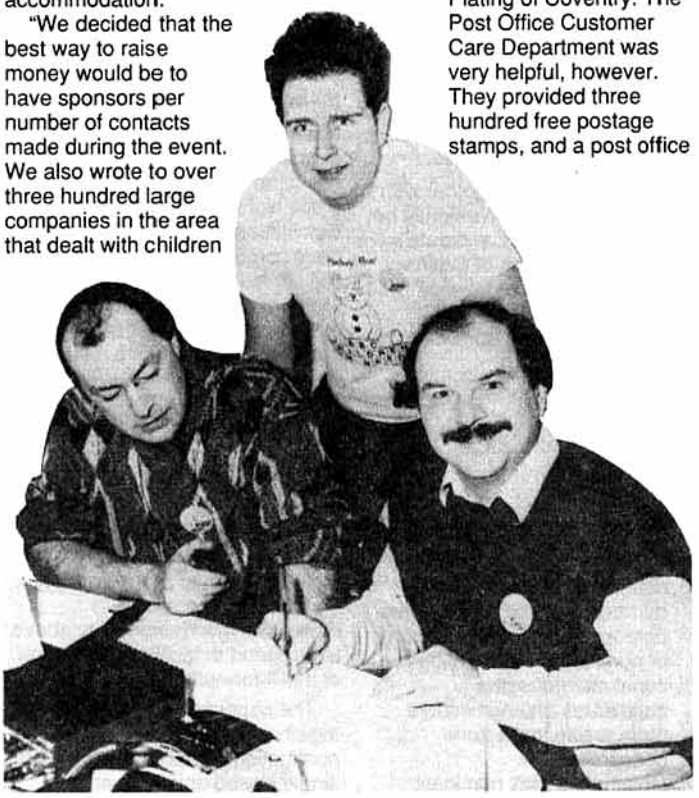
Last November, Mark Bradley, G7DFO, and Phil Radcliffe, G1NIO, set up a special event station to raise money for the BBC's Children in Need Appeal. The event was an outstanding success. Mark Bradley, G7DFO, takes up the story:

"Some may think that setting up a special event station is a difficult thing to do. That was my opinion until Friday 20 October last year. On that date, I heard a test transmission from a new BBC local radio station, BBC CWR. The transmission spoke of the forthcoming Children in Need Appeal, and mention that the station would be interrupting tests for live transmissions for the duration of the Appeal. They asked that anyone taking part in fund raising events should contact them.

"There followed the beginning of an idea. I telephoned a fellow amateur, Phil Radcliffe, G1NIO. We discussed a number of things and set to work. Straight away we reserved the special callsign GB2CIN from RSGB. As we would be operating all bands from 70cm to top band we arranged for Mick Martin, G4VRQ to act as licence holder.

"We rang hotels looking for a public venue from which to run the special station. We were finally offered the Windmill Farm Hotel in Allesley, near Coventry. The owners, John and Janet Harrhy, were amazing. They went out their way to help us by providing food and sleeping accommodation.

"We decided that the best way to raise money would be to have sponsors per number of contacts made during the event. We also wrote to over three hundred large companies in the area that dealt with children appealing for donations. Unfortunately the response to this approach was extremely disappointing. Only one company provided a donation - Exhall Plating of Coventry. The Post Office Customer Care Department was very helpful, however. They provided three hundred free postage stamps, and a post office box number for our use. Another company, GPT of Coventry, offered the use of a cellular telephone. Finally, publicity was arranged, and interviews took place with Coventry Cable Television, BBC CWR, and the Coventry Citizen newspaper.



Left to right: G6IHO, G7DFO, G8PEE. Photograph: G3WCQ.

"Volunteers were plentiful. Not just to run the station, but to erect antennas, supply equipment, and much more besides. The antennas took two long evenings to assemble and erect by the light of car headlamps and hand held flood lights. Setting up the equipment took over six hours. We commenced our marathon operating session at 2pm on Friday 17 November.

"To follow the event we arranged a presentation evening on Friday 15 December at the Windmill Farm Hotel where we presented a cheque to BBC CWR representative, Jim Lee for £1,355.

"Finally we would like to say thank you to everyone that we worked, and to everyone who made a donation to the appeal. We will be trying even harder in November this year. If you would like to help, or have any ideas for sponsorship or donations we would dearly like to hear from you.

"Our address is GB2CIN, PO Box 300, Coventry CV6 3HW."

More Classes and Courses

Further to our feature in last month's edition of *RadCom* we have more news of forthcoming RAE and morse classes.

Ballymena Amateur Radio Club, County Antrim has RAE and morse classes starting in September. For more details contact GI3HCN or GI4CRL. Both are QTHR.

An RAE course is being held at British Telecom Headquarters Amateur Radio Club in Cardiff. The class starts on Tuesday 25 September from 7pm to 9pm. More details can be obtained by telephoning (0222) 629430.

Crawley Amateur Radio Club is running a class for the RAE commencing 1 October 1990. CW classes will also operate if there is sufficient demand. For details of these classes contact David Hill, G4IQM on (0293) 28612.

A morse workshop is taking place in Fareham, Hampshire, at Neville Lovett Community School, Fareham. The workshop starts on 24 September, and potential students should telephone the school on (0329) 823471.

In Hemel Hempstead an RAE course commences on Thursday evenings from 20 September. Enrolment is on 3 September from 2pm to 4pm, and from 6.30pm to 8.30pm. The instructor is G4BIP, and more details are available on (0442) 66337 or (0442) 63771.

An RAE class will be taking place at Lord Grey School, Bletchley on Thursdays starting at 7pm. For more information contact G4NJU, who is QTHR.

There is an RAE class in Morpeth running for 20 weeks from 27 September. This is at King Edward VI School in Morpeth. For more details contact G3BIK, who is QTHR.

A course is also taking place at Rhondda College of Further Education, Tonypandy, Mid Glamorgan. Further details can be obtained from Ronald Flynn, GW1XXL on (0443) 435165.

In Taunton, an RAE course is being held at Somerset College of Arts and Technology, Wellington Road, Taunton. This will take place on Tuesday evenings at 7pm. For more details telephone (0823) 283403.

Meritous achievement

Ian Rivett, G8WPU, has been awarded the Scout Association's Medal of Merit for services to Scouting. Ian is leader of the Northampton Scout Amateur Radio Group and has been responsible for helping over 250 Scouts to achieve their Communicators Badge.

The Northampton Scout Amateur Radio Group is holding its second annual Radio Scouting Gathering over the weekend of 14 to 16 September. This takes place at the Pack Holiday Centre, Overstone Scout Campsite, Northampton. More information about this event is available from Ian on (0604) 715628.

Zycomm take over

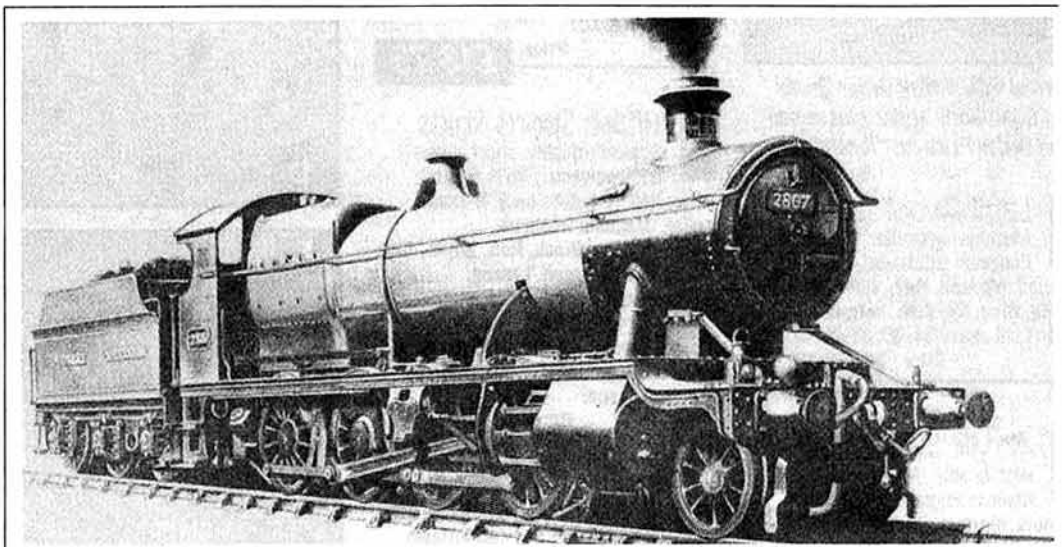
Zycomm Electronics announced in July that they have taken over Matlock based Lowe Electronics. Zycomm was formed in 1979 when Managing Director Ian Sneap, G3ZYC, left Lowe Electronics to form his own company directed more towards the professional market. Ian Sneap has become Managing Director of Lowe Electronics. The aim is now to maintain the Lowe individual identity, ideals and image within the Zycomm group, but to add a new level of enthusiasm and growth to the company.

- Reciprocal licensing is now available between the UK and Poland. Further info can be obtained from Membership Services at RSGB HQ.
- This year's Jamboree On The Air (JOTA) is on 22/23 October.

Don't use leather!

On 31 March, Jack Burns, KA5HNV, died after falling from a 150ft tower whilst replacing a 2m repeater antenna. He was wearing a leather safety harness which apparently snapped. Leather has been superseded by nylon webbing for many years now for professional pole and mast climbing, and even these are required to be checked routinely. It is most inadvisable to rely on an old leather harness.

- Mrs Joan Cook has offered a number of items belonging to her late husband, Brian Cook, G3IYG, to anyone who can make use of them. These include mainly old log books, QSL cards, awards, certificates, etc. Mrs Cook can be contacted at 22 Redhills, Exeter, EX4 1SQ.



Steam Radio

John Moxey, G3MOE, reminds us that it was not uncommon some years ago for a power amplifier to be described as "two 807s in parallel", referring to the then ubiquitous beam tetrodes. John says that he, too, has a very powerful 2807, but this comprises 87 tons of steel, copper and brass. Its heater measures some 38 cu ft and it is run on welsh coal.

His 2807 is, of course, a former Great Western Railway steam locomotive scrapped in 1963 by British Rail, and rescued by John and his friends from a scrap yard in 1982. John is part of Toddington Radio Amateurs in Society - TRAinS (what else) which has twelve members, each of whom is both a radio amateur and a joint member of the Gloucestershire Warwickshire Railway at Toddington. Club callsign is G0GWR!

Restoring the engine is a massive project being undertaken by a small company called Cotswold Steam Preservation Ltd. The work, which is estimated to take up to 14 years, has been in progress since 1982. The scrap value was £6000 but it is estimated that a further £100,000 may need to be spent before she steams again. It is hoped that an amateur radio station can be operated from the footplate during its inaugural run.

Anyone interested in joining TRAinS, or contributing to the restoration fund should contact John Moxey, G0MOE, at 11 Westbury Road, Cheltenham, Glos, CL53 9EN.

Stolen Transceiver

A Kenwood TR751E transceiver, serial number 9070277, was stolen on the evening of Wednesday 11 July 1990 from the home of Mr PM Craig, G7BOH.

Anyone with any information should contact Mr Craig at 119 Oakwood Drive, Lordswood, Southampton, SO1 8EL.

Teledata Group Rally

This year's annual BARTG Rally takes place on 16 September at Sandown Exhibition Centre, Esher, Surrey. There will be trade and display stands, on site catering, easy car access, and talk in on S22 and SU22. The rally is open from 1030 to 1700 local time, and further details can be obtained from Peter Nicol, G8VXY, 38 Mitten Avenue, Rubery, Rednal, Birmingham, B45 0JB; or telephone 021-453 2676.

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Normal RSGB Mail Order Terms and Conditions apply, please see Mail Order Price List for details.

A Lambswool Sweaters

Machine washable. Made in England. Gift boxed.
Colours: **Maroon, Navy, Black, Red, White, Grey, Sky Blue, Yellow.**
Sizes to fit chest: **34, 36, 38, 40,42,44"**
Price: **£26.75**

B Acrylic Sweaters

High quality. Machine washable. Made in England. Gift boxed.
Colours: **Maroon, Navy, Black, Red, White, Grey, Sky Blue, Yellow.**
Sizes to fit chest: **34, 36, 38, 40,42,44"**
Price: **£19.50**

C Acrylic Slipovers

High quality. Machine washable. Made in England. Gift boxed.
Colours: **Maroon, Navy, Black, Red, White, Grey, Sky Blue, Yellow.**
Sizes to fit chest: **34, 36, 38, 40,42,44"**
Price: **£18.35**

D Shirts/Blouses

Shirts: White poly cotton. Machine washable. Made in England. Long or short sleeves.
Order by collar size:
14,14½,15,15½,16,16½,17,17½, 18,18½.
Blouses: White poly cotton. Machine washable. Made in England. Long or short sleeves. Sizes: **S,M,L.**
Price: **£18.99**

E Sweatshirts

Heavy quality fleece. Machine washable. Made in England.
Colours: **Maroon, Navy, Black, Red, White, Grey, Sky Blue, Yellow.**
Sizes: **S,M,L,XL.**
Price: **£13.75**

J British Sports Shirts

Superior quality, short sleeve 65% polyester/ 35% cotton pique knit. 2 button neck, knitted collar. Machine washable.
Colours: **Navy, Black, Red, White, Sky, Royal, Bottle Green, Lemon.**
Sizes: **Small**(34/36"), **Medium**(38"), **Large**(40/42"), **Extra Large**(44/46").
These garments are **not** imported and will machine wash without losing (or gaining) shape.
Price: **£15.95**

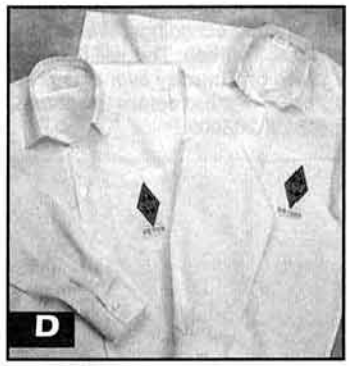
K 'Breeze' Leisure Jacket

Good looking and comfortable 'wear anytime' zip up jacket. 2 pockets and one inside pocket. Knitted cuffs and waist. Stand up collar. Poly/cotton fabric with nylon filling. British made.
Colours: **Navy, Red, White, Royal.**
Sizes: **Small, Medium, Large, Extra Large.**
Price: **£29.95**

Exclusive to RSGB Members

F Sew on Badges

4½" long. Ready to sew on. RSGB logo embroidered onto length of membership colours. (Please state number of years when ordering).
Price: **£1.95**



G Shack Banner

9x6" Ready to hang. RSGB logo plus your own call sign and number of membership years embroidered onto length of membership colours. (Please state number of years when ordering).
Price: **£7.95**

H Ham Bear

18" Tall. Fully jointed collectors bear with headphones. RSGB logo and your call sign embroidered onto his jacket. Definitely **not** a toy. Made in England.
Price: **£29.95**

Correction

An oscillator/multiplier chain for the frequency range 2.0 to 2.6GHz.

The author of this article, Sam Jewell, G4DDK, has advised a number of corrections to the published text:-

* The second part of the last paragraph should read "With this arrangement frequency drift due to crystal self-heating and ambient temperature changes are insignificant after 5 minutes from switch on. Without temperature control, oscillator stability has proven adequate for portable operation at 10GHz, even with the unit exposed to a North Sea coastal gale!".

* The photograph of the completed unit is one of a prototype model which shows the trimmers C26, C27 and C28 incorrectly placed. These capacitors are shown correctly on the PCB layout diagram (Fig.2).

A reminder that drilled printed circuit boards are available for this project from the Microwave Committee components service. The boards cost £6.14 each to members including postage and packing from RSGB Sales.

Werner Hochgoetz, OE1VZ recently paid a visit to Alan Dunford, G3XOF, during which Werner celebrated his 50th birthday. A cake was made in his honour, to the design of a well known HF rig. Even the QSL card was made of icing sugar.

Battle of Britain

From 1 to 12 September the radio clubs of RAF Coningsby and RAF Waddington are using the special callsign GB50BOB to commemorate the 50th anniversary of the Battle of Britain. A special QSL card, together with a commemorative pamphlet, is available direct from The Amateur Radio Club, RAF Coningsby, Lincoln, LN4 4SY, or via the bureau to G0KUC. The event is being sponsored and all proceeds will go to charity.

Readers Survey

Members are reminded that there may still be time to send off survey forms (centre pages August *RadCom*) and have a chance to win one of eight super prizes. **The deadline is 31 August, not as printed on the survey form.**

SA Novice follows RSGB

South Africa will soon introduce a Novice Licence. The national Society, SARL, has been working on this for several years and has based its proposals on the proposed UK Novice Licence. According to SARL President, Hans van der Groendaal, ZS6AKV, "The introduction of the Novice Licence will stimulate the growth of amateur radio in South Africa and will serve as a model for other countries in Southern Africa. Industry sees the introduction as a move to involve more young people in communications and electronics."

The Novices, who must be at least 12 years old, will be required to pass a 5WPM morse test administered by the SARL, and a written exam in operating procedures. ZU1 callsigns will be issued allowing 5 watts DC input (20W PEP out) on phone, CW and data on 1.8, 28 and 430MHz; and CW and data on 3.5 and 21MHz.

- Operation Raleigh has sold the vessel the Sir Walter Raleigh. This has made the permanent special event callsign GB0SWR redundant.

RADCOM PCB SERVICE

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May/June/July 1990

BOARD DESCRIPTON	CODE	PRICE
Complete set of boards	567WIM90	£66.13

G4PMK SIMPLE SPECTRUM ANALYSER

November 1989

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

G3TXQ TRANSCEIVER

February/March 1989

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

All prices include postage and packing.
Please note these PCBs are not available from RSGB HQ, but direct from Badger Boards, 87 Blackberry Lane, Four Oaks, Sutton Coldfield B74 4JF. Tel: 021-353 9326

North Pole 90 Expedition

Is this man still one of ours? 'Comrade' Laurence Howell, GM4DMA, comes in from the cold and tells his chilling tale as a follow-up to the story in the March issue.

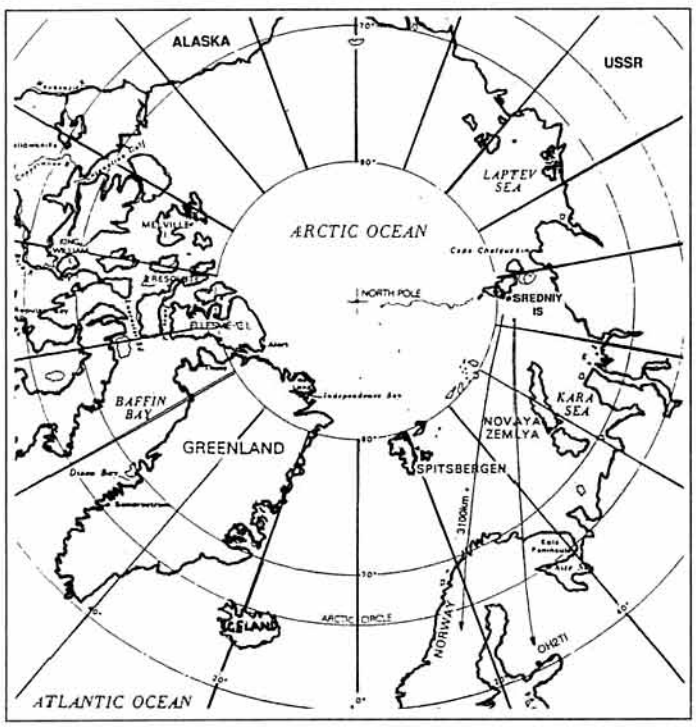
This year something special happened, something very special. For many years our small expedition group (Sir Ranulph Fiennes, Dr Mike Stroud, Morag Howell, GM0MUV, and myself) has sought permission to travel to the geographic North Pole from the Soviet side. We had been trying to reach our goal from the Canadian side, but had often been thwarted by poor surface conditions, so the remote Soviet side offered an alternative we were very keen to take. We were therefore delighted when the rapid changes in Soviet policies on outsiders visiting 'sensitive' areas led to permission being suddenly granted late last year. The North Pole 90 Expedition was born.

OUR BOYS BACK HOME

HF communications from the high polar regions are always difficult and, due to geometry, geostationary satellites cannot be used. Polar orbiting units do not yet fulfil our requirements, so we are stuck with the very-unfriendly-at-times ionosphere. 'Steam' radio, so called? Well, developments in transmission methods continue to abound and we are still trying to ease the pain of the crystal-wristed telegraphy operators. Commercial operators and radio amateurs continue to experiment with data protocols, and this year packet was used for the first time on our expedition from the USSR.

Our voice links back to the UK used British Telecom International's Aeronautical and Maritime Services. Controlled by dedicated operators down in Somerset, this flexible service allowed us to gain access into the Public Telephone Network and the Press people on the expedition were able to send back clear and live reports. The BTI operators' professional excellence and, might I say, personal interest led to an exceptional service over some of the roughest radio routes in the world. Simplex Aeronautical Service frequencies were used most of the time, these frequencies being clear of co-channel interference, while recourse to the International Maritime Service paired frequencies was a back-up facility that was used on one or two occasions.

Our second 'commercial' link was to Moscow's Adventure Club, in the heart of the city. The Adventure Club is a Soviet commercial organisation set up to provide services and back-up for expeditions and school groups. Their radio club RK3KP is equipped with the most modern Japanese amateur radio equipment, and operated by some of the most experienced personnel from their massive country. We found this link far harder to maintain than the one to the UK, probably because of the awkward F-layer distances involved. A back-up route came into play by using a relay in the guise of Serge's (UZ0AA) wife (also an excellent operator) in Southern Siberia.



The thin track near the Pole shows the route of the expedition.

WRAPPING UP PACKET

For the first time packet radio and voice was used on 14 and 21MHz, permission having been re-granted on 1 March 1990, and traffic consisted mostly of Soviet operational and personnel matters. Leonid, UA3CR, was the anchor man and, under his distinctive control, news of the expedition was distributed into the international amateur packet network. RS3A, the famous satellite control station, provided additional back-up when required in Moscow. Packet radio is a relatively new mode in the USSR and has generated a great deal of interest. When a demonstration of HF packet was made at a communications conference in Perm, Ukraine, linked to our base station in Northern Siberia, it made quite an impact on an astonished and intrigued crowd. Greetings messages both in Russian and English were sent and well received.

THE DOCTOR WHO EFFECT

When HF radio conditions were wiped out (which happened frequently at Sredniy, thanks to the Sun), we did have recourse to satellite communications. With the very good support of AMSAT UK, UoSAT and our communications sponsors, we used the high elliptically orbiting OSCAR 13 satellite for amateur messages. Over 100 contacts were made which, with the time allowed, was great fun. The links during the most-disturbed magnetic periods sounded very strange. Warbles, whines, clicks, ranging Doppler and rapid fading occurred, causing the Sredniyites some concern that the local vodka and pure spirit was affecting our hearing! Was Doctor Who nearby?

A Yaesu FT726R, amplifiers and a Jaybeam 145/435MHz single Yagi with az/el rotation was used, and the returned signals averaged around -6dB below the 145.810/12 beacon. The temperatures outside could be easily estimated by how much the elevation rotator's grease was limiting movement! In fact all the rotating gear operated down to our lowest temperatures of -45°C. The RS Series 10/111 satellites were also used, up-linking on 145MHz and down on 29MHz. Quite a few European stations produced good signals, but on many of the passes we were singing a lonely song, being the only signal received on the satellite's footprint. At least if we were really bored we had the ROBOT to talk to! With low-orbiting satellites there are still large areas of the earth's surface where no amateur activity takes place.

Satellite-passed predictions, message data and packet programs were all stored on a Toshiba 1200 lap-top computer, kindly donated by AMSAT-UK. I did have misgivings about using computers in a radio environment, but this device proved to be quite quiet, our base communications systems suffering more from the local aircraft and military transmissions than from noisy computer clocks. The Toshiba proved to be an excellent general work tool and provided a good database for a wide range of science topics we were covering during the period.

The University of Surrey UoSAT team, with the support of Michael Meerman, G0/PA3BHF, had also supplied us with the soft/hardware to use the DCE experiment aboard UoSAT 2, OSCAR 11. This was to up-load positional field group and general amateur radio information on the expedition's status for sending to the various ground station gateways. As things turned out, we had a small problem with our power budgets and receive noise figures which meant in real terms we could only receive news broadcasts and not command the spacecraft. DB2OS kindly up-loaded our news bulletin which we sent to Moscow via packet radio. Michael also loaded into the digitalker positional, and other climatic and operational, information of our field group, as they slowly pulled their sledges northwards. Thus anyone in the world with an FM receiver tuned to 145.825MHz, when the satellite

was visible, was kept up to date on our expedition's progress.

KEEPING IN TOUCH WITH THE TEAM

Field-party communications took up most of our time at base camp. From the very first hour that Mike and Ran were dropped off at Cape Artischesky, a full 24h radio watch was maintained. This watch lasted for 47 days, with a once-daily radio schedule with the team (conditions allowing). Power budget versus our torturous sledge weight allowances meant that only one main lithium radio battery could be carried (50Ah). Consequently, Mike and Ran's transmission times were kept to a minimum, although, on receive, they could listen to home news and general weather and ice movement data. They operated using a lightweight HF portable transceiver with a frequency range of 1.5 to 30MHz. This well-tried device has two power outputs, either 1 or 10W p.e.p. on speech. The aerial consisted of a resonated dipole at only 3 or 4ft above the sea ice and snow interface.

For most of the schedules, signals were very good and our links were conducted just using 1W. When disturbed conditions reigned and D-layer absorption

Morag on the air from Sredniy Is.

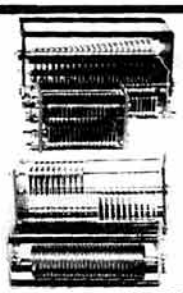
hit, upping the power did not make much difference. This year, especially, we found signals either very strong or non-existent, such was the attenuation caused by destructive protons. At base camp our receive aerial was a horizontally polarized delta loop at 15m, which provided some decibels improvement on our other normal field-party units. It has to be said that Sredniy Island is not the best low-frequency location I've ever operated from or been at. Large amounts of iron ore litter the place and the magnetic map of the area looks like a tortured Spirograph mural. Aerials that operated fine in other locations showed strange side lobes and non-directivity, or maybe it was the vodka?

WE PUT THE LOO IN IGLOO

At base camp, for the first time in many years, we did not have a power budget problem. In Canada power was supplied from large DC storage batteries, recharged from two wind turbines. Here we were connected to the military's 220V 50Hz supply. Three phase too! Connection was by a large power lead some 600m in length. Our base 'portacabin' was pulled by a tractor out of a long line of huts from the military street on Sredniy and placed some 600m away from the local radio noise source, ie as far as possible. This hut had been sitting without heat for over a year, therefore work on rewiring and providing lighting proved to be a finger-numbing time. Snow and ice blocks were cut from the surrounding ground, then snow-blocked walls were erected around our hut and a lean-to added for our food. The blocks were strategically positioned to reduce drift in the internal compound and provide shelter for an ice alcove where our hole-in-the-ground toilet was located. It even had a wooden trap door to cover the offence! When the wind blew hard, as it often did, the area often became drifted in and many people suffered with frozen parts of their anatomy just to fulfil nature's duties.

This single hut was to be Morag's and my home for the next few months. It was fitted with two wire military bunks, tables, chairs and a double electric-element cooking ring (one element of which seemed to have a power output of less than a torch light bulb!). Water and bread were occasionally transported to us by the kind local military.

BUY THE BEST — BUY



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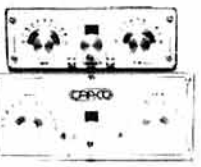

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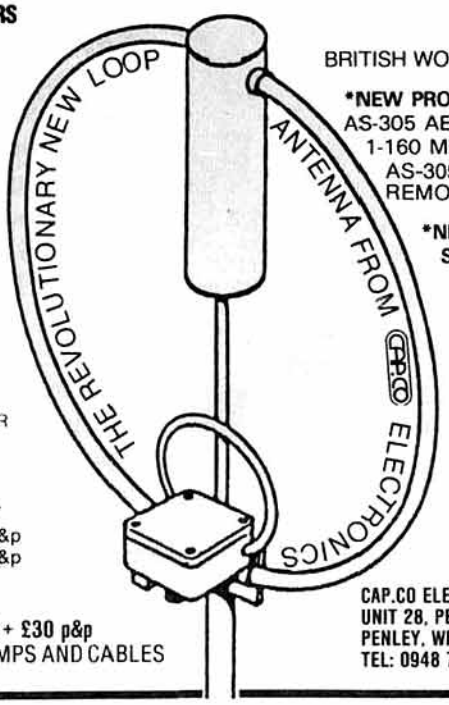

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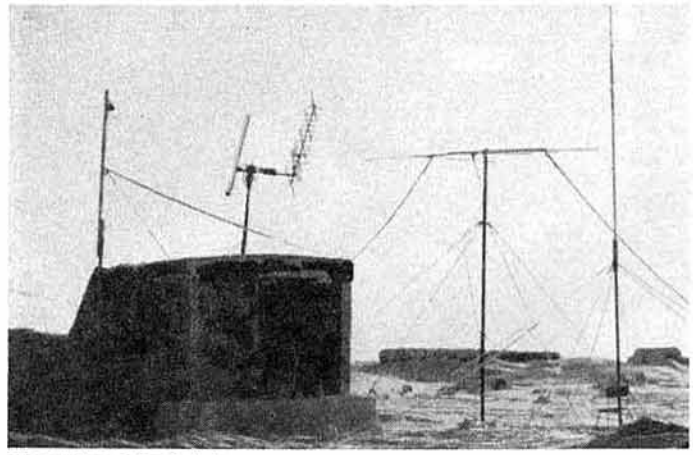
Marks and Spencers provided the food, so if you liked chicken casserole and snack-pots you were onto a good thing. In general, island food was in relative short supply and the diet was unvarying and not of good quality.

Morag and I worked in 12h shifts each, with our Soviet counterparts operating when possible. Our huts became the island's social centre, day and night, with both civilian and military visitors who were most welcome. We found the friendship and help given by the military to be out of this world. Luckily for us the local chief happened to be a budding radio amateur. His knowledge of various television systems was extensive and he seemed especially interested in our TV reception from Norway, over 3000km away. He told us that he had built a tuner with different audio sub-carriers for looking at Finnish TV when he was stationed on the border there. We actually left a 50MHz beam and coaxial cable there on Sredniy so that he could continue to log dates and times of long-distance TV openings for us.

QRV ON SIX

Over the last five years or so, we have been experimenting, with the help of Charlie Newton, G2FKZ, with long-range VHF communications at high geomagnetic and geographic latitudes. In previous expeditions we had looked at the possibility of 50/144MHz links from Canada to Scandinavia via Arctic E-layer propagation. We had actually received Norwegian TV from Ward Hunt Island on many occasions at great strength, but no two-way contacts ever ensued, even with the dedication of many radio amateurs throughout Europe. We would have liked to continue our experiments from the USSR but they do not have an amateur 50MHz allocation. After many letters, personal interventions and pleading, we received permission to operate on two spot frequencies (50.110/50.105), the first-ever USSR warrant. An SMC FT690R and homebrewed 110W amplifier into a Jaybeam four-element Yagi at 10m were used from a fairly flat but not too high plateau site on Sredniy (NQ59OM). A full 24h watch was maintained on this link with parallel visual watches for channel R1/E2/E3 television signals from Europe. CQ calls on the key were hourly events, when commercial traffic allowed.



The station at Sredniy Is.

This system was much improved when we acquired Paul's, G0KPH, autokeyer. Paul and Simon, G0GWA, had come to support another expedition's radio base around 1km from us *(see 'Spectrum Analysis' August 90 - Ed)* and our stocks of good-quality peanuts and vodka suddenly started to drop when they arrived! The keyer was then employed on the FT690R, calling CQ at 20 WPM for 11s then receiving for 4s. In retrospect, I think this item was the reason we finally made the first ever 6m contact from the Soviet Union with OH9NLO via Arctic E (F?) propagation. The linear amplifier's duty cycle was now much higher and it showed up one or two of my soldering faults on high-current components! The unit also became excessively hot so we moved the amplifier to the floor and placed the heatsink by a small hole where very cold outside air poured in. You could almost hear the poor old SD1477 transistor sighing with relief.

Contacts were made on 6m with OH3MF/9, SM3JJG and OH2TI. We were particularly pleased to work the University of Helsinki, OH2TI, as Jukka, OH5DD, a research fellow at that university, had been supporting us for long periods of time during this and previous expeditions. His patience was finally rewarded

Continued on page 64

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NORTH POLE 90 EXPEDITION

SMC were pleased to be able to support the highly successful NORTH POLE 90 EXPEDITION, by providing essential HF and VHF radio communications. All of the equipment, which included the FT747GX, FT757GX, FT726R, FT690RII and Tokyo Hy-Power linear amplifiers, all worked exceptionally well, especially in the extremely hostile physical and climatic conditions, which often reached lows of -45°C. Transmission quality was reported by a seasoned broadcast engineer as "remarkable."

SMC wish to congratulate the team on the conclusion of this most successful expedition

Cold comfort for the opposition!

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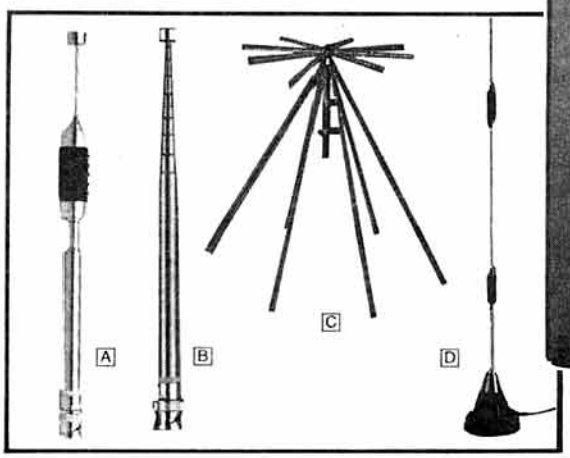

E

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B **Telescoping Whip Aerial.** (Without load coil).
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C **Discone Aerial.**
20-013 ..... **£49.95**

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

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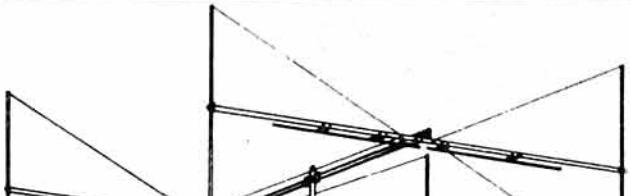

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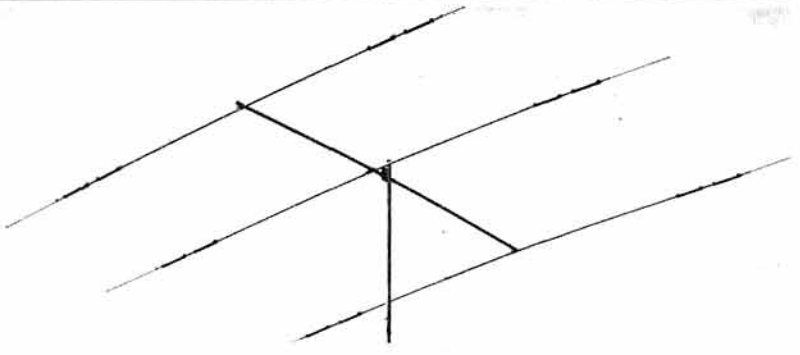

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ARX 450B 435-450 MHz Ringo Ranger vertical **£42.84**
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This month, instead of our usual advertisement, we have decided to publish our entire price list in order to illustrate the present breadth of our product range. If you would like more information on any item on the list, just give us a call. Delivery on most items is ex stock, and we offer a full 12 months warranty on every item sold.

PRODUCT	DESCRIPTION	£ PRICE (inc VAT)	£ PRICE (ex VAT)	P+P
PROFESSIONAL RADIO DATA COMMUNICATION				
TOR-1	Error Correcting Telex Terminal Unit	£574.94	£499.95	B
TOR-S	IBM-PC Compatible Software for TOR-1	£129.95	£113.00	A
TOR-TRAN	600 ohm audio interface option for TOR-1	£79.95	£69.52	A
PK-90	Commercial Packet Radio TNC	£425.44	£369.95	B
PK90/2400	Internal PSK modem for the PK-90	£129.95	£113.00	A
AMATEUR DATA COMMUNICATION				
AMT-3	AMTOR/ RTTY Terminal Unit with IBM-PC software	£179.95	£156.48	B
PK-88	HF/ VHF Packet Radio TNC with free software	£139.95	£121.70	B
PK-232MBX	7 mode Intelligent Terminal Unit with free software	£319.95	£278.22	B
DSP-1232	Single channel multi mode DSP modem	TBA		
DSP-2232	Dual Channel multi mode DSP modem	TBA		
PK-232/2400	2400 Baud modem for the PK-232	£139.95	£121.70	A
PakMail	Personal Mailbox Option for PK-232	£69.95	£60.83	A
AMT-3/Amiga	Amiga software driver for AMT-3	£29.95	£26.04	A
PC-PAKRATT	IBM-PC Software for the PK-232	£19.95	£17.35	A
PK-FAX	IBM-PC Facsimile Software for the PK-232	£19.95	£17.35	A
MacRatt/Fax	PK-232 Driver Program for Apple Macintosh	£59.95	£52.13	A
Amiga-Pakratt	Commodore Amiga Software for the PK-232	£29.95	£26.04	A
Atari-Term	Public domain Terminal software for PK88, PK-232	£5.00	£4.35	A
COMM-PAKRATT	Commodore 64/128 Software for PK-232 (Cartridge, interface)	£59.95	£52.13	A
COMM-FAX	Commodore 64/128 Fax software for PK-232 (Cartridge, interface)	£59.95	£52.13	A
COMM-FAX/CT	As above, but cartridge, manual only	£39.00	£33.91	A
PK-232/BBC	BBC Software for the PK-232	£26.95	£23.43	A
PK-88/C8M	Commodore 64 Software for the PK-88 (Cartridge, interface)	£59.95	£52.13	A
PK-88/BBC	BBC Software for the PK-88	£26.95	£23.43	A
TNTERM	Advanced software for BBC computer and PK-232	£49.95	£43.43	A
FAX OPTION	Manual, Cable, ROM for PK-232	£49.95	£43.43	A
PK-232 FIRM	Upgrade for PK-232	£20.00	£17.39	A
PK-88 FIRM	Upgrade for PK-88	£15.00	£13.04	A
PK-232/RL	Radio lead for PK-232	£7.50	£6.52	A
PK-232/YL	Y (computer) lead for PK-232	£39.95	£34.74	A
RS-232	RS-232 lead for PK-88, AMT-3 or PK-232	£15.00	£13.04	A
COMM-232	RS-232 interface for Commodore 64			
AMATEUR RADIO ACCESSORIES				
MM-3	Advanced Morse Keyer	£169.95	£147.78	B
AT-300	300 watt PEP Antenna Tuner	£149.95	£130.39	B
AT-3000	3000 watt PEP Antenna Tuner	£369.95	£321.70	C
ET-1	300 watt Econo Tuner	£149.95	£130.39	B
HR1	144 Mhz Handheld Antenna	£17.95	£15.61	A
HR3	150 MHz Marine Handheld Antenna	£17.95	£15.61	A
HR4	440 MHz Handheld Antenna	£17.95	£15.61	A
ISOPOLE 144	2 Metre Base Station Vertical Antenna	£49.95	£43.43	B
ISOPOLE 440	70 cms Base Station Vertical Antenna	£82.50	£71.74	B
IsoLoop	14 - 30 MHz loop antenna	£319.95	£278.22	B
IL-50	50 ft shielded cable for IsoLoop	£29.95	£26.04	B
IL-100	100 ft shielded cable for IsoLoop	£39.95	£34.74	B
DL-1500	1500 watt dummy load	£119.95	£104.30	B
LPF-30	1500 watt 30 MHz low pass filter	£49.95	£43.43	B
AVT System	Commodore Amiga Image System	£299.95	£260.83	B

PRODUCT	DESCRIPTION	£ PRICE (inc VAT)	£ PRICE (ex VAT)	P+P
WEATHER FACSIMILE DECODER				
FAX-1	Weather Map/ RTTY/ Navtex Decoder	£319.95	£278.22	B
FAXPACK	FAX-1, SC-1200, AC Power Supply, Leads, Paper	£469.95	£408.65	C
DCP-1	12v Printer, roll Holder, Bulkhead mtg. Plate	£369.95	£321.70	C
MARINEPACK	FAX-1 and DCP-1	£669.95	£582.57	C
NAVTEX	Navtex Receiver Option for MARINEPACK	£129.95	£113.00	A
ANT-1	Active Antenna. 2 Outputs. 70 kHz - 25 MHz	£75.00	£65.22	A
FAX-1/N	As above, but with internal Navtex Receiver	£449.90	£391.22	B
ANT-1/N	Active Antenna for Navtex Reception	£69.00	£60.00	A
FAX-PSU	12V stabilised power unit (3 amp)	£22.95	£19.96	A
OKI-ROLL	Thermal paper roll for DCP-1	£5.50	£4.78	A
OKI-PH	Spare print head for DCP-1	£30.00	£26.09	A
METEOSAT RECEIVE SYSTEMS				
MET-2	Complete Meteosat receive system with free software	£689.94	£599.95	C
MET-PC-INT	IBM-PC interface card	£57.44	£49.95	B
MET-AT Lead	Monitor interface lead for Atari to give grey scale display	£33.29	£28.95	A
MET-NOAA	Receiver, 50m cable, preamp and IBM PC VGA software	£344.94	£299.95	B
MET-1.6m dish	Dish antenna to substitute for Yagi in critical applications	£458.85	£399.00	X
MET-EXT	25m active antenna extension cable	£91.94	£79.95	B
MET-VGA-600	IBM-PC high resolution VGA driver board	£202.69	£176.25	B
DIGITAL WEATHER STATIONS				
7203	Weather Pro (TWR-3)	£169.95	£147.78	B
7103	Weather Data (WD-2)	£219.95	£191.26	B
7106	Weather Master (ALT-6)	£269.95	£234.74	B
7710	Computer Weather Station (PCW)	£299.95	£260.83	B
7832	Rain Collector for PCW and Weather Data (RG-2)	£46.95	£40.83	A
7830	Rain Collector for Weather Pro and Master (RG-3)	£46.95	£40.83	A
7294	Stainless steel desk stand (DSK-22)	£9.95	£8.65	A
7297	Mounting Template	£7.95	£6.91	A
7194	Stainless Steel Desk Stand (DSK)	£13.95	£12.13	A
7197	Mounting Template	£10.95	£9.52	A
7840	12 metre Extension Cable (EC-40)	£11.95	£10.39	A
7824	Car or Boat Lighter Lead (CC-2)	£6.95	£6.04	A
7826	AAA Nicad Battery Pack (BP-3)	£7.95	£6.91	A
7822	12 V DC Power Adaptor and Charger (PS-12)	£11.95	£10.39	A
7712	Extended Software for PCW (PCWPRO)	£89.95	£78.22	A
7262	Precision Thermometer (PT-2)	£69.95	£60.83	B
7264	Time, Temperature (HZ-2)	£59.95	£52.13	B
7266	StandardTemperature Unit (ST-2)	£49.95	£43.43	B
7850	Laboratory Temperature Probe (LP-10)	£29.95	£26.04	B
7192	Carrying case for ALT-6, WD-2	£8.95	£7.78	B
RADIO RECEIVERS				
HF-225	General Coverage HF Receiver	£425.00	£369.57	B
R-72	Icom Marine Receiver	£626.75	£545.00	B
BOOKS				
B001	A Guide to Radio Facsimile Stations	£14.95	£14.95	A
B003	Reading the Weather	£17.95	£17.95	A
B004	Technical Manual for PK-232	£25.00	£25.00	A
B005	User Manual for PK-232	£19.95	£19.95	A

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If ordering more than one item, select the highest individual post and packing rate for the entire shipment

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C	£9.50	By Quotation	By Quotation

SPECTRUM ANALYSIS

HF

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham
B17 8QB

DX NEWS

DX News Sheet mentions US reports which say that VK9TR has now left **Willis Is** and that it is now without an amateur. It is believed that the weather station there has now been automated. JA9IAX/JD1 is on **Minami Torishima** and has been working into Europe regularly on 21MHz. He keeps a schedule with his QSL manager at 1330 on 21.330MHz and is also on that frequency on Sundays between 0800 and 1000. VR6WH is the callsign of the ZL amateur who is now on **Pitcairn Is** during the absence of VR6TC and VR6YL. He is active on rtty.

If you worked EP0A on 31 May please do not bother to QSL - he asked for QSLs via DK3VA who knows nothing about the affair. The same advice applies to N6TY/A7 who was also a pirate. *DXNL* says that the very successful 7O1AA crew will operate from **N.Yemen** this month. There is still some confusion over the present status of the former two Yemens for DXCC purposes.

G4RUL is in **Botswana** and will be there for some time. He hoped to come on the air in mid-July on 21 and 28MHz mostly between 1100 and 1300. ZD9CN on **Gough Is** is believed to be due to leave next month - look for him near 21.290MHz between 1300 and 1730.. According to the *Long Is DX Bulletin* TN1AT in **Congo** is typically near 14.255MHz from 0300, and 7P8DX in **Lesotho** on 14.220MHz at 1600. The latter is in the process of moving to a new QTH where he will have better antenna facilities. It also says that 7Q7JA meets other **Malawi** stations near 28.520MHz daily from 1300. 6W1QB in **Senegal** is to be found on 18.073MHz from 2300. TY1DX is now keeping schedules on Sundays between 1200 and 1500 in the 28.3 to 28.35MHz area.

DXpress says that there will be an expedition to a number of Venezuelan islands this month. These include **Monjes, Aves, Blanquilla, Los Testigos, Tortuga** and **Los Hermanos.**

G3TWO and G4QK intend to operate from the **Isles of Scilly** between 4 and 9 October. They will use 3.760, 7.060, 14.260, 14.280, 21.260, 28.460 and 28.560MHz and the lower ends of the CW bands but probably not on 7 or 28MHz. The islands are IOTA EU11 and WAB squares SV89, 90, and 91. Schedules can be made by contacting G4QK on 0278 424508 or G3TWO on 0278 451644.

NEW DXCC CHARGES

August *QST* announced that there will be a new fee schedule for DXCC beginning on 1 October. This is:-

(1) first time applicants will have to pay US$10.00 plus the usual charge for return postage (DXCC members as of 1 October, 1990, are exempt).

(2) ARRL and CRRL members will be allowed one free submission per calendar year - this may include any number of cards, any number of DXCC awards, and any combination of new and endorsement applications. It does *not* include a person's all-time first submission.

(3) Non-League members outside the USA and Canada will be charged US$10.00 for their first DXCC submission of any kind in each calendar year and

(4) US and Canadian DXCC participants who submit more than once in a calendar year will be charged US$10.00 for each submission after the first one. Foreign non-members will be charged US$20.00 for additional submissions.

Sue Miller, KA9UCK, of Chicago (left) and Mrs Eleanor MacCracken of New York City meet Tom Christian, VR6TC, of Pitcairn Is (a descendent of mutineer Fletcher) during Tom's visit to the USA in July. Tom and his wife, Betty, are also scheduled to visit parts of Europe to meet the many friends they have made over the years via amateur radio. Photo: NZ9E

OVERSEAS ITEMS

David Rankin, 9V1RH, has asked me to draw attention to the fact that airmail postage from the Far East to Europe is equivalent to three IRCs. Operators sending an airmail SAE plus one coupon are supreme optimists - it requires three for first class and two for second class airmail return. He adds that one IRC now buys surface mail return - and possibly second class at that!

The N.California DX Foundation has elected its directors and officers for the next year. Officers are W6OAT (president), K6TMB (vice-president), W6DU (secretary), and W6OSP (treasurer). The other directors are W6QHS, N6ST, W6SZN, K6TMB, K6UD, WA9WYB, WZ6Z, and WB6ZUC. NCDXF has committed nearly US$80,000 in support of expeditions and other DX operations this past year. These included A51JS, 3Y5X, VK9EW, VK9WB, 3D2CR, 3D2AM, 3C1AG, AH3C/KH5J, XU8CW, XU8DX, XW8CW, XW8DX, ZS8MI, 3C0GD, XF4L, S9AGD, ZY0SS, ZY0SW, ZY0SY, PA3CXC/ST0, 1S0XV, and ZS1IS. It also committed US $3,000 to support the World Radiosport Team Championship. All this has naturally strained the Foundation's funds and more are urgently needed. Please send donations to the NCDX Foundation, PO Box 2368, Stanford, CA, 94309-2368, USA - it is an extremely well run worthwhile organisation and it's contribution to the enjoyment of the HF DX gang is enormous.

DX PUBLICATIONS FROM GEOFF WATTS

The latest printing of the *DXNS USSR Oblast Guide* now includes 250 QSL bureau addresses covering all oblasts of the RSFSR and the USSR republics, plus information on the new WAAD Diploma which is issued for working administrative districts of the USSR at totals of 500, 1000, 1500, 2000, 2500 (bronze cup), 3000 (silver cup), and all 3227 districts (gold cup).

The price of each of the four DX publications to UK purchasers is now £1.25, or £1.50 for the single-sided versions. The UK price was last raised five years ago. The publications consist of the *CQ and ITU Zones Guide* (info on DXCC countries with their *CQ* and ITU zones and various prefixes; the *USSR Oblast Guide* (also 15 pages); the *DXCC Countries Guide* - 14 pages including a six band DXCC/IOTA QSL log - and the *Radio Amateur Prefix-Country-Zone List* which is an extremely comprehensive 15 page list of DXCC countries arranged alphabetically with past and present prefixes, deleted

QTH CORNER

OD5EH	via UW6HS, PO Box 20, Georgievsk, 357800 USSR.
T20AA	via N4FJL, T.Schreckengost, 8 W.Pine Tree Av, Lake Worth, FL 33463, USA.
V51BG	PO Box 2177, 9000 Windhoek, Namibia.
YJ0AKY	Box 3, Tokaimura 31911, Japan.
DL8CM/ZS1	H.Jacob, Pfarrer Theisstr.4, D-6605 Friedrichstal, FR Germany.
1S0XV	now to W4FRU. J.Parrott, PO Box 5127, Suffolk, VA 23435, USA.
7Q7LA	via G0IAS, The Conifers, High St, Elkesley, Retford, Notts, DN22 8AJ.
7Q7RM	via K6KII, C.G.Moore, PO Box 1338, Arcadia, CA 91077, USA.
9V0RH	via 9V1RH.
9V1RH	PO Box 14, Pasir Panjang, Singapore 9111.

1990 28MHz COUNTRIES TABLE

G0JZA	180	G4NXG/M	82
G4MUW	178 (ssb)	G0MXU	80
G4VVP	172 (ssb)	G0CKP	79
G4DXW	158	G2AKK	79 (cw)
GM4OBK	122	GM4ZIL	63
G4ZYQ	111	G4SJG	60

Radio Society of Great Britain

HF Convention

ATTENTION!
Revised Programme Details.
See below.

29 and 30 September 1990
Penguin Hotel, Daventry

The Penguin Hotel is immediately south of Daventry on the A45. Junction 16 from the M1.

This year the UK's premier HF Convention is being held at a new larger location with superior facilities. Two lecture streams will cover the latest issues in HF amateur radio.

Programme

(SUBJECT TO CHANGE WITHOUT NOTICE)

Saturday 29th September

Starting at Noon
Conducted tours of the BBC Transmitting station, Daventry *(book with Steve G4JVG - see below)*

Evening
DX Dinner - 7.30 pm
Speaker: Lawrence Howell of the North Pole 90 Expedition, UAO/GB4MSS *(book with Steve G4JVG - see below)*

Sunday 30th September – Doors open 9.45 am

Lectures: 10.30 am to 6.00 pm

Stream A

Pacific DXpedition ..... Mats Persson, SM7PKK
Bouvet DXpedition ..... Einar Enderud, LA1EE
Trophy presentations
RadCom Reader Survey Grand Draw
Young Amateur of the Year Presentation
Bhutan DXpedition, A51JS ..... Jim Smith VK9NS
DX Quiz

Stream B

Amateur Radio Software & DX Packet Cluster ..... Don Field, G3XTT & Ian Shepherd, G4LJF
QRP Forum ..... G-QRP Club
High Power HF Broadcasting Antennas ..... David Yates, G3PGQ
Digital Signal Processing ..... Dr P. Saul, G8EUX
Direction Finding ..... RSGB DF Committee
Question and Answer session on HF and DX matters

Including all the usual attractions . . .

RSGB BOOKSTALL ---------- RSGB COMMITTEES
CW PILE UP TEAM COMPETITION ---------- HANDS ON SOFTWARE DEMOS
RNARS QRQ CW TESTS ---------- WORKED ALL BRITAIN
CHILTERN DX CLUB ---------- PACKET POINT
PLANNING PANEL ---------- IOTA

. . . and many more

Attractions for the family in the Daventry area include Althorp (home of the Spencer family), British Waterways Museum at Stoke Bruerne, a country park and the Daventry indoor swimming pool.

Entry and booking details

Booking essential for Saturday events:

Dinner £16. Cheques payable to M J Atherton
Booking and payment to: Steve Telenius-Lowe G4JVG, Penworth, Tokers Green Lane, Tokers Green, Reading, Berks RG4 9EB.

Entry to Sunday Convention £4.00. Lunches and light snacks available.

Special overnight rate - £25.00. Please make your booking direct with the Penguin Hotel, London Road, Daventry, Northants NN11 4EN. Tel 0327 77333, quoting RSGB HF Convention.

Details of arrangements for handicapped visitors can be obtained from Martin Atherton G3ZAY, 41 Enniskillen Road, Cambridge CB4 1SQ.

countries etc. All four lists cost US$3.00 or six IRCs to overseas purchasers (US $4.00 or eight IRCs for the single sided version). Order from Geoff Watts, 62 Belmore Rd, Norwich, NR7 0PU. I can recommend these lists.

CONTESTS

The **CQ WW DX Contest** takes place next month and the Chiltern DX Club has already given notice that it will again sponsor a plaque for the leading UK single-operator entrant in both the CW and the phone sections.

In the 1990 **Japan International DX Contest** (phone), GM4ELV was the only UK entrant and scored 936 points on 28MHz.

1990 VK-ZL-Oceania Contest

1000 6 October - 1000 7 October (SSB)

1000 13 October - 1000 14 October (CW)

This year is the 150th Anniversary of New Zealand's national existence and special efforts are being made to encourage you to take part. Work ZL/VK/Oceania stations and the special bonus station ZL150A which counts as an extra multiplier. 3.5 to 28MHz (no WARC bands). Only one QSO with a station on each band - each counts two points. The multiplier is the sum of all VK/ZL/Oceania prefixes worked on each band added together. Exchange RS/T plus serial beginning at 001 on each band. Special certificates for top scorers in each country, and participation certificates will be sent to all who include two IRCs with their entry. Listeners may take part in which case both sections are combined into one contest - the scoring is the same. I can supply photocopies of rules (SASE please). Entries to reach VK/ZL/O Contest Manager, ZL1AAS, 146 Sandspit Rd, Howick, New Zealand, by 1 March 1991.

Scandinavian Activity Contest

1500 15 September to 1800 16 September (CW)

1500 22 September to 1800 23 September (Phone).

This year the contest is being organised by EDR. The rules are unaltered and I can supply copies (SASE please).

In the 1989 **CQ WW RTTY Contest**, **G4SKA** came world fourth on 14MHz with 172,235 points. G0ATX scored 404,982, GW0ANA 88,938 and G4BWP 25,056 in the all-band category, and G4UZN 48,960 on 28MHz.

The **YLRL Fall Contests** take place on 5 and 6 September (Howdy Days) and 17/18 October and 31 October/1 November (YL Anniversary Party). These are for YL operators only and I can supply copies of rules.

EIGHT BAND TABLE

Call	1.8	3.5	7	14	18	21	24	28	Total
G3KMA	135	250	313	324	174	323	145	313	1977
G3XTT	162	217	269	310	132	300	101	277	1768
G3GIQ	71	211	272	322	127	321	104	306	1734
G4LJF	42	215	258	304	27	286	5	255	1392
GM3PPE	69	165	177	238	145	232	113	209	1348
G4OBK	124	156	203	279	10	252	3	227	1254
A92BE	55	145	190	302	25	280	3	251	1251
G3JJG	51	101	182	228	121	254	96	199	1232
G3TXF	65	164	204	282	4	264	1	238	1222
G3YMC	81	114	191	250	63	258	50	209	1216
G3JXN	30	64	123	204	73	206	19	234	953
G0AEQ	2	88	118	243	55	196	6	182	890
G3NXG/M	1	33	60	206	37	221	51	207	816
GM4OBK	40	81	115	134	49	122	52	167	760
Average	66	143	191	259	74	251	54	234	1272

Next deadline 8 October. Prepared by G3GIQ (to whom scores should be sent).

AWARDS

California Award

Issued by the Northern California DX Club to those who have QSLs for contacts with at least 220 different California stations as follows: confirmed QSOs with 200 stations in California and in addition 20 members of the

HF F-LAYER PROPAGATION PREDICTIONS FOR SEPTEMBER 1990

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

Time / / GMT	28MHz 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	...1343442..	...25666651.	...57888883.	1.1788888962	535766667897	986433334799	864111.12578	+3.....25+
MALTA	....443332..	...26655651.	1..588888841	311788888974	865876667998	998643345799	987311112588	++4.....25+
GIBRALTAR	....121111..	....3433331.	...17766673.	1..388878862	542787777997	998764445799	998532112588	++52.....25+
ICELAND	.....	.....11112..	....1444452.	37767751	31.267777885	875654445688	887532122457	++52.....24
** ASIA								
OSAKA	...1341.....	...25531....	...365321...	...263222222	....3..13564	1562	.....24.	.....
HONGKONG	...2555431..	...36666531.	...2555576631	1...33337863	2...1..14786	1585	263	.....3.
BANGKOK	...4566663..	...45767751.	...235458841	2...13237874	4.....14798	3.....1588	1.....265	32
SINGAPORE	...4666663..	...45767861.	1..135458852	2....3237875	4.....4798	2.....1587	265	32
NEW DELHI	...566663...	...155767511.	1.2325457431	3121.2237764	73.....4798	62.....1589	4.....267	34
TEHERAN	...67677641.	..1666778621	2.4533558864	526311237886	865.....4799	862.....1589	73.....267	4.....34
COLOMBO	...56667741.	..1456778721	2.1224458864	521..2237987	83.....4799	71.....1589	4.....267	34
BAHRAIN	...67677741.	1.1666778632	3145334588875	6362.1237998	975.....4799	962.....1589	73.....267	4.....34
CYPRUS	...68777762.	1.1888888842	313877889975	6468666788338	988633346893	9863..113689	873.....1478	+4.....45
ADEN	1..677778632	2.2655678854	634422358987	8562..137999	985.....4799	972.....1589	74.....267	42.....34
** OCEANIA								
SUVA/S	.....222.1..	....233323..	...24444462.	...45333582.	..1631..471.	...41...15..	...1.....2..	.....
SUVA/L	32.3211..174	3315432..274	22386331.662	.1386221275.	..273...272.	...4.....5..	...1.....2..	.....
WELLINGTON/S	....1322.....	...1344411..	...45544342.	..165323474.	..1631.1474.	...4....151.	...1.....2..	.....
WELLINGTON/L	21.11.....33	331331....65	343752...274	1348521..473	..373...164.	...4.....41.	...1.....2..	.....
SYDNEY/S	...355552....	...57666411.	..1675556331	...553336662	...22..14772	.....155.	.....22.	.....
SYDNEY/L	....2.....32	11.1411...54	21136321..85	111463111284	...34...1572	...11....44.	.....11.	.....
PERTH	...5777541..	..15777662..	1.1265557521	3...43237753	3...1...4787	1.....1586	263	.....3.
HONOLULU	.....2..	.....1..241.	....231.462.	...14311561.	..3541..33..	..341...11..	..12.....	.....
** AFRICA								
SEYCHELLES	1..666774332	2.1555776654	634312557887	854...236899	973.....4799	96.....1589	83.....267	5.....34
MAURITIUS	1..677778742	311656778865	634323558998	9641..236999	972.....4799	95.....1589	82.....267	5.....34
NAIROBI	2..677788753	411755678876	744522358999	9763...36999	996.....4799	983.....1588	861.....267	53.....34
HARARE	31.677788865	521765678987	864622357999	9864....26999	9971....3799	984.....588	872.....267	54.....34
CAPETOWN	3..587678865	52.776678987	852853257999	98472..36899	9975....3799	9962.....589	774.....267	45.....34
LAGOS	32.487778875	641676568987	874852227999	99783...5899	9987....2799	8974.....589	6751.....267	352.....34
ASCENSION Is	32..87667754	541186557886	874473224899	997661..2899	99873....599	8874.....289	6752.....57	442.....24
DAKAR	21.188777873	431387656986	874684223898	996762..1799	99973....589	88841....278	7752.....57	442.....24
LAS PALMAS	78766741	11.288888873	441598888996	774787777898	998865445799	998632112489	88731....268	++4.....3+
** S. AMERICA								
Sth SHETLAND	2...16888873	421126778886	753355447788	986553226688	99873...3357	79841.....35	5752.....2	242.....
FALKLAND Is	11.127777873	431247776885	763565444688	996763221379	99873....158	89851.....26	7852.....3	452.....
R DE JANEIRO	11..18766763	331227655785	763555312588	9867531..289	99873.....69	98851.....37	8652.....5	542.....2
BUENOS AIRES	11...7776762	321227765685	663545422378	8867532..168	99873.....38	89841.....5	7852.....3	452.....
LIMA	....1.765652	11..21764554	442253431136	77556321..17	898741.....5	79851.....2	5862.....	253.....
BOGOTA	2765652	11...3754454	431124421136	7644432...17	998641.....5	89851.....3	5862.....	253.....
** N. AMERICA								
BARBADOS	7765662	11..27744574	442246411267	7754532...58	998741....27	99851.....5	7862.....2	453.....
JAMAICA	1654541	1....2754453	321.14431136	6632332...17	897641.....5	79851.....2	5852.....	252.....
BERMUDA	4654651	1....5654663	321.25432366	65323421.148	997541....17	89851.....4	6852.....1	352.....
NEW YORK	1544441	2654552	31...3443355	542113221147	886431....16	79741.....3	4752.....1	242.....
MEXICO	144431	354442	31..1.352223	54212123...3	68643.....	38741.....	1652.....	.32.....
MONTREAL	1443431	2555552	21...3454465	541113232257	886431....26	78751.....3	4752.....1	.42.....
DENVER	.....1222.	34331	2.....144333	421....133113	56532.....1	36741.....	.452.....	..2.....
LOS ANGELES	.....332.	15431	1.....36322	32.....241.1	36432...2...	.5741.....	.252.....	..2.....
VANCOUVER	.....1.	.....112.	1.....13322	21.1....14222	34442...3...	14741...1...	.152.....	..2.....
FAIRBANKS	.....	.....	11112221	1..231123432	233531..3321	.2441...11..	..21.....	.....

The provisional mean sunspot number for July 1990 issued by the Sunspot Index Data Centre, Brussels, was 147.0. The maximum daily sunspot number was 272 on 1 July and the minimum was 57 on 18 July. The predicted smoothed sunspot numbers for September, October and November were respectively: (classical method) 135, 133 and 131; (SIDC adjusted values) 127, 125, 124.

A92BE – Bahrain: left to right Lloyd, Sheridon, Iris.

NCDXC. All must date since October 1946 - the date when the NCDXC was founded as the first DX Club in the world. Any band/s and modes may be used. A list of QSLs certified by "officials of recognised radio societies and clubs of the world" must be sent and the award is free. Membership lists of the NCDXC are updated yearly and copies are available if you send an SAE and IRCs to NCDXC, PO Box 608, Menlo Park, CA, 94026, USA. I am able to supply a copy of the most recent list (SASE please).

The Wroclaw Award

European stations need 15 points, others ten, for QSOs with Wroclaw since 6 May 1945. Each ordinary contact is worth two points, with SP6PKQ five points, and with stations using SN, SP0, SR, SQ, or 3Z prefixes seven. In addition QSOs made during the six "Days of Wroclaw" (6-10 May annually) count double. Contacts may be repeated on all bands and using different modes. Listeners may also apply. Applications, certified by your club or two licensed amateurs and accompanied by ten IRCs go to Klub Krotkofalowcow SP6PKQ, PO Box 2190, PL 50-985 Wroclaw 47, Poland.

BAND REPORTS

The wonderful summer weather has proved a strong counter attraction to DX hunting this month. However, reports were received from FE1JUD, G2s AKK, HKU, GM3GDX, G3s GVV, KSH, LPS, URA. YRM, G4s DXW, FMO, FRV, MUW, ZYQ, and G0JZA.
As always stations in italics were on cw.

14MHz

0600	*C3JEA*, KH6IJ
0700	FO0KW
0800	FO5JV, *4K3PWB*
1700	*4K3MI*
1900	JW/DL3LAB
2000	*ZL4OD*
2200	*P43SF, DL8CM/ZS1*

18MHz

0600	KL7CYL, U0AL, VK6, W6, W7AM, 9H3MV, 6W6JX, 9Q5TE
2200	*VP2V/OH2BH, 9L1US*

21MHz

0700	ZS9AAA/1
0800	BZ4RBC, FO0KW, HL0Y, *ZD8CUE*
0900	KH2/JA1GSY, ZK1BY
1000	AH3C, FO0ICS, JE4LWQ/JD1 (Okinotorishima), T20AA, ZK3EKY, 3D2RM, 5W1IU, 6W7/SP5DED
1100	A61AD, FK8FR, WL7E, 5V7RF, 8J90XPO
1200	BZ7AA, FT5XH, V73AX, YJ0AKY
1300	4U1VIC
1500	*XT2BW*, S9A
1700	BV5OC, BY5s QA, QW, RA, P30S, 9V1YC
1800	HF0POL, ZD7VC, 9M2SH
1900	KH6IJ
2000	*FY5FO*
2200	*SV1RP/SU2*

24MHz

0800	KH6SB
0900	JA, VK
1300	A45ZN, 5N6ZHM
1500	5T5FA, 9Y4CD
2100	OA4ZM

28MHz

0800	G4WYG/P/ST2, ZS8MI
0900	FT4XG, FT5XH, VK, 5Z4RT
1000	V51P, ZD8BOB
1200	YI1BGD
1400	TJ1RK, ZD7VC, 9L1US
1500	A22AA, S79MX, VQ9NO, ZS8MI, 7Q7JA
1600	CE0MTY, CE0ZCD, 5U7NU

PROPAGATION

This month G8KG's report goes as follows: "The middle of June seems to have marked a point of change in the pattern of solar activity. The markedly one-sided profile which had persisted for seven successive rotations of the Sun shifted in phase towards the end of the month, leading to a high peak in the solar flux early in July though with as yet no significant change in average levels.

"What did change significantly was the level of geomagnetic activity as reflected by the A-index and other similar measures. Hitherto Cycle 22 had shown abnormally high levels for the early years of a solar cycle and this has resulted in a higher incidence of disturbed conditions on the HF bands than might have been expected. In mid-June, however, there began a period of very stable geomagnetic conditions which at the time of writing (19 July) had lasted 34 days during which the Boulder A index averaged only eight and seldom exceeded 10."

Both 18 and 24MHz are producing some excellent dx openings. How about putting that antenna up now and joining the fun?

That is it for this month but first a thank you to the following for items extracted: the *Lynx DX Group Bulletin* (EA2JGO), *DX'press* (PA3CXC), *DXNL* (DL3RK), the *Long Island DX Bulletin* (W2IYX), *RSGB DX News Sheet* (G4DYO), and the *Ex-G Radio Club Bulletin* (WA8GTA). Closing date for **November** issue is **24 September**.

VHF/UHF

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

While Sporadic-E on 144MHz has been in very short supply this summer, there have been a few useful tropospheric openings; there are even some reports of 430MHz and microwave activity, for a change. 50MHz has seen a high level of European Es activity and I must apologize for the omission of individual reports last month, due to unexpected pressure on space.

BEACON NEWS

T J Cooper, G4XOP (CNL), wrote on 11 July on behalf of the Mid-Cornwall Beacon and Repeater Group. The beacons were off the air for some months following the earlier gale damage to the roof of the building in which they were housed. The roof is now repaired and the GB3CTC beacons are QRV again on 70.030, 144.915, 432.970 and 1296.860MHz. The 70MHz TX was working at reduced power, and the 50MHz one was QRT pending a solution to interference problems with other services.

During a 144MHz QSO on 14 July with Andy Steven, GM4IPK (SLD), he told me that a Norwegian 50MHz beacon was operating on 50.051MHz with the temporary callsign LA0BY. It is in Tromso (JP99) and runs 6W to a 4-el. Yagi. He also mentioned that he has submitted further Shetland beacon proposals, including 50MHz, to the VHF Committee.

In his *6m Information Pages*, Ted Collins, G4UPS (DVN), notes 50MHz beacon proposals by LX1JX, LA8AK, OZ7IS and YI1BGD in Iraq. A continuous French beacon, FX4SIX (JN06CQ), has been widely reported on 50.047MHz; it runs 10W to a 5-el. Yagi beaming 50°. 50MHz beacons ZB2VHF and 5B4CY were QRV again from early July.

REPEATERS

The 15th *Newsletter* published by the Aylesbury Vale Repeater Group includes the usual status reports on its two relays, GB3VA on VHF and GB3AV on UHF. Neither suffered any antenna damage in the winter storms and both have been operating faultlessly.

The Group has 165 members and its correspondence address is: c/o Mike Marsden, G8BQH,

Hunters Moon, Buckingham Road, Hardwick, AYLESBURY, Bucks, HP22 4EF. The telephone number - after 6.00PM - is 0296 641783.

CONTEST NEWS

If you are a keen 50MHz operator you won't want to miss the weekend 17/18 November. The UK Six Metre Group has organized a 48h event starting at 0000UTC on the Saturday to coincide with the SMIRK QSO Party. Crossband QSOs are valid with stations that do not have 50MHz in their country, but no QSOs allowed in the 50.100-50.130MHz DX window. Exchanges to include callsigns, locator square - first four characters sufficient - and/or British county using the RSGB list, and whether or not you are a group member.

The scoring is one point per contact plus an extra point if the other station is a group member. The multiplier is the total of different countries, squares and counties contacted, so the final total is points times multiplier. Any log format may be used and entry forms and official logs may be had from G4AHN for a SASE. He is: Richard Lax, 1 Gardeners Hill Road, FARNHAM, Surrey, GU10 4RL, which is the address to which entries must be sent postmarked no later than 10 December. There are several cups, trophies and certificates on offer for transmitters and SWLs.

METEOR SCATTER

There are no significant meteor streams in September although dozens of minor ones are listed in the *BMS Radiant Catalogue*. I noticed one that peaks on the 29th with a ZHR of 30. It is a daylight shower called the Sextanids and its radiant is above a mid-UK horizon between 0400 and 1530. For those with number crunchers, the Right Ascension is 152° and the Declination is 0°.

The orbit period is 1.40 years, the eccentricity 0.87 and the inclination to the ecliptic plane is 22°. The stream velocity at atmospheric encounter is 32.2km/s. My MSD1 program indicates the following times when reflection efficiencies exceed 50%: NE/SW 0530-1030; E/W 0700-1230; NW/SE 0900-1400 and N/S an hour or so either side of 0700 and 1300. If anyone tries this one, please let us know if reflections were any better than random.

PHANTOM QSOs

From time to time most of us have received QSLs for QSOs we never had, usually because the fellow at the other end misread the callsign. In a hectic Es opening, confusion often reigns, especially when the DX operator doesn't make it clear to whom he is giving a report. But sometimes people 'try it on' to get a card from a station they did not work. John Nelson, GW4FRX (PWS), received a QSL from UB5KY (KO31) for a phantom QSO in the great March 1989 aurora. Has anyone else received a card from this station for a non-QSO?

DXPEDITION NOTES

First a reminder about the round Britain trip by Birmingham Radio Society members between 8 and 19 September - details in the August issue. Some years ago, the Oxford University Radio Society used to undertake annual DXpeditions to rare squares. As I recall, they were quite good at QSLing. Bob Henshaw, G4GCM (HPH), has still got all the logs from these trips but does not think there are any envelopes in the bureau. So, if anyone is lacking a QSL, you can either send yours through the Bureau via his own call, or direct to his home QTH - with a SASE if you want a direct reply - and he will oblige; he is QTHR.

SOFTWARE

I have no new programs in CP/M for the Amstrad PCWs to offer, but David Searle, G7GOP, would like some help. He is looking for a program; "...which will help teach morse code." I presume he means a random figure/letter generator with a facility to permit subsequent checking? If anyone knows of suitable software, please contact him at 40 Truro Lane, PENRYN, Cornwall, TR10 8BW.

In the August issue of *8000 PLUS* magazine, I noticed an advert by the PCW Software Library which professes to have: "A huge range of excellent and tested PD software for every purpose." They will send you a catalogue on receipt of your SASE. Their address is: 11 Older Way, ANGMERING, W Sussex, BN16 4HQ. If you want my PROGLIST of amateur radio programs, send me a SASE to the Purley address.

50MHz

The first task this month is to clear up, once and for all, the Swiss situation. The following official packet message was posted from HB9RHV at 4U1ITU on 18 June addressed to all.

"Dear OMs and 6 metre users. In the beginning of 1990 the Swiss PTT have allowed to use the 6 metre band from the Swiss territory. Here are the main rules for this limited test of exploitation:

1. This authorization is limited from January 1st to December 31st 1990.
2. QRG is 50-52MHz according to class of licence.
3. Maximum power is 100W ERP.
4. Written authorization from the Swiss PTT must be received before transmitting.
5. Transmissions are allowed only when channel 2 of Swiss-German television and other TV transmitters near the Swiss border are switched off.
6. Log is obligatory with the times.
7. The Swiss PTT can withdraw the authorization at any time.

Point 5 means that HB9 stations can only operate approximately between 2200-2300 to 0400UTC. Stations outside these hours are completely illegal and pirate, so don't make any contact or sked with them. Thanks for your comprehension and good DX."

This was confirmed again in a letter, dated 12 July, from Etienne Heritier, HB9CX, the IARU Liaison Officer of the Swiss national society, USKA. He stated the operating times as 2300-0400UTC till the end of September and 0000-0500UTC from October to March, obviously to coincide with standard and summer times. There are no exceptions to these rules for Swiss amateurs. However, Pierre Pasteur, HB9QQ, did have proper authorization for his recent 24h a day operation from the Principality of Liechtenstein.

The June report from Ray Cracknell, G2AHU (HWR), was shorter than usual as several of the regular contributors were on holiday. He quotes the official mean sunspot number for May as 132 and the solar flux as 194. The yearly, smoothed sunspot number for 1989 was finalized at 157.6 and the monthly means for January through December were 161.3, 165.1, 131.4, 130.6, 138.5, 196.2, 126.9, 169.9, 176.7, 159.4, 173.0 and 165.5 respectively.

Commenting on Es, Ray wrote: "The extent of the openings will surprise all students of propagation, but we must warn that it would be a great mistake to dismiss it as expected at sunspot maximum. All other evidence, such as the low incidence of good transatlantic Es openings to the USA, Canada and Central America on 50MHz, relatively fewer 144MHz openings into Europe, and a small decrease in 28MHz Es into Europe, point to the expected decrease in Es propagation at sunspot maximum.

"Nevertheless one might

ANNUAL VHF/UHF TABLE
January to December 1990

Callsign	50MHz Cty	50MHz Ctr	70MHz Cty	70MHz Ctr	144MHz Cty	144MHz Ctr	430MHz Cty	430MHz Ctr	1.3GHz Cty	1.3GHz Ctr	Total Points
G1SWH	41	30	26	6	70	13	33	8	-	-	245
G6HKM	55	30	-	-	61	19	31	9	24	6	235
G0IMG	34	25	37	3	42	8	29	4	-	-	182
G0CUZ	-	-	-	-	85	24	30	6	-	-	145
G1WYC	16	18	-	-	53	14	25	8	-	-	134
G8PYP	22	23	1	1	42	13	21	6	-	-	129
G8ESB	8	4	15	2	42	6	30	4	9	4	124
G0NFH	37	3	9	2	44	9	7	2	-	-	113
G4XEN	-	-	-	-	54	19	32	3	1	2	111
GW6VZW	72	38	-	-	-	-	-	-	-	-	110
G0EVT	21	23	-	-	36	14	5	1	-	-	100
G8XTJ	12	23	-	-	52	13	-	-	-	-	100
G3FPK	-	-	-	-	78	18	-	-	-	-	96
GI4OWA	20	4	-	-	30	12	-	-	-	-	66
G7CLY	-	-	-	-	57	9	-	-	-	-	66
G6MXL	3	12	1	1	25	5	7	2	2	2	60
G6ODT	-	-	-	-	35	6	15	4	-	-	60
GM0GEI	29	22	-	-	-	-	-	-	-	-	51
GM0JOL	-	-	-	-	33	13	-	-	-	-	46
G4OUT	-	-	7	1	28	5	-	-	-	-	41
GW7EVG	-	-	-	-	26	6	-	-	-	-	32
GM1ZVJ	1	9	-	-	2	1	-	-	-	-	13

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

remark that the Es results really are phenomenal. This has lead to many of us dismissing it as too easy and not worth reporting. Please don't do so. We really do need to determine just how extensive Es really is and to measure our results quantitatively in order to compare results from one year with succeeding years through to sunspot minimum."

Next a summary of notes from G4UPS's data starting with Cyprus, from where ZC4AD had his first opening to England on 1 July. His QSL route is the same as for ZC4s AB and MK - JSB, Episcopi, BFPO 53, LONDON. A45ZN reports that operators in Oman have applied for 100W experimental licences for 50.1-50.2MHz; a response from the authorities was awaited.

IK2GSO, who operated from La Maddalena signing /IM0 during the first half of June, worked 303 British stations, 314 other Europeans, ZS and ZC4 in 90 squares. I0AMU and I0CUT activated HV3SJ on 16 July from 1600 to 1845 working about 60 stations, but there was no propagation to the British Isles apart from Jersey.

From Malawi, Ron Macfarlane, 7Q7RM, has been QRV since 21 July from KH74MG. His first European opening was on the 24th from about 1800 when he worked GJ4ICD. From around 1700 next day he contacted about 40 UK stations on CW, the furthest north probably being G2ADR. QSLs can go to PO Box 472, Blantyre, Malawi.

1A0KM, the Sovereign Military Order of Malta, is a much sought-after station on the HF bands when it infrequently appears. It was activated on 50MHz by I0AMU on 20 July when Alfonso worked GJ4ICD and G4AHN. Siggy Iulius, YO2IS (KN05), received a special 50MHz permit on 23 July and worked some 9Hs right away; details of QRGs and power are awaited.

Now to individual reports, starting with Chris Gare, G3WOS (HPH), who operated from 4U1ITU in Geneva 8 – 10 June. The QSOs marked with an asterisk were firsts from this United Nations enclave. On MS on the 8th he completed with GJ4ICD*, G4ASR, FC1JG*, and G8PYP; on the 9th with G3SDL, G4CCZ, G3XBY, G3ZSS, GW4LXO, G8HCV and G4IGO; and on the 10th with G4IJE, G4MKF, G4FUF and 9H2CG*, the last with a bit of Es, too.

Es brought OZ1VW* and OZ1HWQ on the 8th; PA3BFM*, G3VYF, G4AHN, G4CCZ, G3NAQ, PA0ERA and G3CEG on the 9th, all described as "...long burst or more likely triggered Es." Chris failed to complete with G3KOX, GI4YDZ and 9H2GB. Other calls clearly identified were G2ADR, LX1IS, OZ1GH, G3IMV, G3NOH, SM7CMU, PA0HIP and G3OHC.

Darrell Moody's, G0HVQ (GLR), letter covered the period 20 June to 14 July when Es propagation was evident on 15 days. Best days were 1 July, when the band was open from 0830 to 2200, with IV3GBO (JN66), IK1LUT (JN34), IN3TWX (JN56) and FC1JUC (JN35) being the pick of the bunch; the 13th, 1140-1940, when he worked IS0, IK6 and IK5, and the 14th, 1130-2030, described as "Quite an opening" and which brought QSOs with SM3LBN (JP80), CT1/G3SDL (IM57), FC1MKY (JN33), IK4ADE (JN54) and T77C (JN63).

Darrell wonders if Es is linked to solar activity after all? Well, it is one proven factor but there are others, as Jim Bacon, G3YLA, explained in his *RadCom* articles last year. The records of 144MHz Es openings I have kept since 1976 seem to show that sunspot maxima years do not produce very good Es propagation, as I mentioned at the beginning of last month's *VHF/UHF*. We should follow G2AHU's advice and keep detailed records for future study. It is accepted that the magnetic solar maximum occurs 12-18 months after sunspot maximum, and a similar pattern seems to be apparent with Es.

Neil Carr, G0JHC (LNH), worked PA3DWD/TF/P on 22 June and A22BW on his birthday on the 26th; he heard V51E, ZS6WB and W3EP. Next day, N4EJW (Florida) was the only station heard - and for an hour, too. On 2 July there was "... incredible propagation with K5CM and K7KV (CN86) heard at 1200." The latter was RST539 for 3min while working GD3AHV. ZC4MK was S9 on the 7th, 8th and 9th and he worked 9H3LF on the 9th. The 12th brought CU2/G3KOX on SSB and CU2/G3RFS on CW and Z23JO was S5 for 30min on the 14th. Next day, V51E was S9-plus as was the V51DM keyer on 50.0175MHz.

Terry Chaplin's, G1UGH (SFK), letter covered the month to 17 July and he took good advantage of the frequent European Es openings. He also worked this EB5EIB character on 20 June but, since no EAs are licensed for 50MHz, they can't be claimed for table points. Best DX included T77C on 28 June, TF3EJ at 1807 on 2 July, ZC4AB on the 9th, CT1/G3SDL (IM57) on the 13th and ZC4MK the next day. On 26 June he heard a W1 and on the 28th, WA2FUZ (FN22).

Brian Booth's, G3SYC (YSW), letter covered up to the end of June and his highlights were OY7ML and CU1EZ on the 19th, PA3DWD/TF on the 22nd and OX3LX on the 30th, all mid-evening contacts. At 1951 on the 27th he copied the VO1MUN beacon.

Paul Turner, G4IJE (ESX), worked K7KV (Washington State) at 1401 on 1 July and that is further west than any Ws worked in the F2 season last Autumn and Winter. Other choice DX were OY6FRA (IP62) at 1215 on the 2nd, ZC4MK at 1333 on the 4th, CU2/G3KOX at 1215 on the 12th and CU2/G3SDL on the 13th. He also worked the EB5 and EA8/DJ.

As usual, G4UPS spent many hours on the band in July and Ted had something to report on every day up to the 25th. He worked most of what was available in Europe so I looked for the more DX stations. On the 1st he heard VE4MA, VE3OK and WW8M for 9min from 1203 and at 1354 WB4JJG (EM75) was S9 for a time. On the 2nd, WW8M appeared for 30s at S7 at 1227. N8GR was RST579 at 1219 but only got the G4 part of Ted's call. On the 6th he heard KP2A working G4IGO at 2025.

On to the 14th when Z23JO was heard at RST569 at 1840 and again exactly 24h later. At 1820 on the 15th LU8YYO was RS44 and at 2120, KP4EIT was working G4IGO and G4HBA but nothing heard in Hemyock. VE1YX was worked on CW at 1215 on the 18th and the ZD8VHF beacon was copied for 25min from 2007. The 21st brought a contact with Z23JO at 1732; the ZD8VHF and FR5SIX beacons were both audible. Ted heard 7Q7RM working GJ4ICD at 1800 on the 24th and next day, at 1720, he worked Bob. Later ZS6WB was S9, the V51E keyer was S7 and LU8MBL was RS57 at 1930.

In a brief letter, Byron Fletcher, G6HCV (SFD), said he had added 10 more countries and another 58 squares since 2 May and has now passed the magic 300 figure. Derek Brown, G8ECI (LCN), went QRT at the beginning of July, and is now working in Libya for at least a year. He worked SV, I and OE before departing, had MS skeds with two SM7s which were completed in 10min, worked ZS6LN and ZS6WB on 26 June and V51E on the 28th.

From Scotland, John Hilton, GM1ZVJ (LTH), has worked some excellent Es DX with just 2.5W PEP and 3-el. Yagi, such as I2FHW (JN45) and some DLs on 26 June, OE9 and I4 next day and more OEs and F6BSJ (JN26) on the 30th. Other Es were on 4 and 9 July and he lists QSOs with I4s and DLs on the 12th.

Finally, a mention of the UK Six Metre Group, now under more dynamic and high profile management. Membership has more than doubled since the new committee was elected at the VHF Convention. G4UPS is the secretary and an SASE to him will bring full details. His QTH is 27 Parklands, HEMYOCK, Devon, EX15 3RY.

70MHz

Commenting on the proposed new band plan published last month, Alan Reeves, G4ZFQ (IOW), wrote: "I was horrified to see the revised 4m band plan. We must have a wide stopband between low signal SSB and high signal FM." His problem is a local FM-er on 70.215MHz who is so strong that he is unable to hear any moderately weak signal from 70.180MHz upwards.

It seems this kind of problem could be resolved at local level by the FM station reducing the deviation. If he is causing problems 35kHz away, and Alan's RX system has a good dynamic range, he must be overdoing things. In a band only 500kHz wide, I don't think we can afford to adopt guard bands. Nevertheless, I expect we will consider this point at the next meeting of the VHF Committee. If you operate in the Trophy Contest on 16 September - see the June *RadCom* for the rules - turn your antennas towards the Irish Republic. Paul Martin, EI2CA, and Bill Somerville-Large, EI9FK, both from County Wicklow, plan to activate some of the rarer squares. They will try to encourage some of the 10 active EI 70MHz operators to come on the band for the event.

A few years ago, Paul did a lot of MS operating on the band from rare squares in the west of Ireland. He wrote: "I can report that it is a superb band for this mode once the distances are reasonable. I have completed QSOs with stations running as little as 10W to 2-el. beams, so I would certainly encourage people to 'have a go' when the MS expeditions are QRV."

G8ECI wrote that G4MXI (LNH) is equipped for 70MHz operation for those looking for JO03 square. Derek had an Es QSO on 1 July with ZB0W on 70.210MHz, a couple of days before departing for Libya. The only reader who updated his table score this month was Mike Gotch, G0IMG (ESX). What a pity that there are so few activity reports.

144MHz

The only significant Es openings in the period were to Spain on 5 July and to Italy on 14 July. In the latter, at G3FPK there were numerous very loud stations but they were all concentrated in the I8 and I0 call areas and in

squares most people have worked several times before. Brief events to the Mediterranean were reported on the 21st and 25th. There were also some reasonable tropo openings.

Colin Morris, G0CUZ (WMD), caught the Spanish Es and, between 1628 and 1658, he worked EA7PZ (IM67), EA1MO (IN71), EA7BVD (IM77), EA7s ALL, AJ and BNB (IM87), EB4CYF and EA4CM (IN80). The Italian event started at 1936 and he contacted IS0BHL (JM49), I0AKP, IK0OKY, IW0BET and IK0AKA (JN61), IC8EGJ, IW8BZN, IK8FUN and IK8JPI (JN70), IK5FTJ (JN53) and IW0QLV and I0UZF (JN63). His last QSO was at 2005.

On tropo, Colin lists July contacts with EI4VLE/P (IO55) on the 1st, GW0KZG/MM (IO34) on the 2nd, EI4VLE/P (IO44) on the 9th, EA1BCB (IN53) and EA1TA (IN53) on the 10th, EA2AGZ (IN91) on the 11th, GM3ZXH/P (JP00) and EA1TA again on the 15th. The GM is Les Anderson who was in the Ninian Oil Field and who worked scores of stations, mainly in eastern Britain.

G1UGH caught the 5 July event and worked EA1MO at 1710. John Hunter, G3IMV (BKS), has profited from GW0KZG's recent -/MM activities to the tune of seven new squares. Other new ones were EA2LU/1 (IN71), EI4VLE/P (IO55) and GM3ZXH/P.

Andy Cook, G4PIQ (ESX), reckons the lack of major Es openings this year is due to the E-layer having been privatised, found to be unprofitable, so taken out of service! However, he did work 11 Is on 14 July but only JN53 was a new square. Going back to NFD, conditions on the 7th were the worst he has known and G4BAH said they were the worst for 20 years from East Anglia. The 8th was a lot better with OZs, Ys and HB9LU (JN46) who was a new square.

Tropo was good on the 12th with three SPs worked, while the 13th brought 12 OKs, many Ys and HG6s Z, KQ/P and VV/P all in JN97. After that, he put up two 19-el. Yagis and did very well during the weekend 14/15. On the morning of the 15th, Andy worked 27 HB9s, several OE9s, lots of southern Germans, mostly in JN44/45, but best DX were over the Alps to I5BHS, I5YDI and I4VOS (JN54). The evening provided a 'private duct' to Scandinavia; LA6IM (JO28) was S9 with a quarter-wave whip antenna.

On the 18th there was tropo propagation from LA to OK and southern Germany. The period 22/23 brought more excellent tropo contacts with 18 SPs, best being SP2DDV (JO93), SP2NJZ (JO92), SP3GFP (JO84), SP4MPB (KO03), SP5NHF, SP5ELA and SP5AJJ (KO02) and SP7BCA and SP7RFE (KO01). I could hear Andy working all this in Purley, but not a whisper from the SPs in G3FPK's RX.

On 10 July, G8PYP worked EA1BCB (JN63), FC1DPU/P (IN87) and FA1LIX/P (JO10) and next day Steve contacted F6GQE/P (IN92) on tropo. On the 12th he completed an MS sked with IK0BZY (JN61) at 0400 in 10min. FC1ADT/P (JN15) and FC1HSU/P (JN05) were tropo QSOs shortly afterwards. On the 14th he had Es QSOs with I4XCC (JN63), I4RHP (JN54), I6IQU (JN63) and I7QAU (JN80) from 1954. He heard IW9 and IS0 for 20min from 1750 on the 21st and made more tropo contacts with Fs later. At 0837 on the 23rd he worked OK1AGE/P (JO70).

Mervyn Rodgers, GM0GDL, has now left his Alva QTH and moved to Padanaram (TYS). The take-off is much better with a clear view to the north, east and south, so he hopes do well.

430MHz

Responding to pleas for more activity reports, Bob Henshaw, G4GCM (HPH) wrote about the UHF Contest on May 5/6. His group operated from a coastal site near Scarborough (YSN) from where conditions on the 5th were much better than on the 6th. They used 400W from a K2RIW amplifier, the antenna array described as "(8+4) times 21-elements". The more distant squares worked were JO41-46 and in Scandinavia, JO28, 38 and 53. Best D contacts were DL4OL (JO52), DB8DKB (JO53) and DF9CY (JO54).

G4PIQ worked a couple of SPs in JO71 and JO81 on 12 July. The evening of the 15th brought Andy a QSO with LA1BM at S7; he was using a 5/8 whip antenna. SM4KYN (JO79) was the most inland station contacted. On the evening of the 19th there was selective tropo with OZ1JPT (JO64) worked; beacons OZ7IGY and OZ1UHF took it in turns to be strong signals, a kind of see-saw effect. In the morning of the 23rd he worked Y22ME, DK0TU and Y26CI, all of whom are 1kW, eight Yagi stations.

For G6HKM, NFD brought nine new 1990 counties. On 12 July, Ela contacted DD1BR (JO32) and DL3YEE (JO42) and on the 14th, OZ/DK2UO/P (JO45), DG8BAX (JO43), DG4BR (JO33), ON1AZH (JO20) and GD8EXI. G8PYP operated in NFD and found a few more counties for the Annual Table. In the French QRP Contest on the 21st, Steve worked F6HPP/P (JN19) but best DX was OK1AGE/P on the 23rd.

THE MICROWAVES

In the May contest, G4GCM's group operated on 1.3 and 2.3GHz. On 1.3GHz they used 250-300W from a pair of water-cooled 7289s to 16 23-el. Yagis. Bob wrote that, at times, conditions were better than on 430MHz. Best DX were SM6HYG, LA8OJ (JO28) and OZ5BZ (JO45). GI4OPH was QRV and they made 107 QSOs. Using 50W on 2.3GHz with a 2m dish, they made 36 contacts, all bar three on the Saturday. Bob is interested in running tests on 430MHz and 1.3GHz and, now that the contest season is drawing to a close, he should be more active from home. He would like to try with GD, GI and GM stations. G6HKM collected nine more counties on 1.3GHz in NFD, spending most of the time on the band; Ela made 36 QSOs. On 14 July, she worked OZ/DK2UO/P and G8SSL and G8AAP (NOT).

DEADLINES

Quite an eventful month and just as I was finishing this piece on 28 July, John Regnault, G4SWX (SFK), telephoned me about a good aurora on 144MHz that I was missing. There were some very strong signals in G3FPK's hearing aid and there was another phase in the wee hours of the 29th; activity seemed low, though. *(After Norman's piece was received, G4KUX (IO94) phoned to say he had worked in the early hours of the 29th, via the aurora, lots of SP/Y/SM/OH plus UB5KY (KO31), UA2FL (KO14), HG6VV/P (JN97), ES2XM (KO29), UV1AS (Leningrad), and UC2CBZ (KO34). ES2XM was 59+ for many hours. - Ed)*

The new deadlines are 27 September for the November issue and 25 October for the December one. Writing this at the end of July in a heatwave, those dates seem a very long way off.

SWL

BOB TREACHER BRS 32525
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DXTV

I shall start, for a change, with a very full report on DXTV from GM1DSK, who provided the photographs. He has been licensed since 1984 and has spent the last two years monitoring TV bands, initially as a means of watching for when Es openings might get up as far as 144MHz, but latterly just to see what might be seen in the way of TV DX. He uses a pair of omnidirectional crossed dipoles at about 30ft into a Labgear CM6022/RA televerter and a 12in black and white portable TV. TV DXing, just like any other DXing, is all about being in the right place at the right time. Recently he has seen some good pictures from the USSR, Poland, Germany, Holland, France, Italy, Norway, Sweden, Denmark, Iceland, Portugal, Switzerland, Yugoslavia and Czechoslovakia, as well as a few which could not be identified.

The first pictures this year came in on 31 May at 1720 with a quiz programme on ORF (Austria). Pictures were stable until 1830. On 1 June, he watched a programme on cookery and an old film around 1800, but could not identify either. 6 June brought some good pictures from France and Spain between 1700 and 1900, and then he watched some World Cup Football on TVE1 (Spain). CST from Czechoslovakia was a good signal; at 1840 until 2030 during which time he watched CST News. RAI from Italy provided good strong, but unstable pictures on 18 June, with SRG (Switzerland) visible until around 1800. At lunch-time on 19 June he viewed

Band I TV from USSR. Photo: GM1DSK.

Band I TV from Poland TVP. Photo: GM1DSK.

'A day at the races' (Marx Bros) on Italian TV (RAI), while in the evening he watched some more World Cup football, this time on an unidentified Eastern European station until about 2000. A 'pop' show from Spain at 1540 was seen on 22 June, when he also watched a children's show called 'Plastic' until 2020. The 26th was the best day of the period with good pictures most of the day. On 1 July, he watched football on RAI and a news programme from TSS (USSR) until 1930, and then Polish TV (TP) until 2130.

Not many people take TV DXing seriously, and it has been good to give some space to a facet of the VHF spectrum which I do not cover in much detail very often. If there are any other TV DXers out there, please let me know what you have been watching.

HF NEWS

Only a few reports were received in time for this piece, but there was sufficient information to show that the bands had been in fair shape as we headed through the summer. Robert Small, BRS8841, provided DX news going back to the beginning of June because he missed the last deadline through holiday commitments. He had logged several 4K stations operating from Russian islands, together with quite a number of islands which count for the IOTA Awards. Conditions to the Pacific had been good, especially during early morning hours on 21MHz with ZK3EKY, YJ0AKY and JJ1TZK/V6. He was quite surprised to hear AH3C from Johnston Is on 21MHz at 23 45 on 2 July. 28MHz had been extremely quiet, with little good sporadic-E heard. 18 and 24MHz had been fairly productive: new ones on 18MHz were ES1QD, T5RR, TB8HX, H28MEQ, ZB2CF and TI2PZ, while 24MHz provided 8P9FF. 3.5MHz had only provided VP2E/G4JVG and VP8ADR, while 7MHz came up with PJ2/PA3CWQ.

Luciano Marquardt, G1VDW, had logged 125 countries so far this year at the time of his July report. All-time new ones this time around were HZ1AB and HK0EFU on San Andres Is.

G4WXT wrote regarding my comment in the May issue about the unusual nature of the callsign JR4ISF/CE0. This was only because it is some distance for a JA to mount an expedition to Easter Island and not have a 'proper' DXpedition callsign. G4WXT had worked the station and had received a fine QSL card showing the stone figure of Rapa Nui which stands above the island.

Steven Slater had spent more time on 14MHz and had found some new countries. His best DX on the band included FG4FF, HC4MZ, VP9GQ, HK0EFU and TI2BK/MM.

David Whitaker, BRS25429, provided much detail about his 50MHz activities, which I will cover later. On HF he had spent some time on 18MHz and had logged AH3C, KH6SB, HH2PK, OA4ALO, TA0B, and 3X1AU. On 21MHz T20AA, 3D2XV and ZK3EKY were all heard between 1000-1100 on 23 June. On 7MHz several quick forays had found HF0POL at 2042, PY0FF and ZD8BOB.

Reg Akehurst, BRS25209, provided a useful report, listing DX on all bands down to 7MHz. 21MHz seemed to provide the better DX, including A22AA, C53FV, HL9HH, HS1BV, TJ1BJ, TL8WD, 5U7NU and 9M2CA.

Using information provided by these reporters, I have compiled details of other DX which had

continued on page 65

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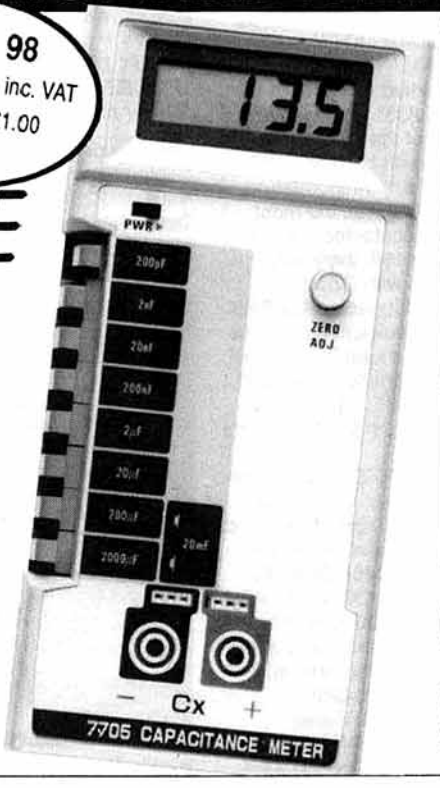

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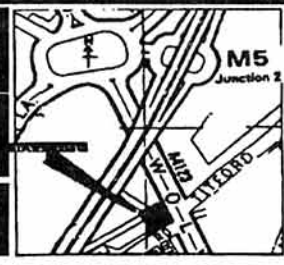

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NEW FROM YAESU THE FT650

The FT650 is the latest in a long line of acclaimed 6m transceivers from the Yaesu factory. Designed and built using the latest modular construction techniques and components to give great performance in a compact, easy to use package.
The transceiver covers from 24-60MHz continuous on receive and 12, 10 and 6m bands on transmit, with a full 100W output, ideal for all DX operators.

MAIN SPECIFICATIONS/FEATURES

- ★ 24-60MHz Receive Coverage
- ★ 10, 12 and 6m Transmit Coverage
- ★ 100W PEP output (25W Carrier, AM)
- ★ LSB, USB, AM, FM, & CW Operation as standard
- ★ Optional internal 240V AC Power Supply
- ★ DVS-2 Digital message storage option
- ★ 99 memories
- ★ Programmable TX Offset

OPTIONS

FP-22 Internal 240V AC P.S.U.
DVS-2 Digital Message Storage Unit
XF455m CW Filter 600Hz

AROUND £995

The Best of The Best — the FT1000

Designed with no spared effort or expense for optimum performance and operability, the FT-1000 is the fruit of over 25,000 man-hours of intensive research and development by Yaesu's top design engineers. Instead of merely offering incremental improvements on existing designs or adding bells and whistles to an old model, the FT-1000 project involves a wholly new approach to the application of the latest digital and RF technologies to today's most demanding needs on the hf bands. Extensive surface-mount component technology allowed six microprocessors and five Direct Digital Synthesizers to be harmoniously integrated with a simple operator interface into a highly reliable full-featured transceiver optimized for serious hf applications.

ADDITIONAL FEATURES

Other features include adjustable IF width, IF shift, IF notch and APF controls. AGC presentable for fast, medium and slow + defeat, on/off selectable, preamp + adjustable attenuator −6dB, −12dB, −18dB, Adjustable — mic gain, RF power o/p, processor and drive controls. Built in electronic keyer with adjustable speed control. Twin independent frequency displays with mode indication + much more.

BRIEF SPECIFICATIONS

- ★ General Coverage Receiver 100kHz-30MHz
- ★ Ham bands TX 160-10m
- ★ Modes CW, USB, LSB, AM, FM, RTTY and Packet
- ★ VFO steps 10Hz CW, SSB, RTTY, 100Hz, AM, FM, PKT
- ★ Auto antenna impedance range 16.7 to 150 ohms
- ★ Selectable receiver band widths 2.4kHz, 2kHz, 500Hz, 250Hz
- ★ Dual band receiver tuning and monitoring with balance control
- ★ Power output up to 200 watts P.E.P. 50W AM
- ★ Sensitivity preamp on SSB/CW 0.25 micro volts 10dB S/N
- ★ D.D.S. Direct Digital Synthesiser
- ★ Dual Selectable noise blankers with adjustable threshold
- ★ 99 memories

OPTIONS

SP5 external L/S with audio filter
DVS-2 Digital Voice message storage system
BPF-1 Sub VFO filter unit
YH-77ST Headphone for stereo or mono dual receive
TCXO-1 High Stability oscillator unit

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SAGRA-600

★ 2m Linear Amplifier
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★ 2 x 4CX250B VALVES

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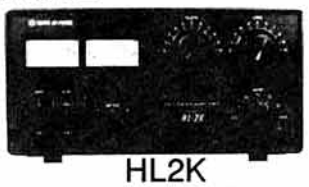
AS REVIEWED IN APRIL 90 HAM RADIO TODAY

HF LINEARS

HL/KGX
160-10m 2 x 4CX250B
1KW PEP RF INPUT
70-120W DRIVE
£945.00



HL2K
160-10m 2 x 3-5007
2KW PEP RF INPUT
60-120W DRIVE
£1425.00

VHF LINEARS

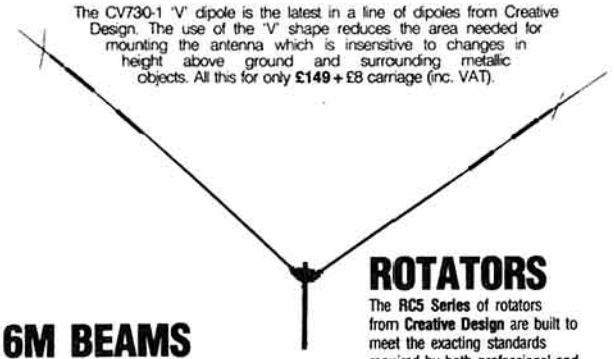
HL66V	6m 10W in 50-60W out RX Preamp	£129.00
HL166V	6m 3/10W in 80-160W out RX Preamp	£249.00
HL37V	2m 3W in 32W out RX Preamp	£89.00
HL62V	2m 10W in 60W out RX Preamp	£135.00
HL110V	2m 2/10W in 100W out RX Preamp	£215.00
HL180V	2m 3-25W in 120W out RX Preamp	£295.11
HL36U	70cm 3/10W in 40-50W out RX Preamp	£135.00
HL60U	70cm 10/25W in 50W out RX Preamp	£215.00
HL130U	70cm 3-25W in 120W out RX Preamp	£389.00

CREATE CREATE CREATE CREATE CREATE

The CREATE company has, for the past twenty years, been the leading manufacturer of amateur and commercial antennas (mainly HF) in Japan.

Now available to customers in the UK through South Midlands Communications, the appointed distributor, are the popular CREATE HF beams to cover the 10/15/20 metre bands, HF baluns up to 10KW PEP and the exciting 10/15/20/40V dipole which has elements of only 19ft and is designed in such a way that it can be mounted in particularly awkward places. SMC also stock what must be one of the largest amateur antennas available, the 40 metre full sized beam, as well as 6 and 7 element and six metre yagis and professional quality log, periodic antennas for 50-1300 and 105-1300MHz. CREATE also manufacture rotators to exacting levels of precision and these have virtually no back lash, quiet gears, variable speed and large torque. All are now available from SMC stock. Please contact us NOW for full details.

The CV730-1 'V' dipole is the latest in a line of dipoles from Creative Design. The use of the 'V' shape reduces the area needed for mounting the antenna which is insensitive to changes in height above ground and surrounding metallic objects. All this for only **£149** + £8 carriage (inc. VAT).



HF BEAMS

Introducing the NEW 318 series of DX Tribanders from Create which offer outstanding efficiency with High Q traps especially designed for 14, 21, & 28MHz. High grade materials are used to ensure long life, maximum reliability and light weight with no compromise in performance.

All beams supplied complete with balun

CD318JR 4 ele 10-15-20M 750W PEP Gain 7:7:5:8dB F/B 18dB	Only **£299** P&P £5.90
CD318 4 ele 10-15-20M 2KW PEP Gain 7:8:8:5dB F/B 18:20:20dB	Only **£349** P&P £5.90
CD318B 5 ele 10-15-20M 2KW PEP Gain 7:5:9:95dB F/B 20:18:20dB	Only **£449** P&P £7.90
CL40B-4 3 ele Yagi 40m 4KW PEP Gain 8dB F/B 22:18dB	Only **£999** P&P £12.50
CL10 5 ele 10m 2kW PEP Gain 12.0dB F/B 24dB	Only **£215** P&P £15.00
CL15 5 ele 15m 3kW PEP Gain 12.5dB F/B 24dB	Only **£319** P&P £15.00
AFA40 2 ele 40m 2kW PEP Gain 6.0dB F/B 20dB	Only **£375** P&P £17.50
714X-3 3/4 ele 15-20-40m 3kW PEP Gain 7:9:10dB F/B 20:23:20dB	Only **£799** P&P £25.00
CV48 40M vertical 2KW PEP 500W PEP Radial wires included suitable for ground or roof mounting	Only **£210**
AD385 Matching network 40?80M for CV48 remote switchable	Only **£49** P&P £2.85
CV730V-1 V dipole for 10-15-20-40- 1KW-2KW PEP 19' ele capable of being mounted anywhere	Only £149 P&P £3.50

6M BEAMS

New from Creative Design are a range of 6m beams, the CL6DX 6 element, CL6DXX 7 element and CL6DXZ 8 element.

All these antennas are the result of long and continued research to achieve the best possible performance whilst remaining both cost effective and extremely robust.

CL6DX 6 ele 13dB*	**£115.00**
CL6DXX 7 ele 14.3dB*	**£168.99**
CL6DXZ 8 ele 14.5dB*	**£225.00**

*Manufacturers figures.

ROTATORS

The **RC5 Series** of rotators from **Creative Design** are built to meet the exacting standards required by both professional and amateur users. A range of models is available designed to cater for medium to large sized antennas. All the rotators are manufactured with high quality components allowing continued and reliable operation.

RC5-1	**£219.00**
RC5-3	**£275.00**
RC5A-3	**£425.00**
RC5B-3	**£675.00**
CK46 Rotary bearing	**£34.95**

***FREE FINANCE ON SELECTED ITEMS**
On many regular priced items SMC offers Free Finance (on invoice balances over £120) 20% down and the balance over 6 months or 50% down and the balance over a year
You pay no more than the cash price!
Details of eligible items available on request
*Subject to status.

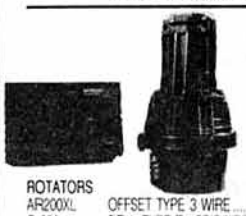
Free interlink delivery on major equipment
Small items, Plugs, Sockets, etc by post £1.75. Antennas, cables, Wires & larger items. Lynx up to £5. Interlink delivery available, upon request for items other than radios from £7.30 depending on weight. Same day despatch whenever possible.

YAESU DISTRIBUTOR WARRANTY
Importer warranty on Yaesu Musen products. Ably staffed and equipped Service Department. Daily contact with the Yaesu, Musen-factory. Tens of thousands of spares and test equipment.

PRICES & AVAILABILITY SUBJECT TO CHANGE WITHOUT PRIOR NOTICE

SMC South Midlands Communications ltd.

ROTATORS



Superb engineering standards combined with pin sharp setting accuracy means new technology from Yaesu create Kenpro Hygain.

ROTATORS		
AR200XL	OFFSET TYPE 3 WIRE	£49.50
G-250	BELL TYPE TWIST/SWITCH CONTROL	£78.00
G-400	BELL TYPE METER CONTROLLER	£139.00
G-400RC	BELL TYPE ROUND CONTROLLER	£169.00
G-600RC	BELL TYPE ROUND CONTROLLER	£219.00
T2X	BELL TYPE METER CONTROLLER	£499.00
G-800SDX	BELL TYPE 450 DEG VAR. SPD	£325.00
G-1000SDX	BELL TYPE 450 DEG VAR. SPEED	£368.00
G-2000RC	BELL TYPE ROUND CONTROLLER	£445.00
G-500	ELEVATION METER CONTROLLER	£149.95
G-5400B	AZIMUTH/ELEV DUAL CONTROL	£375.00
G-5600B	AZIMUTH/ELEV DUAL CONTROL	£435.00
RC5-3	BELL TYPE PRESET	£275.00
RC5-1	BELL TYPE ROUND CONTROLLER	£219.00
RC5A-3	BELL TYPE VAR. SPEED AND PRESET	£425.00
RC5B-3	BELL TYPE VAR. SPEED AND PRESET	£675.00

ROTATOR HARDWARE		
AR200AB	ALIGNMENT BEARING AR200XL	£17.50
KS505	ROTARY BEARING 1½" MAST	£19.95
GS-065	ROTARY BEARING 2" MAST	£29.95
GC-038	LOWER MAST CLAMP G-400, 600 etc	£16.95
9523	CHANNEL MASTER BEARING	£19.95
CK46	ROTARY BEARING 1.5-2.5 MAST	£34.95
MC1	LOWER MAST CLAMP RC5 SERIES	£25.00

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

CARRIAGE:
ROTATORS FREE, ROTATOR HARDWARE £2.85, ROTATOR CABLE £3.50 UP TO OVER 20 MTS, OVER 20 MTS £5.00

STRUMECH VERSATOWER

MINITOWER 10M10 Series		
10M10P30	30FT POST MOUNT	£530.76
10M10BP30	30FT BASE PLATE MOUNT	£562.11
10M10FB30	30FT FIXED BASE MOUNT	£522.49

STANDARD 13M20 SERIES		
13M20P25	25FT POST MOUNT	£458.85
13M20P40	40FT POST MOUNT	£646.30
13M20P60	60FT POST MOUNT	£761.30
13M20FB25	25FT FIXED BASE MOUNT	£317.40
13M20FB40	40FT FIXED BASE MOUNT	£481.85
13M20FB60	60FT FIXED BASE MOUNT	£596.85
13M20BP25	25FT BASE PLATE MOUNT	£541.65
13M20BP40	40FT BASE PLATE MOUNT	£750.95
13M20BP60	60FT BASE PLATE MOUNT	£845.25
13M20M25	25FT MOBILE TOWER	£2179.25
13M20M40	40FT MOBILE TOWER	£2387.40
13M20M60	60FT MOBILE TOWER	£2557.60

HEAVY DUTY 16M20 SERIES		
16M20P40	40FT POST MOUNT	£802.70
16M20P60	60FT POST MOUNT	£910.80
16M20P80	80FT POST MOUNT	£1426.00
16M20FB40	40FT FIXED BASE MOUNT	£644.00
16M20FB60	60FT FIXED BASE MOUNT	£763.60
16M20FB80	80FT FIXED BASE MOUNT	£1219.00
16M20BP40	40FT BASE PLATE MOUNT	£851.00
16M20BP60	60FT BASE PLATE MOUNT	£952.20
16M20BP80	80FT BASE PLATE MOUNT	£1530.65
16M20M40	40FT MOBILE TOWER	£2847.40
16M20M60	60FT MOBILE TOWER	£2967.00
16M20M80	80FT MOBILE TOWER	£3680.00

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

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

MORSE KEYS

MORSE KEYS			p.p.
HK702	STRAIGHT KEY	£42.75	£1.75
HK703	STRAIGHT KEY	£49.69	£1.75
HK704	STRAIGHT KEY	£26.35	£1.75
HK705	STRAIGHT KEY	£26.25	£1.75
HK706	STRAIGHT KEY	£28.95	£1.75
HK707	STRAIGHT KEY	£25.49	£1.75
HK708	STRAIGHT KEY	£26.45	£1.75
HK710	STRAIGHT KEY	£41.75	£1.75
HK711	STRAIGHT KEY KNEE MOUNTING	£41.75	£1.75
BK100	MECHANICAL BUG	£41.45	£2.00
MK701	SINGLE LEVER PADDLE	£38.35	£1.75
MK702	SINGLE LEVER PADDLE	£41.50	£1.75
MK703	SQUEEZE KEY	£37.00	£1.75
MK704	SQUEEZE KEY	£24.99	£1.75
MK705	SQUEEZE KEY	£32.78	£1.75
MK706	SQUEEZE KEY	£35.00	£1.75
HK802	DELUXE BRASS KEY	£99.95	£2.50
HK803	DELUXE BRASS KEY	£89.95	£2.50
HK804	DELUXE BRASS KEY	£95.00	£2.50

MORSE EQUIPMENT			
KP100	SQUEEZE KEYER	£109.25	£2.50
DEWSKEYSTD	STAR MASTER KEYER	£54.69	£2.50
DEWSKEY M	STAR MASTERKEY MEMORY	£94.99	£2.75
D70	MORSE TUTOR	£63.40	FOC

DATA TERMINAL		
PK232/MAIL	MULTIMODE DATA TERMINAL C/W Mail Drop	£319.95
PK88	HIGH GRADE PACKET TU	£129.95

COMET & HOKUSHIN ANTENNAS

New from Hokuskin, an exciting range of high performance antennas, the WX1 has been a best seller for some time now, available are its bigger brothers the WX2 and WX4. Both are multi section 2m/70cm colinears and the mechanical construction the best we have seen yet. On the mobile front a new mini dual band mobile, the HS-727SS, very similar to the Comet CHL21J, and tests with our network analyser confirm its compatibility with our existing range of gutter and mag mounts. Also available a low profile hatchback mount and cable, the SS-B1, two new dual band antennas, the very slim VM-720SKR and the compact HS-727VMS. Both are suitable replacements for the 70N2M. For the HF enthusiasts a compact 10m HB9CV dual driven element antenna that is extremely light and very cleverly constructed.

WX2	WX4	HS-727SS	28HS-2HB
VHF/UHF Base	VHF/UHF Base	VHF/UHF Mobile	10m 2 ele HB9CV
144/432MHz	144/432MHz	144/432 mini	Dual driven element
6/8dB gain	7.8/10.8dB gain	1/4 5/8 wave	6dBi gain
200W max	200W max	100W max	500W PEP max
£75.00	£99.00	£16.95	£65.00

MOBILE ANTENNAS

2QW	2m 1/2 wave	£4.95
2NE	2m 5/8 wave folding	£13.25
78B	2m 7/8 wave	£15.00
78F	2m 7/8 wave folding	£21.50
88F	2m 8/8 wave	£24.10
258	70cm 2 x 5/8	£29.37
358	70cm 3 x 5/8	£33.73
268E	70cm 2 section colinear	£32.80

DUAL BAND MOBILE

CHL21J	Mini dual band mobile	£14.95
CHL23J	Small dual band mobile	£16.90
CA2X4KG	2m 2 x 5/8 70cm 4 x 5/8	£39.95
CA2X4MB	2m 4.5dB 70cm 7.4dB	£37.75
HS-727SS	Dual band mini antenna NEW	£16.95
HS-727VMS	2m 1/2 70cm 2 x 5/8 NEW	£25.95
VM-720SKR	2m 1/2 70cm 2 x 5/8 NEW	£24.95

DUAL BAND BASE ANTENNAS

WX1	2m/70cm colinear	£54.99
WX2	2m/70cm colinear	£75.00
WX4	2m/70cm colinear, high gain	£99.00
CA2X4WX	2m/70cm colinear	£79.00
CA2X4MAX	2m/70cm colinear, high gain	£99.95
CF416MN	Duplexer 1.3-500/400-540MHz	£25.50
HS790DN	Duplexer less 1.6-150/410-460MHz	£25.50

ANTENNA MOUNTS

GCCA	Gutter mount and cable	£14.25
HDTMCA	S/S trunk mount and cable	£19.50
SOMM	Mag mount and cable	£12.75
TBR	S/S hatch back mount NEW	£11.25
RS17	Mini hatch back mount NEW	£12.50
RS16	Mini gutter mount NEW	£12.50
SS-B1	Mini back mount & cable NEW	£26.50
CK-3LX	Cable assembly for RS16, 17, TBR	£19.95

CARRIAGE BASE ANTENNA £7.50, MOBILE ANTENNAS £4.00, CABLES AND MOUNTS £3.50

SUMMER SPECIALS

70CMS HANDHELD BARGAIN OFFER

BRAND NEW EX COMMERCIAL HANDHELDS FOR USE ON 70CMS 6 CHANNEL CRYSTAL CONTROLLED

ONLY £99 inc. NICAD (Charger & Crystals Extra)

Carriage on Transceiver £2.75

88F	8/8 wave 2m antenna	£18.00	144/17T	2m 7 ELE YAGI	£23.88
SQ144	2m Swiss quad	£65.00		2m 14 ELE YAGI	£46.20
78B	7/8 wave 2m Ball Mount Ant	£15.00	144/19T	2m 19 ELE YAGI	£55.28
GP23	3 x 5/8 wave 2m Base Ant	£45.00	432/17X	70cms 17 ELE CROSS YAGI	£48.64
50/5	5 ELE 6m YAGI	£51.52	50/2	2 ELE 6m YAGI	£27.52
JD110	PWR METER 1.5-150	£12.50	50/3	3 ELE 6m YAGI	£34.36

Carriage on antennas £5.50

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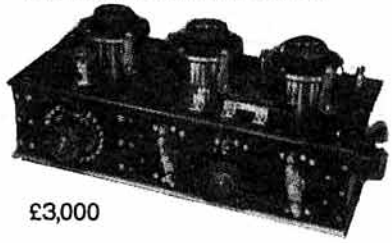
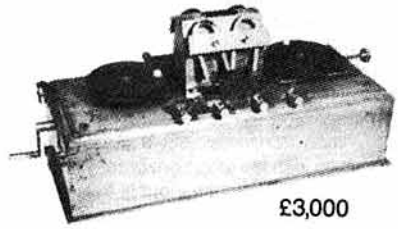
MARCONI MULTIPLE TUNER



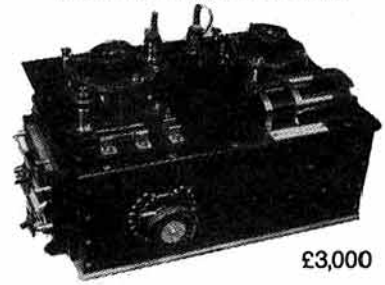
£3,000

MARCONI MAGNETIC DETECTOR



£3,000

MARCONI VALVE RECEIVER



£3,000

W.W.I. TRENCH RECEIVER

£800

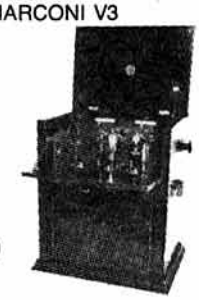
GEC° PHONE 2 VALVE

£400

ERICSSON 4 VALVE

£800

MARCONI V3



£600

PYE 3 VALVE

£600

GEC° PHONE CRYSTAL SET

£100

EKCO

£150

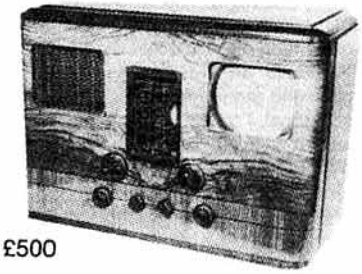
PHILIPS

£200

EKCO

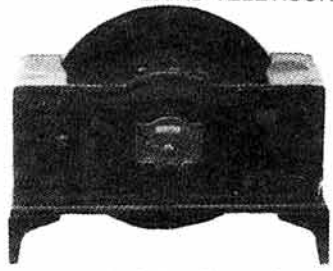
£250

HMV MARCONI TELEVISION



£500

BAIRD TELEVISOR



£2,500

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TECHNICAL TOPICS

PAT HAWKER G3VA

HORIZONTAL LOOP ANTENNAS (REAL AND WITH MININEC)

Although the 1λ wire loop antenna (square or triangular (delta)) has long been established both as a single-element antenna or, with a parasitic reflector loop, as the respected two-element quad beam, it is usual practice to have the loop in the vertical plane, providing either horizontally or vertically polarized signals according to how it is fed. A loop antenna mounted in the horizontal plane is still something of a rarity despite having been discovered by serendipity (the happy accident) over 20 years ago by the late Peter Pennell, G2PL, who for many years was a prominent DXer.

A *TT* item in July 1968 (later included in many editions of *ART*) described how, during some severe gales, he took the precaution of lowering his three-band quad, mounted on a tilt-over mast, so that the quad elements were in effect firing straight upwards, with the reflector loop touching the ground in places. *TT* continued: "Under these conditions, he found the performance of the aerial to be superior to that of a resonated vertical on all three bands (typically receiving S9 from VK on 14, S7 from W6 on 21 and 28MHz). The feeder SWR was little different from that in the usual vertical position... the 28MHz driven element was about 7ft above ground and that of the 14MHz element about 12ft... Tests at G2PL suggest that the angle of radiation compares with a dipole a half-wave above ground, and he feels it would be a simple matter to erect such a system using four (short) vertical posts." Personally, I would not expect a low, horizontal loop to have much low-angle radiation, although entirely suitable for NVIS (near vertical incident skywave) short-range working.

A few years later (June 1972 *TT* and digested in later editions of *ART*) S M de Wet, ZS6AKA, reported on a series of "experiments with multiband loop aerials" including loops 1λ and ⅔λ (with stub matching), rectangular and triangular loops in both vertical and horizontal planes and with the horizontal loops at heights of about 35-40ft: **Fig 1**. He pointed out (as G6XN had done earlier) that a 1λ loop (unlike a ½λ dipole or ½λ loop) provides a low-impedance (resistive) feed-point not only at *f* but at all harmonics of *f*. His 1λ (3.5MHz) loop had an input impedance of about 100Ω at 3.5MHz, rising to roughly 200Ω at 28MHz, with intermediate impedances at 7, 14 and 21MHz.

General observations made at the time by ZS6AKA seem worth recalling: "(1) the loop tuned much more broadly than a dipole; (2) the voltages along the loop were much lower than a dipole; (3) although the loop requires a minimum of three supports, the extra support was usually easy to find in practice — the best results were obtained with the loop horizontal, but it did not greatly affect results with the loop horizontally slanted or even vertical; (4) when the input is balanced, the furthest mid-point may be earthed; (5) when the loop is fashioned in rhombic shape it does in fact become a rhombic directional aerial at the higher frequencies with a low input impedance; (6) if the shape of the loop is changed from circular to square, triangle, rectangle and the like, the radiation resistance decreases as the enclosed area decreases — this means that a shape may be found which has an input impedance of approximately 50Ω; and (7) there are many shapes and mounting configurations which remain to be explored."

ZS6AKA noted that on lower frequencies the loop (as with a low dipole) provides omnidirectional radiation, but breaks up into a series of lobes at higher frequencies.

That was back in 1972. Coming up to date, Doug DeMaw, W1FB, provides 'A closer look at horizontal loop antennas' (*QST* May 1990, pp28, 29, 35) providing E- and H-plane radiation pattern diagrams for a large multiband loop antenna, computer-generated by Harold Johnson, W4ZCB, using an IBM computer with MININEC software (see July *TT*). W1FB's loop **(Fig 2)** is in the form of a square with 132ft 2¾in sides at a height of 50ft, and the radiation patterns are at 1.9, 3.84, 7.16, 14.2, 21.2 and 28.5MHz; **Fig 3**. If moved up a band, the patterns should hold approximately correct for a scaled-down loop with 66ft sides at a height of 25ft. The patterns resemble those noted by ZS6AKA.

With this large multiband loop, W1FB found that "the system produces 14, 21 and 28MHz performance that is on par with, and sometimes better than, that of my commercial triband Yagi at 55ft." He concludes his article as follows: "The point is that, if you have space for one, you can use a horizontal loop as a multiband antenna. You need not tailor it for 160m. A 75 or 40m full-wave loop will usually fit into a city lot. The higher you erect it above ground, the better its performance will be. But, don't give up the notion of a loop if you can't get it high above ground. Height extends the useful working distance of a loop, but many loops at low heights still permit good DX results at the higher end of the HF spectrum. The improvement in noise rejection during receive may be sufficiently rewarding to justify putting up a large piece of wire, especially if you live in a noisy neighbourhood.

"One word of caution: Wire that has thick polyvinyl insulation (such as No 14 (American) electrical wire) causes the antenna resonance to be somewhat lower than the formula dictates. Apparently the propagation factor of the wire, when used in a closed loop, causes this phenomenon."

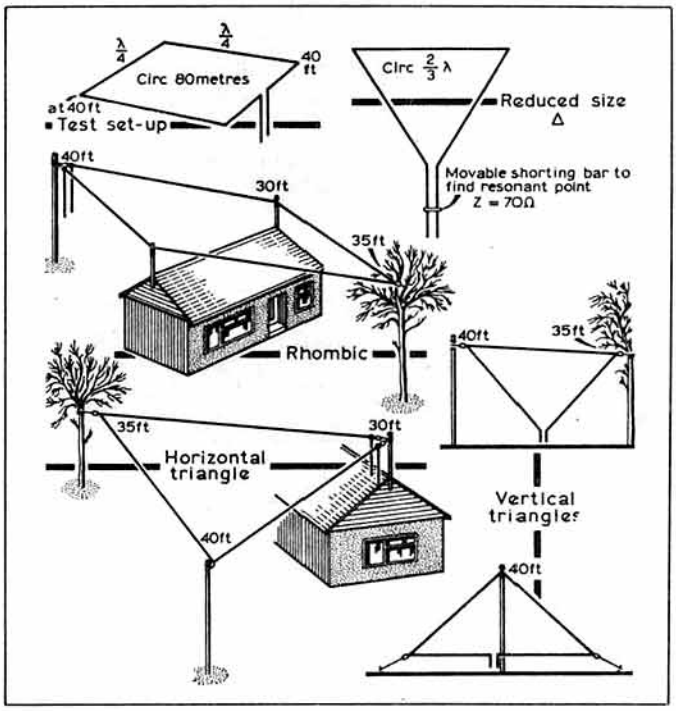

Fig 1. Some of the loop antennas tested by ZS6AKA in the early 1970s. No unbalanced line currents were detected with either twin or coaxial feeder despite the absence of a balun transformer.

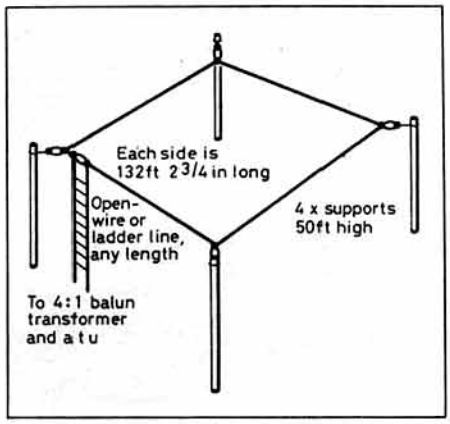

Fig 2. The 1.9MHz/multiband horizontal loop at 50ft as used by W1FB.

GETTING THE BEST FROM THE NE602

TT, January and April 1989, provided a good deal of information on some of the many ways that the Signetics/Philips NE602 IC can be put to good use in amateur radio projects while, at the same time, pointing out that it was never intended to provide a state-of-the-art front-end receiver mixer. The NE602 chip includes a double-balanced mixer, associated bipolar oscillator and integral buffering. The mixer is *not* intended for the front-end of VHF receivers, but the oscillator section can be connected as an LC or crystal oscillator up to about 200MHz. The device was used in K2BLA's low-cost spectrum analyser featured over several months in *TT* during 1988.

QST's 'Technical Correspondence' column (May 1990) includes an interesting letter from Bob Zavrel, W7SX which notes that some amateurs have complained of inferior performance of the NE602, explains the way to use the device correctly, and discloses that Signetics are about to introduce an NE602A device identical in function and pin-out to the NE602 but providing an additional 4 to 5dB of dynamic range and a somewhat better noise figure — and will be a drop-in replacement for most existing NE602 designs.

W7SX, however, remains enthusiastic about the current NE602. He is convinced that most reports of 'inferior performance' are due either to unreasonable expectations or improper use. He explains that the device was originally intended to be used as the second-mixer in double-conversion VHF 'cellular radio' double-superhets. When used as a first mixer at HF, the device can provide a two-tone dynamic range of up to 85dB but this figure is

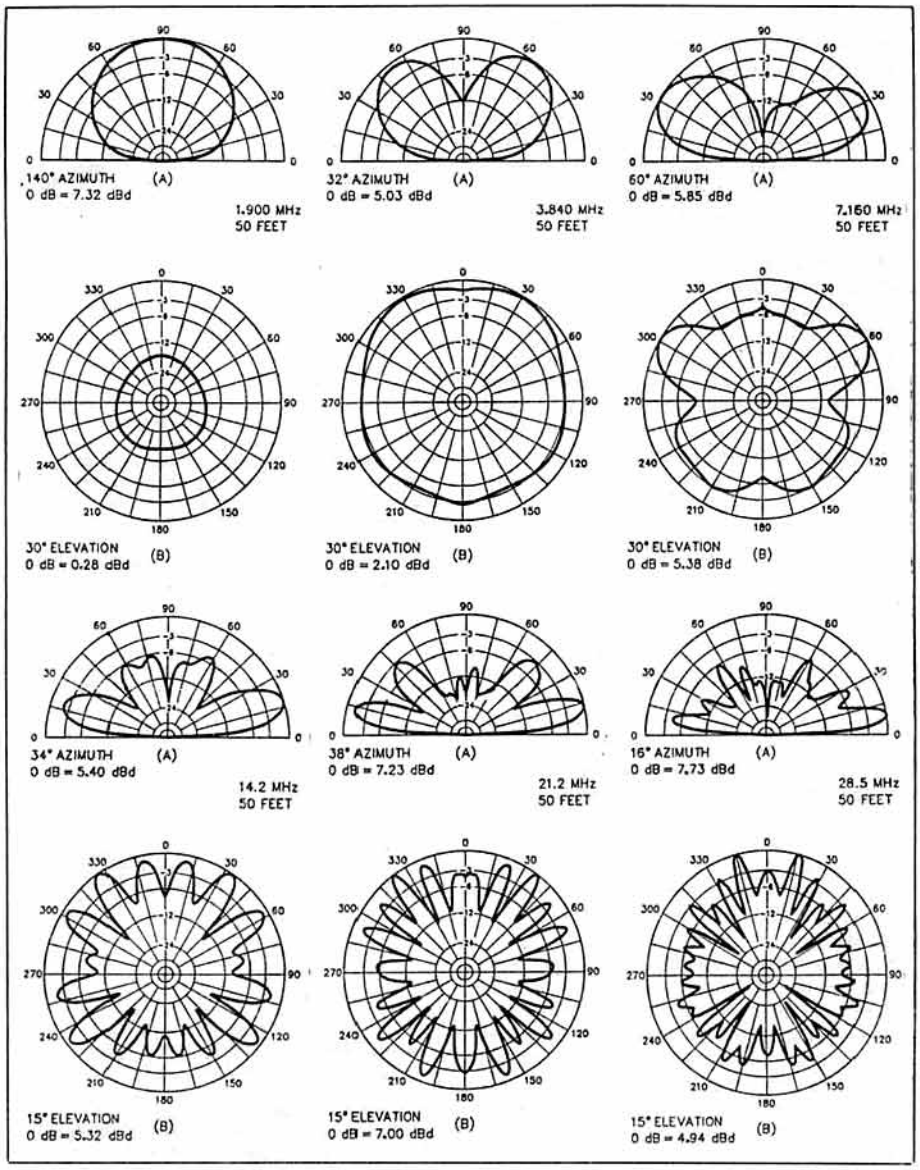

Fig 3. E- and H-plane radiation patterns for the loop of Fig 2 derived by W4ZCB using MININEC computer-simulation for 1.9, 3.84, 7.16, 14.2, 21.2 and 28.5MHz.

greatly diminished if a pre-amplifier is placed ahead of the mixer (with a noise figure of about 5 to 6dB pre-amplification should usually be unnecessary on HF). The oscillator can be configured as a traditional LC or VFO circuit, fundamental or overtone crystal oscillator, or even as a VCO (voltage-controlled oscillator). However the 602 is *not* a good choice as a VHF first mixer (6dB NF, 60-70dB dynamic range) because of its unacceptable noise performance and diminishing intermodulation performance at higher frequencies. When the 602 is used as a second mixer, the total gain of the preceding stages should not exceed about +10dB. The 602 requires only 2.5mA from a single 5V or (preferably) 6V DC supply.

W7SX stresses: "Because of its very high performance/power ratio, the 602 is an ideal choice for portable, HF direct-conversion and superhet receiver designs. The device will not provide the equivalent performance of a factory-built high-performance receiver with a 100dB dynamic range. It will, however, offer outstanding performance (80dB-plus dynamic range) when you consider its simplicity, power requirements, size and cost."

For pin-out, device and circuit information see *TT*, January and April 1989. The NE602 is stocked by some UK suppliers although not always easy to locate. The NE602A is still something to look forward to!

SMALL-SIGNAL DIODE-BRIDGE DETECTOR

Bruno Fagnini (Siemens-Albic AG) in *RF Design* (March 1990) describes a novel 200MHz detector for weak signals: **Fig 4**. Conventionally, a diode detector requires the amplitude of the input signal to be relatively high because of the need to exceed the forward voltage of the diodes. He concludes his article: "A simple detector for RF signals of small amplitude has been presented. It has been shown that a high output voltage can be obtained for further processing even when the RF signal has a small amplitude. Without amplifying the incoming signal, this high output is possible because a resonant circuit has been introduced in the detector which produces a resonance peak before rectifying the signal. By selecting the appropriate components, ie diodes, transformer and inductor, the circuit operates in the very large frequency range from a few MHz to beyond 1GHz. Components specified for use at around 200MHz include: transformer 1:1, 3t each winding with 0.13 diameter wire; core Siemens B62152-AB-X30. The adjustable inductor (L) 99nH with Neosid core 99-048-96, 2¼ turns, 0.4mm diameter wire.

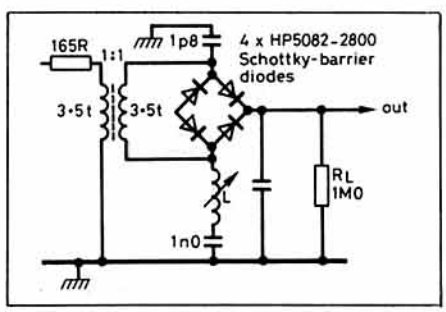

Fig 4. 200MHz diode-bridge detector suitable for small signals and using a resonant circuit to produce a resonance peak before detection.

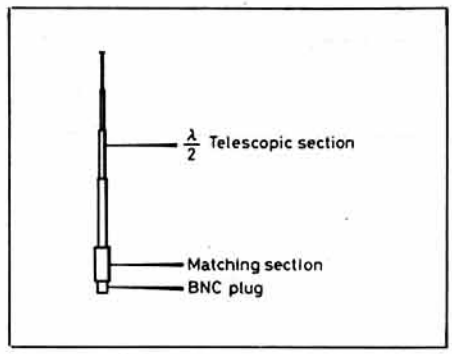

Fig 5. The AEA 'Hot Rod' λ/2 end-fed dipole antenna for 144MHz as reviewed by ZS6GM.

END-FED DIPOLE FOR HANDHELDS

The short ¼λ helically-wound 'rubber duck' is a most convenient antenna for hand-helds (provided that the power radiated close to the user's eyes is kept low) since such units are not usually expected to make contacts over difficult paths. However, it is not a particularly efficient type of antenna. One reason for this is that the 'ground plane' is dependent to a large extent on the capacitance of the hand-held transceiver to earth via the 'lossy' body of the user. An antenna that does not depend on an 'earth' connection should prove both more efficient and more consistent.

In *Radio-ZS* (February 1990), Chris Turner, ZS6GM, reviews favourably the AEA 'Hot Rod' 144MHz half-wave antenna: **Fig 5**. In tests with ZS6BTD via the local repeater, he reports achieving a very clear improvement in performance compared with a 'rubber ducky'. Laboratory tests showed that the feed impedance varied only over the range 40-65Ω compared with the 45-350Ω of a rubber duck helical where the feed impedance depended on how close the transceiver was to the body. He concludes: "It is my opinion that AEA has succeeded in overcoming the matching problems associated with end feeding a ½λ monopole. The result is a highly efficient portable antenna which performs well under laboratory conditions and in the field. If it were not for the 1m length I would have no hesitation in using this antenna permanently. For anyone who uses a handheld and needs to communicate from an area of poor signal strength, this antenna is certainly the answer."

Unfortunately for home constructors, it is not clear from this review of a commercial product what type of matching section AEA have included to transform the '50Ω' transceiver output to the 1000-1500Ω of an end-fed rod dipole. I recall that some multi-element UHF TV receiving antennas have been marketed with end-fed elements.

THE 8JK REVISITED AND THE NEW BRD-ZAPPER

The major breakthrough in the design of amateur rotary beams came in 1937 from Professor John D Kraus, W8JK (my apologies for giving him last month the callsign W8XK, that of the old Pittsburgh HF broadcast station, later KDKA). Both his work on the first close-spaced 'flat-top' bidirectional driven arrays (often implemented as fixed beams),

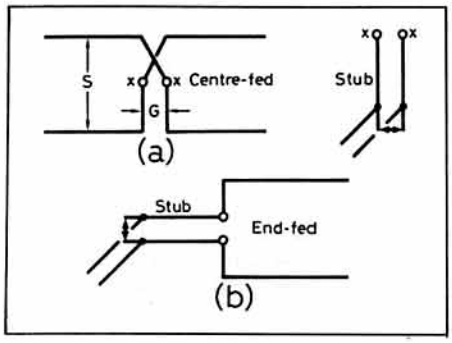

Fig 6. Basic single-section W8JK flat-top antennas. In 1981 Dr Kraus pointed out that the centre-fed arrangement with a typical spacing, S, of about λ/8 on the lowest frequency used, L can range from less than λ/2 to more than 1.5λ, permitting its use over a continuous frequency range of 3:1. With L equal to 7.3m (centre gap G forms part of the measurement) and S equal to 2.6m, the bidirectional gains are: 14MHz 5.7dBi; 21MHz 6.7dBi; 28MHz 7.7dBi; 50MHz 8.2dBi. Values for 18 and 24MHz bands can be interpolated. The end-fed version should provide roughly similar results if correctly tuned.

and that of Walter Van Roberts, W3CHO, shortly afterwards on the first close-spaced, two-element Yagi-Uda unidirectional parasitic array, were based on recognizing the significance of the work of Dr George Brown (RCA) on vertical monopole arrays for medium-wave broadcasting. Until then it had always been assumed that a Yagi parasitic reflector should be ¼λ behind the driven element, requiring a boom length, at least on 14MHz, that virtually ruled out flat-topped arrays, although a few amateurs had built Yagi rotary beams based on vertical elements spaced ¼λ apart.

By the time that UK amateur operation was closed down on 1 September 1939, knowledge of the family of 8JK bidirectional arrays and close-spaced Yagi arrays had crossed the Atlantic (see for example brief references in the first edition of the RSGB's *The Amateur Radio Handbook* (1938) but were still rare. It was not until the early post-war period that the three-element Yagi array began to establish itself worldwide. Due to their unidirectional properties, Yagi arrays became, and remain, far more popular than the 8JK driven bidirectional arrays, although these have some important advantages, including multiband operation with a single set of two elements: **Fig 6.**

In *QST* October 1981 (see *TT*, November 1982) Dr Kraus restated the very real attractions of the centre-fed design when it comes to multiband use, showing that a compact single-array with 7.3m elements can cover 14, 18, 21, 24, 28 and 50MHz bands. Among the plus points he listed in 1981 were: (1) continuous frequency span of more than 3 to 1 (with suitable matching/tuning arrangements); (2) no traps or loading coils; (3) no critical dimensions, as the entire antenna and feed system can be resonated; (4) it can be used horizontally or vertically for optimum radiation angle; (5) it is ideal for finding round-the-world (long path) openings; (6) it has theoretically zero radiation off the ends of the elements; (7) it can be fed with low-loss, inexpensive twin line (or very-low-loss cut-away 300Ω line or open-wire line); and (8) a compact array can cover many bands including the non-harmonically related bands. Minus points are that the bidirectional pattern does not give protection against continental European signals when the array is pointed towards North America; the forward gain is lower than with a good monoband Yagi array; and the low radiation resistance does not make it a good system to install indoors in the presence of metal structures etc (but in practice some amateurs have found the 8JK most satisfactory as a fixed indoor array). The end-fed form is particularly easy to install in, for example, a roof space or as an outdoor antenna supported from a mast or tree using two light wooden spreaders.

For those who require unidirectional patterns, it is possible to convert the 8JK into this form by using the fact, shown in Dr Brown's classic paper, that when two driven elements are fed 135° out-of-phase with equal amplitudes of RF power, a cardioid radiation pattern results, giving forward gain and a deep rejection null in the reverse direction. Exploitation of this principle has led to such antennas as the ZL-Special, the HB9CV and G8PO antennas as described in *TT*, October 1981.

The ZL-Special was so named and described in print by Fred Judd, G2BCX, (*Shortwave Magazine* July 1950, pp337-9) where he commented on its origins: "Data on the aerial came to the writer from New Zealand, hence the name ZL-Special. Little is known of its origin save that it was designed in the USA just prior to the war, for commercial purposes. (This is probably a reference to the work of Dr Brown on MP broadcast antennas - G3VA). Since the war it has been modified and developed for amateur use by W5LHI, W0GZR and ZL3MH. Further tests and measurements made by the writer may be of interest."

The 'G8PO Special', as described by J E Ironmonger, G8PO, in the *RSGB Bulletin* (November 1947), provides a 'reversible' unidirectional fixed beam, originally developed as a result of a 'mistake' in cutting feeder lengths when erecting an 8JK. It uses two feeders of different length, ie arranged so that either feeder can be ⅛λ longer than the other by having two sockets into which the transmitter feed-line is connected: see **Fig 7.**

The same basic approach is also used in the antenna developed by Rudolf Baumgartner, HB9CV, which in recent years has become a popular 144MHz portable antenna, with unidirectional characteristics.

Now Rod Newkirk, W9BRD, has come up with an antenna that combines the relatively little-used 8JK end-fed arrangement with the 135° out-of-phase approach. This has been implemented as an indoor 21MHz fixed wire-beam pushing signals into Europe from the Chicago area with less interference from the western States than with the basic 88JK end-fed array **(Fig 8)** from which the 'BRD Zapper (*QST* June 1990, pp28-29: 'The 'BRD Zapper: A Quick, Cheap and Easy "ZL Special" Antenna') was developed with the same basic dimensions.

Instead of feeding the elements 180° out of phase, they are driven 135° out of phase by feeding the stub λ/16 from the stub's shorted end so that the feed path to one element is ⅛λ (45°) longer or shorter than the other, which, after the stub's 180° phase reversal, produces the required

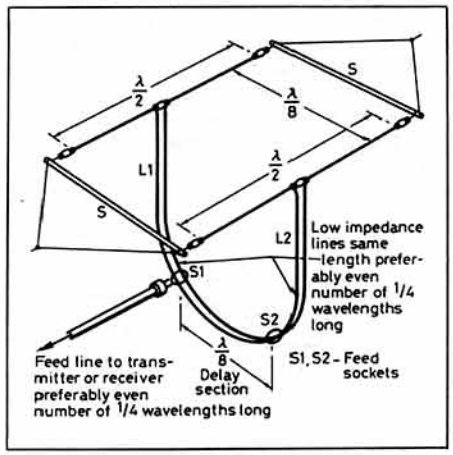

Fig 7. G8PO reversible unidirectional 14MHz array as described in 1947. Direction depends on whether transmitter feed is connected at S1 or S2. Note the delay line section is twisted once to provide the 135° out-of-phase drive.

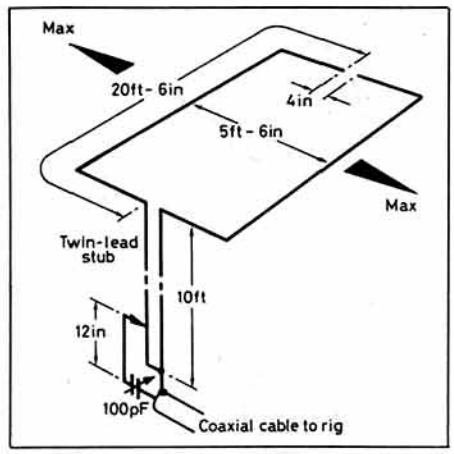

Fig 8. W9BRD's W8JK gamma-fed wire beam for 21MHz made to fit the dimensions of the bedroom it occupies. Dimensions are not critical for the elements but they should be close to λ/2 (total each), with the stub about λ/4 or multiples. Phasing point is fairly critical and should be selected as described.

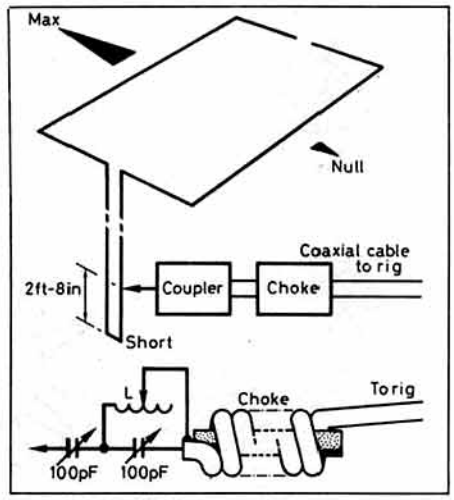

Fig 9. W9BRD's W8JK converted into the unidirectional 'BRD Zapper. L consists of 10 turns of No 16 wire, 1.5in dia, space-wound. Broadcast-type variable capacitors can be used at powers up to about 100W. Adjust inductor tap for lowest SWR. Coaxial choke made of 30 turns of RG-58 cable wound on a ferrite rod.

(180-45 = 135°) phase shift. W9BRD points out: "You can find the proper feed point on the stub by 'sniffing' signals of known origin along *one side* of the stub with the insulated centre conductor of some coax hooked to a receiver. (Start looking for this point by measuring λ/16 up from the bottom.) Directivity is reversed by selecting the opposite side of the twin-lead stub... Pattern distortion through incidental radiation and pickup must be minimized. The coupler must be built in the most compact form possible, mounted right at the stub, and isolated to keep the feed line from distorting the pattern. Such isolation is done at W9BRD via a home-brew coaxial choke made of 30 turns of the antenna's RG58 feed line wound on a ferrite rod just before the matching network: see **Fig 9(b).** The single wire run from matching network to antenna had better be no more than an inch or two. Here, I'm borrowing on the single-wire-feed theme by Windom. Since any circuitry above the choke will be hot with RF a bulky matching unit will not do... System Q is lower with wider spacings but gain is maximum with the elements spaced ⅛λ."

SOLAR CYCLES AND PROPAGATION

It now seems evident that Solar Cycle 22, which began in September 1986, passed through its high

EASY-TO-BUILD 144/28MHz CONVERTER

Mike Parkin, G0JMI, had need to help another amateur to listen to his GB2CW slow morse transmissions. He had tried to build a 144MHz to 28MHz converter from a kit but had not been able to make it work satisfactorily. This encouraged G0JMI to develop an easy-to-build converter which in practice took him about four hours to build from start to finish (including preparing the PCB) at a cost of less than £10 using all the bits (including the crystal, Dalon pen and etching solution) acquired at the Longleat and Mercury Radio Rallies.

The converter worked reasonably well when connected to G0JMI's five-element Yagi antenna, with GB3VHF only about 3 or 4dB down on his factory-made Microwave Modules converter. G6JOI also tested it on a three-element 50MHz Yagi, receiving G0JMI's signal as 5/9 over a 30-mile path. G0JMI writes:

"I have tried to keep to a KISS approach. The converter **(Fig 10)** was built on double-sided copper-clad fibre-glass board, etched after drawing on the circuit layout with a Dalon marking pen, as shown. The passive components are attached to the top of the board, onto the PCB copper tracks directly, and the transistors mounted under it (ie screened from the inductors etc) with their leads passing through counter-sunk holes to maintain the insulation. The BFY90 transistors used have a fourth leg that is the screen terminal; this is soldered directly to the copper screen. The FET is soldered into position on top of the PCB (the opposite side to the bipolar BFY90s). Components mounted on the top of the board are soldered to the bottom of the board by passing the component's leg through suitably drilled holes (see PCB layout diagram **Fig 11**). The board was mounted in an aluminium box with BNC connectors used to attach the coaxial cables."

G6JOI is now finding the converter very useful when listening to the GB2CW morse practice transmissions.

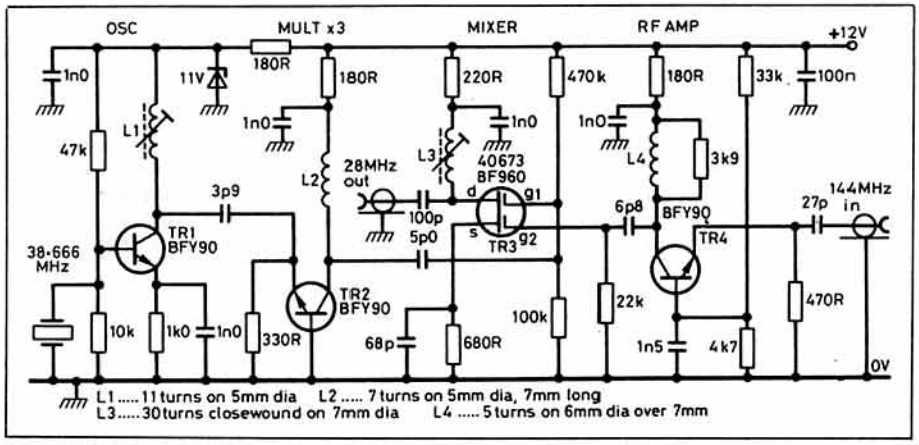

Fig 10. G0JMI's 'simple-to-build' 144MHz to 28MHz converter.

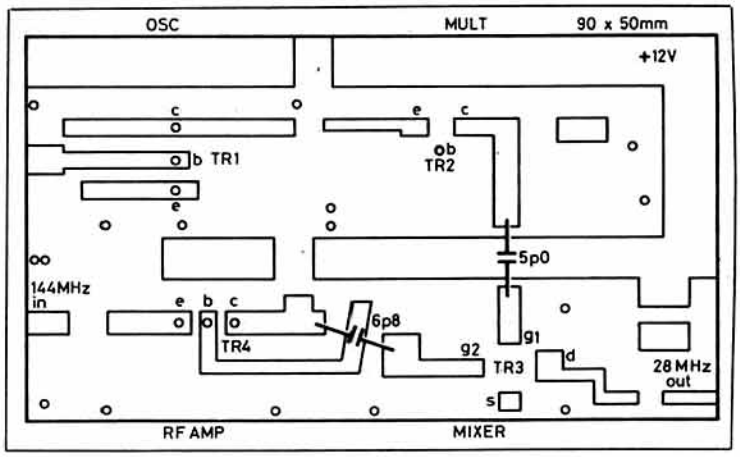

Fig 11. PCB layout of the G0JMI converter.

maximum last autumn, 10 years after the peak of Cycle 21 in 1979, showing once again that the '11-year cycle' is an average, not an absolute, period. Having begun listening on HF in my early teens in 1935, this marks my sixth peak, a fact that brings home to one how quickly the years pass! I am glad to say that my log last year shows reasonably good use of the exceptional DX conditions on some at least of the higher HF bands.

Not only does Cycle 22 appear to have produced the highest sunspot numbers since the all-time record peak of 1957/58 (supporting the belief that solar activity has been, on average, rising steadily over the past 400 years) but also, as a consequence, the second half of 1989 proved to be the most prolific period of high-energy cosmic-ray/particle production by the Sun since continuous monitoring of cosmic-ray activity reaching the Earth by neutron detectors was begun in 1957. A major burst of activity (solar flare) was recorded by the team at the Canadian University of Calgary on 29 September 1989. Only particles of very high energy (about a billion electron volts) reach ground level because of interactions with the Earth's magnetosphere and atmosphere. The levels experienced in the final months of 1989 were such that there was a potential hazard to passengers in aircraft flying at heights of 10-15km as well as to spacecraft. A magnetic storm in February 1989 attracted media interest by causing a major blackout of electricity supplies in Quebec Province, despite the use of resistive circuit breakers that had been designed to protect the networks from power surges induced by geomagnetic storms, following the experience of Sweden where the electricity grid was lost for several days during the high solar-activity of 1958. Whether, in future, the depletion of the protective ozone layer may increase the number of high-energy and UV particles reaching ground level to hazardous levels at sunspot maxima remains to be seen.

Mike Parkin, G0JMI, has, since February 1988, been keeping his own regular weekly observations of the Sun in the hope of being able to gain an indication of when events, such as aurora, may be likely to result in interesting 50MHz propagation.

He writes: "The observations have been made using a 60mm refractor telescope that I set up in the back garden to observe the Sun by means of projection on to a sheet of white paper. (Need I repeat the warning *never* to look at the Sun through binoculars or a telescope! - G3VA) The image formed is about 8cm in size and any solar activity, in the form of sunspot groups or other similar activity, shows up fairly well.

"After making a drawing of what has been observed I calculate the sunspot count by using the British Astronomical Association's recommended formula: Spot Count = K (10g + N) where K is approximately equal to 3.5 (for my case), g is equal to the number of sunspot groups seen, and N is the total number of spots counted overall. Thus, if I observe two groups of spots with each group containing three spots each, then the count for that observation would be 91. I use a K value of 3.5 that has been derived from examination of the solar data given on GB2RS each week.

"Bearing in mind the interest that Solar Cycle 22 has generated, I feel the bar chart of **Fig 12** may be of interest to *TT* readers; it shows clearly the rapid rise and fall (?) of Cycle 22. Each bar represents the total count observed for the particular month - it is of interest to look at the March 1989 bar - this was the month of the largest aurora since 1937 and was visually seen and photographed from my back garden in Alton, Hampshire. The results show a dip in the count that month (following the major geomagnetic storm of February 1989 — G3VA)."

Many of us find the terms used by the professional radiophysicists in discussing the ionosphere pretty esoteric, with the result that the whole subject is often dismissed as an arcane branch of science despite the important effects on radio communication. I was therefore interested to find a long, *readable*, review paper "Ionospheric effects on modern electronic systems" by Dr John M Goodman (US Naval Research Laboratory) and Dr Jules Aarons (Boston University Center for Space Research) in *Proc IEEE*, March 1990, pp512-528. This surveys ionospheric effects from ELF to earth-space (transionospheric paths) propagation at SHF, listing no less than 95, mostly recent, reference sources.

It seems worth digesting briefly some points from the paper which notes that "The HF band is

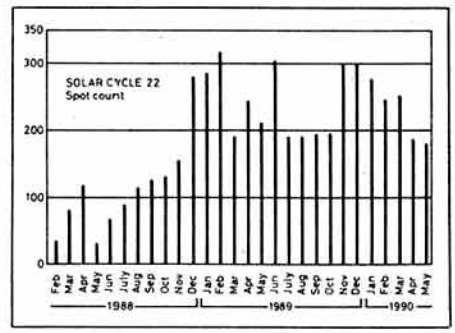

Fig 12. G0JMI's bar chart of his observations of the Sun during Solar Cycle 22 from February 1988 to May 1990.

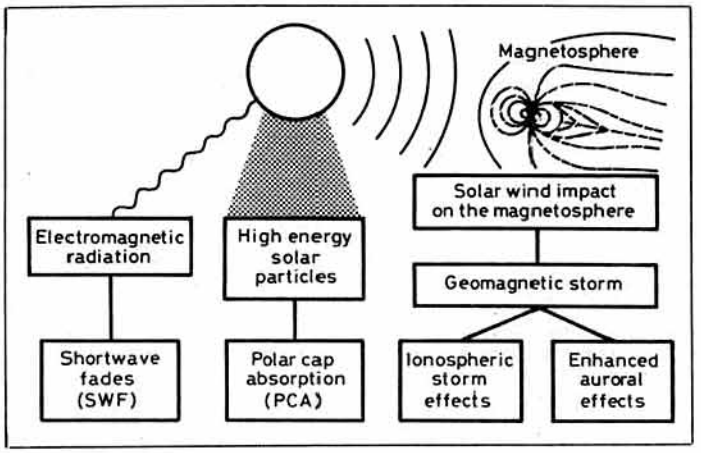

Fig 13. Effects on the ionosphere that are directly related to solar flares and related activity on the Sun.

by far the most sensitive to ionospheric effects. Indeed, HF radio waves experience some form of almost every conceivable propagation mode, including groundwave, line-of-sight and earth-space modes, reflected modes, refracted modes, ducted modes, chordal (earth-detached) modes, and scatter modes. The major ionospheric layers possess characteristic plasma frequencies that lie within the HF band, and as a result, ionospheric interaction is most pronounced... One of the major problem areas that arise in connection with HF performance is the variability in coverage and reliability for a fixed transmitter site and a specified frequency...

"Included among the quasi-global disturbance phenomena that may impact long-haul HF systems are: Sudden Frequency Deviation (SFD) and Short Wave Fades (SWF), both of which occur within seconds of the appearance of an X-ray flare on the solar surface. These events are important only on the sunlit portion of the ionosphere and the effects are diminished as the ionospheric distance from the sub-solar point increases. Less immediate but near-term phenomena associated with energetic solar protons are also encountered. PCAs (Polar Cap Absorption) are perhaps the most catastrophic events in connection with HF radio propagation in the high-latitude zone, with attenuation over skywave circuits in excess of 100dB sometimes encountered. These absorption conditions may last from hours to days. Fortunately, they are rare events not typically encountered at solar minimum and observed about once a month at solar maximum.

"Probably the most interesting phenomenon to be encountered at HF is the ionospheric storm **(Fig 13)** which gives rise to a hierarchy of effects at midlatitudes... it may be devastating since it may limit ionosopheric support in the normally-propagating higher frequencies, causing a non-absortive 'blackout' of HF trunks in the affected area."

The following is a summary of ionospheric disturbances affecting HF propagation based on a table in the *Proc IEEE* paper:

Sudden ionospheric disturbances (SID): has the effect, in the sunlit hemisphere, of strong D-layer absorption (HF blackouts) and F-region effects which start approximately simultaneously and last about a half-hour. Around solar maximum occur about twice a week; at solar minimum about twice a year. Probable cause is enhanced solar X-ray and EUV flux from solar flare.

Polar cap absorption (PCA): results in intense signal absorption in magnetic polar regions, starting a few hours after a flare and lasting one to several days. Occurs about once a month around solar maximum. Does not occur during solar minimum. Probable cause solar protons 1-100MeV.

Magnetic storm: affects F-region causing an *increase* of f_0F2 (ie higher MUF) during first day, then depressed f_0F2 (ie lower MUF), possibly lasting for days with strong daily variations. About 26 per year at solar maximum, 22 per year at solar minimum. Probable cause is interaction of solar low-energy plasma (solar wind) with Earth's magnetic field, causing energetic electron precipitation, auroral effects, heating and TID generation.

Auroral absorption (AA): produces enhanced absorption along the auroral oval (located in high latitudes) in areas hundred to thousand kilometres in extent. This is a complex phenomena lasting from hours to days. Essentially omnipresent, probably caused by precipitation of electrons with energies a few tens of keV within an oval region equatorward of the polar cap.

Travelling ionospheric disturbances (TIDs): these cause changes of f_0F2 with corresponding changes of MUF, sometimes periodic. Typically the periods are from tens of minutes to hours. Essentially omni-present with larger scales enhanced during magnetic storms. Probable cause is atmospheric waves.

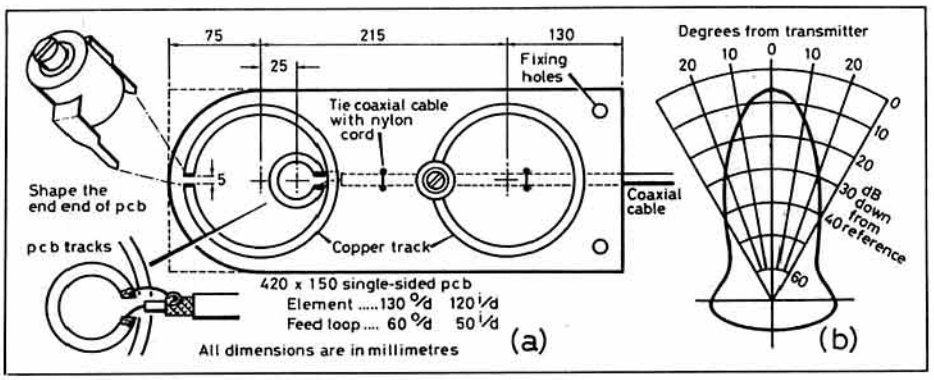

Fig 14. (a) The 144MHz 'MEF' DF antenna as used by ZS6EF. Place the coaxial cable on the non-copper side of the board. (b) Pattern measured using 200mW test transmitter and 60dB attenuator in series with receiver. The level of the S-meter was adjusted back to the same value for each 5° of rotation.

144MHz 'MEF' SNIFFER (DF) ANTENNA

The April *TT* noted the development by 1943 of the German Funkabwehr 'Guerteipeiler' (Stomach direction-finder), a miniaturised seven-valve, 3-20MHz (with plug-in coils) receiver carried in a form of satchel across the stomach under outer clothing and with a loop antenna around the neck of the user. This equipment was used by the ORPO (police) DF teams when closing in on an urban clandestine transmitter. Such equipments, including those developed in the UK and USA, became known as 'sniffers' and were intended only for use in the final stages of a 'foxhunt'.

Today, although most amateur DF contests in the UK are still run on 1.8MHz with its reliable groundwave propagation, in many other countries the amateur 'foxhunts' usually take place on 144MHz, often without the use of motorised transport. In *Radio-ZS* (February 1990), John Williscroft, ZS6EF, describes his novel MEF (Miniature Electromagnetic-coupled Foxhunting) antenna constructed on a 420 by 150mm single-sided glass-laminate PCB and used with a well-screened receiver. It was designed to complement his handheld 'DEF' DF receiver (described in *Radio-ZS* March 1990) to which it is mechanically attached to form a gun-shaped assembly. His DEF receiver is specifically designed as a sniffer with high immunity to strong, local RF breakthrough, but the antenna could be used with other 144MHz receivers/transceivers if sufficiently well-screened. The loops are formed from the PCB copper but it is possible to substitute the tracking with copper wire (not less than 2.5mm diameter) on a non-conductive piece of laminate etc.

The antenna is in effect a miniature tuned loop (similar in concept and coupling to the I1ARZ transmitting loop) as the 'driven' element, plus an in-line parasitic loop as a reflector tuned 1.5MHz below the fox frequency. Dimensions shown in **Fig 14** are stated to be fairly critical, particularly the dimension between the loops which ZS6EF suggests should be checked carefully. The quality and type of the two tuning capacitors are important. Small amounts of inductance in the capacitor affect the field pattern at the ends of the inductor; the capacitors must have small metal parts and preferably be of the variable dielectric type shown in Fig 14 with a capacitance of 1-10pF (air-spaced trimmers have too much inductance; beehive capacitors are not recommended).

After completing assembly and connecting the coaxial cable, test and align the antenna at least 1m away from any metal structures; this can be done with a GDO. Tune the driven element to the fox frequency with an insulated trimming tool. Place the GDO coil close to the element on the opposite side of the loop to the capacitor. A deep dip should be obtained with the GDO 40mm or so away from the element; a shallow dip may be an indication of an unsatisfactory capacitor. Next tune the parasitic loop 1.5MHz below the fox frequency. When the coaxial cable is plugged into the receiver (which *must* be well enough shielded so that local signals do not break through when no antenna is connected), very carefully peak the tuning of the loops for maximum signal with the antenna pointed straight at the test transmitter.

Finally, it is suggested that the antenna board is covered with Solarfilm or similar covering to protect it from water, humidity changes and accidental knocks. In use the antenna detects the polarisation and direction (including whether above or below your position) of the fox transmitter (always optimise reception first for polarisation). Unfortunately there are few commercial 144MHz receivers with sufficient immunity to local signals that can prevent signal breakthrough when very close to the transmitter, and a special-purpose receiver can give better results. □

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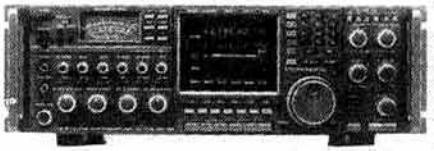

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Battery-operated AF oscillator and waveform generator

E. Chicken MBE, BSc, MSc, CEng, FIEE, G3BIK, describes a handy unit covering the full audio range from 20Hz to 20kHz.

INTRODUCTION

This simple-to-make, but very effective, self-contained audio-frequency signal source provides a most useful aid to the radio/electronics experimenter, without financially denting the pocket in which it can be conveniently carried.

This unit is essentially safe in use in that it is independent of the electrical mains supply, but draws only a small current from a standard PP3 (9V) battery. Sine, square and triangular waves are available over the frequency range 20Hz to 20kHz, at voltage levels which are continuously adjustable from zero to 2V peak-to-peak.

Additionally, a dedicated output terminal provides a square-wave with the same frequency range, but at a fixed voltage level suitable for TTL and low-level CMOS logic-switching.

CIRCUIT DESCRIPTION

The prototype was produced primarily to fulfil the need for a sinusoidal and square-source to cover a wide variety of radio/electronic servicing and experimental development applications. It soon came to be accepted as an indispensable item, and is well worth the small initial outlay, both practical and financial.

The fact that the 8038 IC used in the design also provides a triangular-wave output has proved advantageous, especially when examining Class B audio amplifiers for cross-over distortion, and for fault diagnosis in mini-electronic organ/synthesizers.

Previously published designs for signal generators based upon this IC tended towards the use of a mains-derived dual-rail power supply which added to the complexity and cost.

This design **(Fig 1)** was simplified by adopting a single voltage-supply philosophy, and care was taken to ensure that the waveforms available at the output terminals are true enough for most practical purposes. Distortion measurement of the sinewave showed it to be as low as 0.5% *when properly adjusted.*

The 8038 data sheets suggest a minimum of 10V for a single supply voltage, but each of the five samples chosen at random performed well in this circuit powered from a 9V battery. The 8038 waveform generator provides three outputs, sinusoidal (pin 2), triangular (pin 3), and square (pin 9). The triangular wave is produced by charging and discharging an external capacitor (C1, C2, or C3) from a constant-current source within IC1 via external resistors R4 and R5. As with the well-known 555 timer IC in its multivibrator astable configuration, the charge and discharge voltage ramps developed across the external capacitor are linearised by restricting the charge and discharge cycles to 2/3 and 1/3 of the supply voltage respectively. This ensures that the slopes of the triangular waveform are truly straight. Resistors R4 and R5 determine the charge rate and discharge rate, and hence the repetition frequency and duty cycle of the triangular wave produced.

The arrangement of RV3, R4 and R5 adopted for this design simplifies adjustments to produce a perfectly symmetrical triangular wave, whilst the resistive values associated with the external capacitors establish the required basic frequency range.

External adjustment of the frequency is effected by a variable potential-divider formed by RV2 and R3, connected between the positive supply rail and an internally derived 7V reference potential at pin 7 of the 8038 IC. Pin 8 gives access to the current-controlling circuits associated with the charging and discharging of the frequency-determining capacitor. The voltage applied to pin 8 via the slider of RV2 regulates the current hence the charge/discharge time which in turn determines the repetition frequency.

The resistive values chosen for RV2 and R3 allow a 10:1 frequency adjustment on each of the three frequency ranges, as well as the use of preferred values for the external capacitance, ie 20-200Hz with C = 100nF, 200-2000Hz with C = 10nF, and 2000-20,000Hz with C = 1nF. By

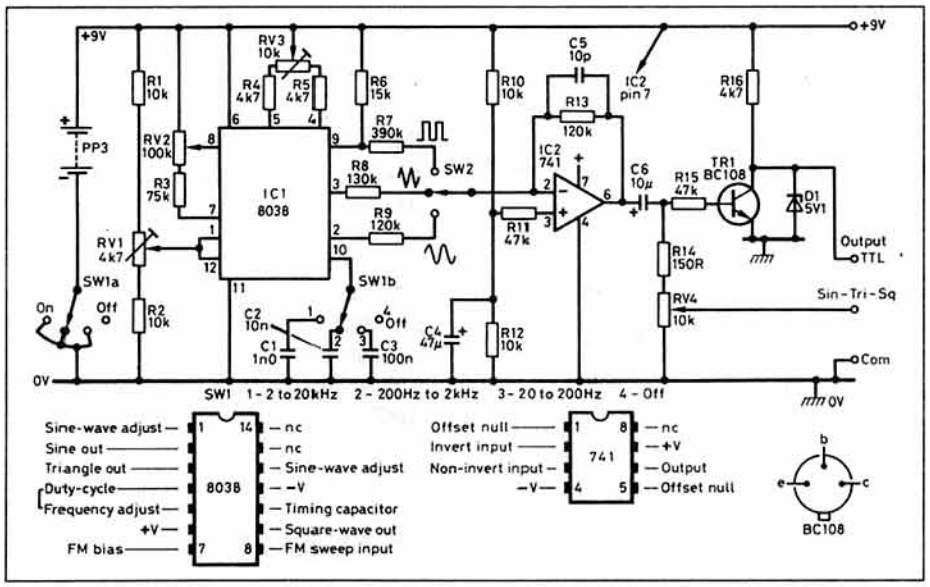


Fig 1. Circuit diagram.

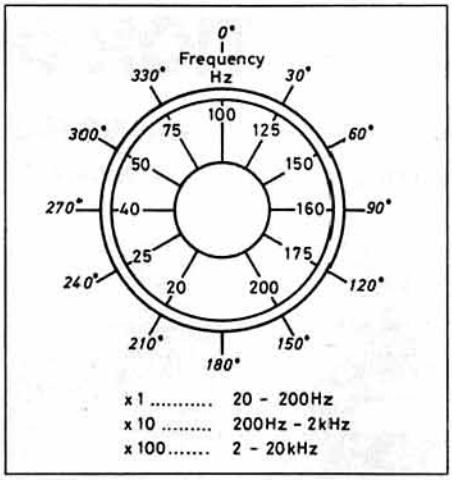


Fig 2. Frequency scale.

inference, though not provided in the original, the inclusion of a 1µF capacitor should yield a lower frequency range of 2-20Hz.

The use of a linear-law potentiometer for the external frequency control RV2 gives a rotationally linear frequency scale **(Fig 2)**. Frequency control by RV2 applies to the sine and square waves, as they are both electronically derived from the triangular wave within the 8038.

Many sinewave generators rely upon an external resonant LC circuit or phase-shifting CR circuit to force an amplifier into sustained oscillation. However, in this IC a non-linear amplifier modifies the linear slopes of the triangular wave such that the abrupt peaks are converted into gentle curves, thereby rounding them off to produce a simulated sinewave.

Pins 1 and 12 are intended as a means by which to adjust the positive and negative peaks of the simulated sinewave for maximum symmetry and minimum distortion. For simplicity and convenience of adjustment, pins 1 and 12 have been connected and fed from a common point on the resistive potential divider formed by R1, R2 and RV1.

Peak to peak output levels from IC1 for the sine and triangular waves are 2.0V (pin 2) and 2.2V (pin 3) respectively. In each case they rise above a +4V base-line. The square waveform is also derived from the triangular wave within the 8038. It is provided at pin 9 via an internal transistor with open-circuit collector. Resistor R6, between pin 9 and the +9V supply rail, acts as the collector load across which the square-wave voltage is developed. The square wave switches between 0V and +6.5V.

It was experimentally determined that the integrity of the sinewave-shape signal at pin 2 was noticeably degraded by resistive loads of less than 100kΩ. This dictated the need for a high input-impedance buffer stage between it and any succeeding circuit. It was also considered desirable that the maximum output level should be equal for all three waveform signals, and that they should each be free from any DC component.

To achieve this, a 741 operational amplifier (IC2) was configured such that it provides the

required gain/attenuation by means of R13 in its negative feedback loop, in association with a resistor in series with each of the three output signals from pins 2, 3 and 9 of IC1. These resistors were kept higher than 100kΩ to avoid the distortion referred to earlier. Single supply bias for the 741 is set by R10, 11, 12 and C4. Note: This could also be accomplished by a resistive attenuator before the 741 and then using the latter as a unity gain buffer.

The desired waveform signal is selected by switch SW2 which routes it from IC1 to the inverting input of the 741 operational amplifier, the gain of which is then determined by the combination of the selected input resistor and the fixed-value feedback resistor.

A common signal level of 2V peak-to-peak was adopted, so the resistor R9 in series with the sinewave signal from IC1 pin 2 was made equal in value to the feedback resistor R13 to provide unity gain, ie 2V output for 2V input.

Similarly, R8 (130kΩ) at the triangular wave pin 3 produces a gain of 120/130 = 0.92 to reduce the 2.2V triangular signal to 2.0V, and the 6.5V square-wave signal from pin 9 is reduced in level by a gain of 0.31 produced by R7 (390kΩ) and R13 ie (120/390) x 6.5V = 2.0V.

The low-value capacitor C5, which is connected directly across the feedback resistor R13, was incorporated into the prototype to suppress a tiny high-frequency spike which appeared on the crest of the sinewave signal, as a result of cross-talk in the external wiring from the high-speed switching action of the square-wave signal. This 10pF capacitor increases the negative feedback at high frequencies, so attenuating the spike without affecting the low-frequency waveform.

Sine, triangular or square-wave signals appearing at the output terminal (pin 6) of the operational amplifier swing about a +4V DC level, which is removed by the series capacitor C6 before the signals are presented via the variable attenuator RV4 to the AC signal output terminal.

Resistor R14 (150Ω), though theoretically not necessary, minimises the possibility of damage to the 741 operational amplifier in the event of an inadvertent short-circuit on the output.

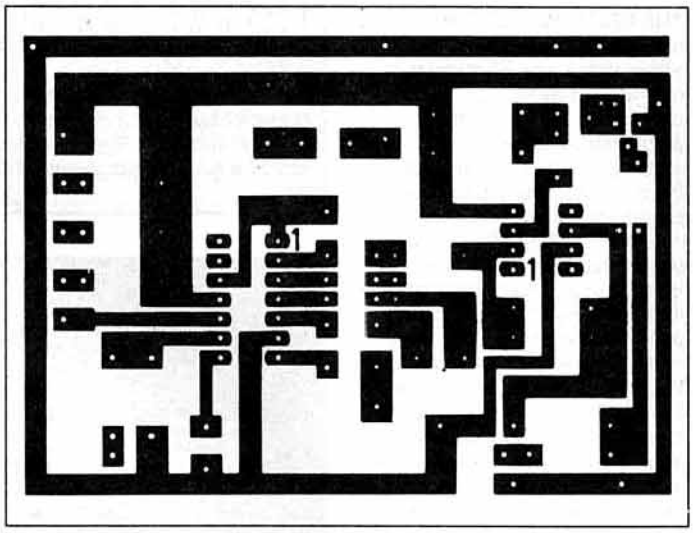
The simplistic but functional output-level control for the sine, square and triangular-wave signals does not present a constant value of output impedance throughout its range. Output impedance varies from circa 150Ω at 2V output, to a maximum of about 2kΩ at mid-position of the output-level control.

Turning now to the TTL output signal, the required 5V peak level is determined by the 5.1V zener diode D1 which is fed from the +9V supply rail via resistor R16. This resistor also serves as the collector load for the NPN transistor TR1. This transistor is connected directly across the zener diode, so that when it is switched into full conduction, it short-circuits the diode, thereby reducing the potential at the collector to almost zero volts.

Repetitive switching of the transistor is by driving its base, via current limiting resistor R15, from the square-wave signal which appears at the output capacitor C6, with switch SW2 in the square-wave position. The resultant signal at the dedicated TTL output terminal is a 50/50 duty-cycle square-wave with a rise time of about 10µs, switching between 0V and +5V to make it suitable for driving TTL logic circuitry as well as low-level CMOS.

With the waveform selection switch in either the sine or the triangular position, the TTL signal is still at the 5V level, but with a duty cycle of approximately 80/20 instead of 50/50.

Fig 3. PCB, copper side.



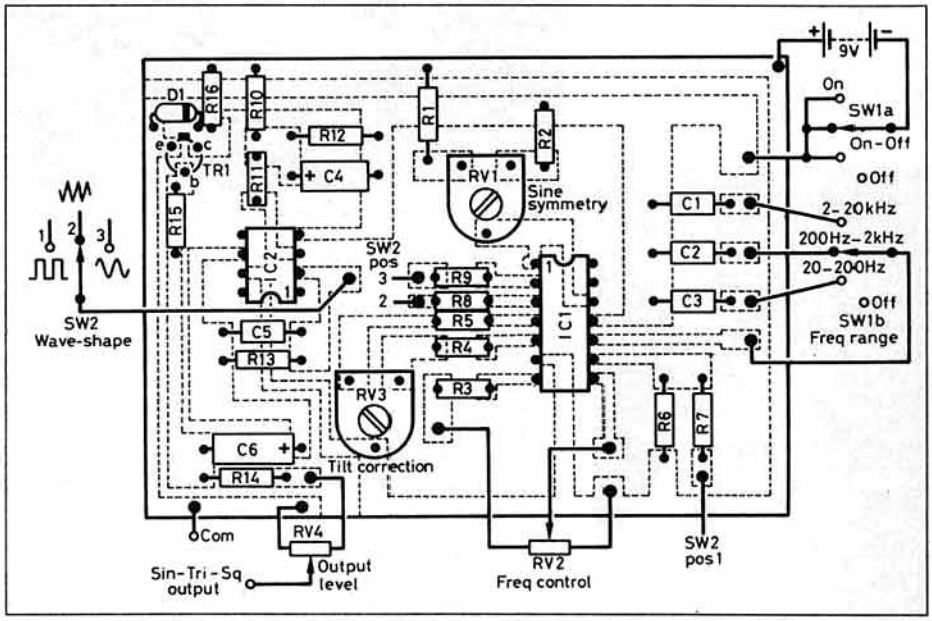


Fig 4. PCB, component side, showing external connections.

CONSTRUCTION

The prototype electronic circuit was constructed on a 40mm square section of 0.1in hole-spacing copper strip-board, which allowed both it and the associated panel-mounted components and battery to be accommodated in a plastic box with lid, of external dimensions 120 x 80 x 35mm.

However, the dimensions of the PCB shown in **Figs 3** and **4** are more suited to a slightly larger container, for example a 150 x 85 x 45mm ABS plastic box with a separate lid which acts as the instrument panel. Such boxes are readily available through the catalogues at a realistically low price.

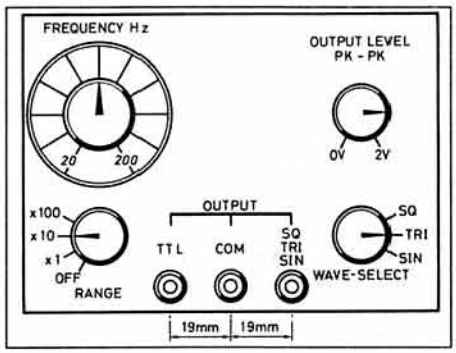


Fig 5. Panel layout.

It is advisable, though not essential, to use DIL sockets for the two integrated circuits, in that it makes initial tests and adjustments somewhat easier than with directly soldered components.

A suggested panel layout is given in **Fig 5**. All of the inter-connecting wiring should be kept short, but special care should be given to the routing of the wire which carries the square-wave signal from IC1 pin 9/R7 to the waveform selector switch SW2. This wire should be spaced as far as practicable away from the other inter-connecting wires, to minimise cross-talk which could create tiny spikes on the sine and triangular waveforms.

For convenience of making a BNC connection to the output if required, the centre-to-centre spacing between each of the three 4mm insulated terminals or sockets should be 19mm (3/4in), thereby allowing a standard two-pin 4mm plug-to-BNC socket adaptor to be plugged directly into the common terminal and either of the two signal terminals. The 4mm insulated terminals could be replaced or supplemented by BNC sockets, if desired.

Fig 2 illustrates a suitable frequency scale, which may be copied onto white paper, or alternatively traced onto a white self-adhesive label for direct application. In either case, the central hole must first be cut out of the scale to allow it

continued on page 49

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.

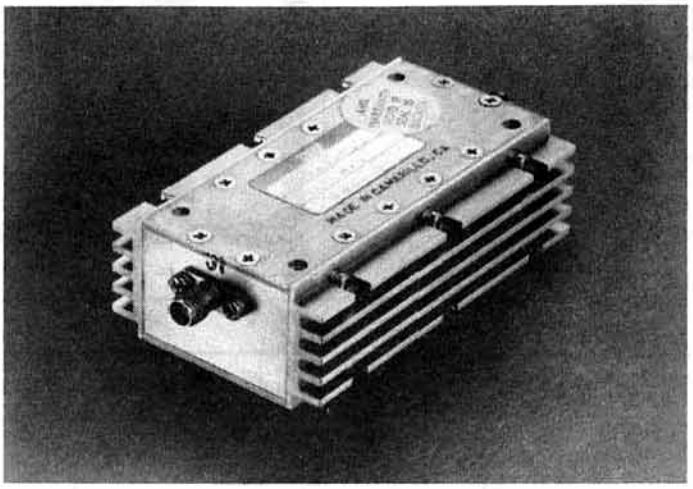
THE EDITORIAL DOORMAT was recently severely dented by the arrival of the new Electromail catalogue, a stunning 1500 (yes, one thousand five hundred!) pages featuring over 22,000 electronic and electrical products. Even someone who baulks at paying for a catalogue may well consider £5.50 good value for such a comprehensive book. This is, of course, the private customer end of the Radiospares trade used extensively by those commercially involved in electronics. You can, therefore, expect the same service and rapid response to orders as you would expect from RS. Although the catalogue is updated every four months, it is not necessary to buy as often as that; the most up to date price list is always available for an A4 SAE and 51p in stamps.

Electromail: PO Box 33, Corby, Northants, NN17 9EL. Tel (24 hours) 0536 204555

The compact wind speed indicator from Incastec

WORRIED ABOUT your aerial's ability to survive a gale? The Windy – "Digital windspeed at a reasonable price" – can tell you how strong the wind really is. The device is compact and runs from a PP3 type battery. Readout is switchable between knots and metres/sec and there are comparison scales for Beaufort or km/h. The UK distributors, Incastec, say that amateur radio operators "have shown a good deal of interest in the Windy as its size and ease of operation make it ideal for this environment". Price is £75 inc VAT.

Incastec: 75/77 Christchurch Road, Ringwood, Hants, B24 1DH. Tel 0425 476211



High dynamic range; low intermod. EMC Ltd's 50 - 500MHz Rx amplifier.

A SUPER HIGH DYNAMIC range is one of the features of a 50 - 500MHz receive amplifier from European Microwave Components Ltd. Catchily named the AFR30040025, the amplifier has a typical 24dB gain, a 9dB max noise figure, and "outstandingly low intermodulation products". Size is 3 by 2 by 1.25in. This looks like a commercial, rather than amateur, quality product and is likely to have a price to match. However, it looks attractive for anyone needing a broadband amp in close proximity to other transmitters.

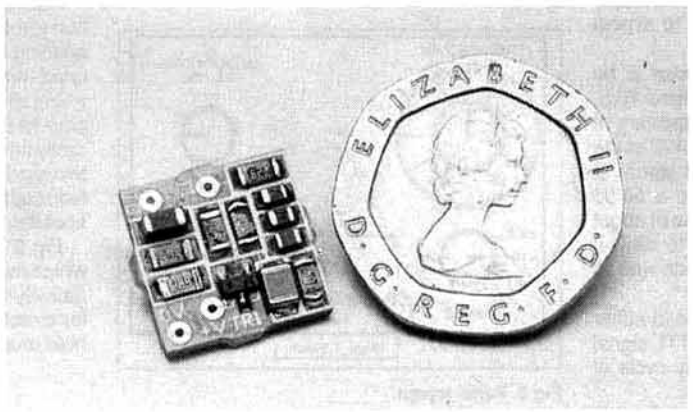
European Microwave Components Ltd: 7 Freebournes Court, Newland Street, Witham, Essex, CM8 2BL. Tel 0376 502013

UNTANGLING ELECTRICAL SPAGHETTI is the boast of a French company, Professional General Electrical Products, announcing their range of Pulti-Line multipoint adaptors. They are made of shockproof anodised aluminium and the sockets are connected by three to four brass double strips mounted on phase contact support that ensures constant pressure on the plug and eliminates wear and tear. Connectors are available in many formats.

PGEP: 38 Rue Magloire Douville, 78270 Cravant, France. Information: 010 33 34761268

AN INEXPENSIVE LITTLE ADD-ON comes from Cyfas Restbury. It is an audio high pass filter intended for filtering out CTSS tones, which are being increasingly used in amateur radio, but which could also be used to reduce hum and other extraneous low frequency noise. The wafer thin PCB has only 4 connections and costs less than £5.

Cyfas Restbury: 11 Albone Way, Langford Road, Biggleswade, Bedfordshire, SG18 8BN. Technical enquiries Claire Painter 0256 83656



FROM MAPLIN ELECTRONICS comes "the most useful set of tools ever put together at a cost of under £10". The set comprises a pair of 125mm long nose pliers with serrated jaws, cutter and insulated sprung handles; a pair of 110mm cutters with insulated sprung handles; 6 flat blade jewellers screwdrivers 1.4mm to 3.8mm; 6 phillips blade jewellers screwdrivers 1.4mm to 3.8mm; a pearl catcher; a pair of tweezers; a small hammer and a good quality glass magnifier. The whole lot is housed in black plastic box with a transparent slide-on lid.

Also from Maplins is a six piece screwdriver set featuring three flat blade and three crosspoint screwdrivers. The screwdrivers have long shafts and are ideal for reaching recessed screws in electronic equipment. Handles are made from moulded plastic and incorporate finger grips. Shafts are made from nickel chrome molybdenum steel. The sizes are 2.4 x 75mm, 3.0 x 100mm and 3.8 x 150mm for each type.

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

Convert your handheld to a desk top unit!

DO YOU HAVE a handheld scanner? If so, the JIM PSU-101 may suit you. This is a 240V AC supply which powers and charges the scanner whilst allowing convenient desk-top use. It is suitable for the Fairmate HP100E, Jupiter MVT5000E, AOR AR-1000, and Bearcats 50XLT and 55XLT. Made in the UK by SSE, it can be obtained from Nevada at a mere £26.

Nevada: 189 London Road, North End, Portsmouth, Hampshire, PO2 9AE.

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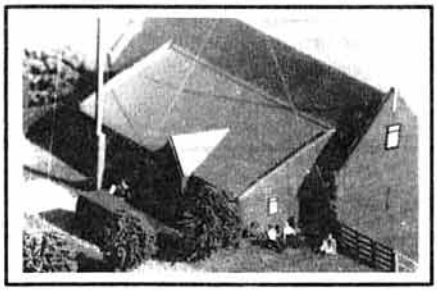

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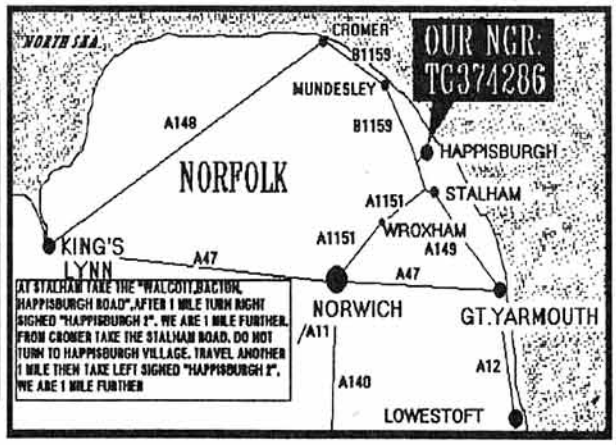

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TS-950SD £3,199

The new HF standard bearer for Kenwood, and the standard setter for the rest of the industry. The TS-950S with its remarkable Digital Signal Processing system represents a real step forward in generating the best sounding clean transmitted SSB and CW signals possible. Coupled to a low distortion PA, the TS-950S helps to clean up our crowded bands as well as giving pleasure to its lucky owner. See it soon, or send for details right away.

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TS-940S £1,995

This is the most respected HF transceiver in the world, and has maintained its lead over all the competition. Check what the leading contest stations are using, and you will find the TS-940S at the top of the list. Uncompromising performance, unrivalled facilities, and uncanny ease of use make the TS-940S the HF transceiver which you will want to own one day.

KENWOOD

TS-440S £1,138

The TS-440S is probably the most successful HF transceiver ever made by Kenwood, and this is no surprise when you realise that it is virtually a mobile version of the TS-940S. I can't put it better than Geoff Arnold in his review of the TS-440S: "The receiver in particular is a joy to use". He was not wrong, and just ask any TS-440S owner to confirm it. All band, all mode operation, with a receiver covering 100kHz to 30MHz; the TS-440S is unbeatable at any price.

Random Ramblings

Well, I guess the most significant news of the moment is the take-over of Lowe Electronics by Zycomm Electronics run by my old friend Ian Sneap G3ZYC. The two companies together should be a powerful force, combining as it will the hobby and leisure activities of Lowe with the proven expertise and success of Zycomm in the fiercely competitive field of commercial mobile radio.

The occasion also marks the passing of an era in that Bill Lowe finally bows out from the company which has borne his name for the last 26 years or so. No-one could disagree that Bill Lowe had an independent and individual approach to his business, and anyone who was active in amateur radio in the late 1960s will remember the "Bandit Bill" advertising which raised many a smile. However, as the Romans are said to have said, "Tempora mutantur, nos et mutamur in illis.", and indeed it is true that times change and we (must) change with them.

The changes which we hope to bring are a new and more open approach to you our customers; to you our dealers; and to everyone we meet in business. The new management team of Ian Sneap, G3ZYC as managing director (Alan Whitford having now departed), Richard McLachlan, G3OQT as commercial director; and me of course, John Wilson, G3PCY as engineering (and general scribbler) director, want to assure you all that Lowe Electronics is now looking forwards with renewed enthusiasm to a closer and more harmonious relationship with you. As a start to this process, we are now open for business at the Matlock head office on a full six day Monday to Saturday basis. Why not give us a call and talk about the new approach?

Bill, have a happy and peaceful retirement.

John Wilson, G3PCY

HEAD OFFICE & MAIL ORDER: Chesterfield Road, Matlock, Derbyshire DE4 5LE

Shops in **GLASGOW** Telephone 041-945 2626. **DARLINGTON** Telephone 0325 486121. **CAMBRIDGE** Telephone 0223 311230.

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The New HF-225 Receiver

I am delighted that the HF-225 has been a raging success world wide, and I will just quote a letter received from one of our American customers:—

"I received my Lowe HF-225 about a week ago. Since then I have enjoyed many pleasant hours listening to it. As a past owner of receivers such as the Sony ICF2010 and Grundig Satellit 650 and 500, I must say that none compare to your Lowe HF-225. Without question, for hour after hour listening, nothing compares. I especially like the Genie key pad. Why more receivers do not incorporate such intelligent rergonomics is beyond me. I also thought both the instruction manual and the short wave book were well written, with the shortwave guide particularly enjoyable."

The letter comes from Chris Williams in Massachusets, but is typical of many letters we are receiving from all over the world about the HF-225.

Technically, the HF-225 distinguishes itself by having a low phase noise synthesiser, which gives a reciprocal mixing performance not far off that of "professional" receivers costing up to ten times the price, and that's not just advertising talk, it is really true. The synthesiser actually tunes in steps of 8Hz, which betters most other receivers and gives a smooth "VFO" feel when tuning. As one user has already commented "If you tuned the HF-225 with your eyes closed, you would believe you had a £5,000 receiver on the table".

The HF-225 has a range of low cost options which extend its appeal; such as a keypad for direct frequency entry, which simply plugs into a rear panel jack; an active whip aerial; a rechargeable battery pack for portable use; and an attractive carrying case which protects the receiver whilst allowing full operational use. The new D-225 detector option is really something special, because it gives true synchronous AM detection for dragging sensible programme quality out of a signal being affected by selective fading distortion. The same option also gives narrow band (communications) FM demodulation.

Every listener these days appreciates a receiver which offers facilities for memorising favourite or regularly used frequencies, and the HF-225 offers 30 memory channels for this purpose. Using the memories has been made particularly versatile, because the operator can review the contents of the memories whilst still listening to the frequency he is using, or alternatively in the "Channel" mode, can tune through the memory channels using the main tuning knob, listening to each frequency as it appears on the display. Just like having a bank of single channel receivers under your control. Terrific for checking HF airband channels for activity.

Unlike most HF receivers on the market, the HF-225 comes complete with all filters fitted for every mode:— 2.2kHz, 4kHz, 7kHz, and 10kHz. There is also a 200Hz audio filter for CW, and if the D-225 detector is fitted, a 12kHz filter for FM. The correct filter for each mode is automatically selected by the receiver mode switch, but further selection can be made by the user from the front panel and the receiver remembers which filter was last used. True versatility and all built in at no extra cost. When selecting filters in use, the filter bandwidth is shown on the main display.

The display itself is a high contrast liquid crystal type, and shows frequency, filter bandwidth, detector lock (when D-225 is fitted), and whether the receiver is in memory mode. Automatic placing of the decimal point takes place as the receiver is tuned, so there can be no ambiguity in reading.

At the end of the day, what does the HF-225 offer you as a user? I can do no better than quote what was said by Rainer Lichte about the earlier HF-125:—"The HF-125 is a serious piece of equipment; don't be deceived by the unassuming front panel and the lack of spectacular features. The HF-125 will outperform most competitors. If you like an honest approach to receiver design, this is it. British understatement at its best".

The HF-225 is even better.

HF-225 £395 John Wilson

Telephone 0629 580800 (4 lines) Fax 580020 Telex 377482 All branches are closed all day Monday.

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Diagnosis of a Problem

by R M Page-Jones, G3JWI

The Art of EMC Detection

Surely the best known fictional detective of all time must be Sherlock Holmes of 221b Baker Street (not QTHR), but though he was created in 1887, a year or so before Heinrich Hertz generated and detected signals on about six metres, there is no record of his being called in to tackle an EMC problem. It is just possible that he was consulted on such a problem but the matter was of such delicacy - possibly involving the good name of a very eminent lady - that the good doctor felt obliged to keep a discreet silence.

One of Mr Holmes' best known sayings was "When you have eliminated the impossible, whatever remains, however improbable, must be the truth". It seems surprising that his colleague, being a medical man, did not tell them that this simplistic view just does not apply to situations where there are lots of unknown factors. Many EMC problems fall into this category, and perhaps it would be more true to say "when you have eliminated what you thought was impossible there remains an infinite number of progressively less likely solutions"! Many Amateurs tackle EMC problems by trying different filters until the trouble goes away - equivalent to arresting all the possible suspects in the hope that one of them is guilty - and while in simple cases this can be quite successful it has the disadvantage of being time consuming and expensive. A much more serious disadvantage is that, due to the complex nature of radiation and pick-up in the domestic enviroment, it is possible to achieve an apparent cure, only to have the trouble recur later because of some minor change of conditions. As in all radio problems, the investigator who knows what he is doing is in a far stronger position - even though he has to resort to trial and error to finish the job. The knowledge required is not academic engineering, but rather the nitty-gritty of practical radio that makes Amateur Radio such a fascinating activity. In a nutshell the art of EMC detection is to make best use of a mixture of logic, experience and downright luck, and the more you know, the better the chance of a speedy, permanent solution.

Inside or Outside the Station

Let us imagine that someone has come round to say that you are causing interference - unfortunately, for most of us, this does not require much imagination! The first thing to do is to find out if it is really your station that is involved. A little judicious questioning and reference to the log should clear up this point. Assuming that it is you, the next step is to determine whether the problem is due to spurious radiations from the transmitter, or lack of immunity in the neighbours equipment. The way this is tackled depends on what facilities are available, but for the moment assume that no special test equipment can be begged or borrowed, and that you have only the resources of the typical amateur station to hand.

Ask yourself the following questions:-

(a) is the neighbour's equipment some form of radio device - such as a TV or radio receiver, suffering interference on specific frequencies?

(b) if so, is equipment tuned to similar frequencies in your own house or at other neighbours' houses affected?

If the answer to both these questions is yes then it is possible that you have a transmitter problem. If practical, confirm your suspicions by tuning round the affected frequencies using a communications receiver, but take care to avoid overloading the test receiver and causing spurious responses which will only serve to complicate the issue.

If the answer to either question is no, then the chances are that the problem is breakthrough due to lack of immunity in your neighbour's equipment. However this does not mean that the amateur's responsibility ends here. Ask yourself two more questions:-

(c) is the trouble due to leakage from the transmitter either directly or via the mains?

(d) am I taking reasonable precautions to avoid breakthrough, by practising good radio "housekeeping" [1]? In particular are my antennas sensibly sited, considering the power being used?

To answer question (c) run the transmitter into a dummy load; if the breakthrough still persists then the transmitter needs investigation.

If the honest answer to (d) is yes, then it is probable that the trouble is due to poor immunity in the neighbours equipment.

Investigating the Breakthrough

Try to get some idea of how severe the problem is, by reducing the transmitted power while observing the effect on the breakthrough. A second person is required for this operation and a couple of CB radios make a very good link which almost anyone can use. If the breakthrough is significantly lessened when the transmit power is reduced to about 25 watts then it is likely that simple ferrite ring filters will prove effective. If the breakthrough persists when the transmitted power is reduced to about ten watts or so then there are three possibilities:-

i The installation has very poor immunity indeed, often due to poor wiring up of otherwise satisfactory units.

ii Your signal is getting into the mains or other wiring, and is either being conducted into the equipment through the mains lead, or is being re-radiated and entering via antenna or speaker leads.

iii You didn't answer question (d) honestly!

Of these possibilities, the first is most likely, particularly where audio equipment is involved, and with a bit of luck it might be possible to persuade your neighbour that he will improve his hi-fi performance if he tidies up on his installation and makes all his connections properly. In the case of TV and video installations look out for badly made-off co-ax cables ,and in particular the unsoldered centre pin of coax connectors.

In the second case, a mains filter will take care of the conducted signal, but added to this there is almost always some re-radiation, and to see if this is significant - possibly involving resonance effects - move the antenna co-ax, and the mains lead about to see if this affects the interference. If possible go round with a portable radio or TV to see if the room has any 'hot spots' - often near central heating pipes or antenna down leads. Occasionally simply re-routing leads may effect an improvement. In the case of a battery operated radio with an internal antenna moving the set to a location where the breakthrough is minimum may be the only solution available. Where serious mains pick up is suspected, have a look at your antenna siting again to see if antenna or feeders are running unnecessarily close to mains wiring.

Trial And Error

At this stage the only practical course is to try to fit filters in the appropriate leads, starting with a ferrite ring braid breaker on radio and TV devices. For HF and low VHF breakthrough on TV, signals picked up by the coax braid are by far the most likely cause. Signals coming down the centre of the coax are uncommon unless the operating frequency is somewhere near the TV frequency so that the TV antenna itself actually picks up a large unwanted signal. If one filter is not completely effective then either the filter has insufficient rejection or the interference is getting in by more than one route; probably the mains or, in the case of hi-fi, via the speaker leads. The way forward depends on what filters are available to hand, but in general the procedure is as described in [2]. In the majority of instances this will result in clearing up the problem. However, there are stubborn cases where the signal gets directly into a badly designed piece of equipment, and at this stage the only recourse may be to contact the manufacturer.

Checking the Transmitter

If testing the transmitter into a dummy load showed that some interference was still present then either the screening of the transmitter is very poor, or more likely RF is leaking out via the mains lead. If the transmitter is home built, it should be a fairly straightforward matter to look at the integrity of the case and to examine the mains filtering. In the case of a commercial rig, check obvious discontinuities in the screening - such as case screws missing or even internal screens left out by a previous owner. A mains filter is always good practice and a simple choke made by winding the mains lead onto a ferrite ring as in [3] may be all that is required.

The control of unwanted emissions has been a problem ever since radio began. While the professional radio engineer has spectrum analysers which tell him the whole story at the flick of a switch, the amateur is in much the same position as he would have been fifty years ago. There is one important fact in our favour, and that is that we are not interested in high accuracy measurements, but only in being able to detect conditions which are severe enough to cause trouble.

There are two types of unwanted emissions, the first are harmonically related spurious, usually known as "harmonics" and non-harmonically related spurious, usually known simply as "spurious". Harmonics will always exist to some extent whenever RF is generated, and in fact the harmonic content is simply a measure of the distortion of the sine wave. Spurious emissions are generally caused by instabilities in one of the transmitter stages or by unwanted mixer products leaking past filters and arriving at the antenna socket. The broad "splatter" signals caused by over driving the audio input to an SSB transmitter are really unwanted mixer products.

Returning to our imaginary interference, suppose that we suspect the possibility of transmitter problems. Consider the interfering frequencies, and decide whether they are likely to be harmonics, (or to any other spurious higher than the transmitter frequency),

and if this is the case try a low-pass transmit filter. In the case of HF, try an ATU first if one is not already in use. An ATU will help to reduce spurious emissions at both high and low frequencies, provided they are not too close to the carrier. With a single band VHF or UHF transmitter, a band pass filter will fulfil a similar function and, with careful construction, very good rejection of out of band spurious is possible [4]. In some instances, the existence of a spurious may indicate a transmitter fault or a basic design snag which requires investigation. The remaining possibility is spurious close to the carrier, and this is often caused by modulation problems - usually overdriving the mic input with SSB, or key clicks caused by a bad keying waveform in the case of CW. In either case the best test is an honest report by a local station who has the equipment and experience to differentiate between a bad signal at your transmitter and overloading and similar effects at his end.

EMC And Home Brewing

Generally, spurious emissions from transmitters are much less of a problem than they used to be, mainly due to the demise of VHF TV but also because of improved design of equipment, both amateur and commercial. However, though the vast majority of EMC problems involve local domestic equipment, it is worth remembering that spurious emissions can cause interference to other services such as aircraft and marine radio, which can be a much more serious matter. Some activities could be said to have a high a spurious risk, and extra care should be exercised in these areas:-

(a) transverters - including modifying or realigning a commercial unit [5].

(b) adjustment of the input and output circuits of transistor power amplifiers. Under adverse conditions these will sometimes go unstable at relatively low frequencies, so that the output consists of a comb of spurious signals either side of the carrier.

(c) Adding high gain power amplifiers to QRP rigs. Some rigs, including some commercial kits, produce spurious signals which cause no problem at carrier powers of a watt or so, but when amplified fifty times could become significant.

Whenever possible the serious home brewer's workshop should include some test gear for checking spurious emissions. Though modern spectrum analysers are far out of the range of the ordinary amateur, it is often possible to pick up redundant commercial RF test gear at reasonable prices. Rooting round junk sales and rallies for suitable items is an interest in its own right , and it is hoped that this topic will be covered in more detail in a future article.

References

[1] "Breakthrough": *RSGB Amateur Radio Call Book.* 1989 and later editions.

[2] "Were You On Your Radio Last Night" A McKenzie G3OSS *Radio Communication*, May 1987.

[3] "Reducing RF Breakthrough Using Ferrite Rings" RSGB Pamphlet.

[4] *RSGB VHF-UHF Manual, 3rd Edition.* Section 6.

[5] *RSGB VHF-UHF Manual, 3rd Edition.* Section 5 page 5.84.

Correction

Mr Mitchell of the IEEIE has pointed out two errors in the EMC article in *RadCom*, July 90. In Table 1, column 3, 4890 should have read 4809, and 5384 should have read 5394.

Book Reviews

IN THE PAST there has been little written especially for the SWL. Now there are two books on the market which provide much useful and essential information: *Short-Wave Listeners' Handbook* by Arthur Miller, BRS88969, and *Short-Wave Listening Handbook* by Joe Pritchard, G1UQW.

SHORT-WAVE LISTENERS' HANDBOOK

By Arthur Miller, BRS88969

Costs £6.99 and is available in bookshops (ISBN 0 85059 883 4), or from Patrick Stephens Ltd, Denington Estate, Wellingborough, Northants, NN8 2QD.

ARTHUR MILLER'S book starts with an introduction to the short waves, and takes an in-depth look at the amateur bands from 160m through to 10m and the 'broadcast' bands from 120m to 11m. It explains all the modes of transmission, some propagation characteristics and some well-used Q codes.

It then moves to discuss receivers and antennas in some detail, giving fuller details of some of the more popular receivers currently on the market. It has a very useful section devoted to looking at what a listener needs to consider in buying either a new or second-hand receiver in terms of frequencies, sensitivity, the ability to filter out interference, and whether it is comfortable to operate over a long period (important if you are keen on 24 or 48-hour contests). On the antenna front, the book looks at the best and most trusted designs.

A particularly interesting section takes us through an imaginary amateur-band contact, so that when the RAE is successfully undertaken, the newly licensed amateur does not 'freeze'. There is also a list of the recommended phonetic alphabet and details of the full Q code. The section goes on to explain the composition of amateur callsigns and how to identify stations by their callsigns. It also deals with 'pile-ups', 'split-frequency' working, 'lists' and 'nets'.

The next section in the book is a must for all those who think they know it all about amateur band propagation and band characteristics. It is crammed with useful information on the best times to hear your favourite part of the world on each of the six main amateur bands. There is also a brief insight into the DX which has so far obtained permission to operate on the WARC bands.

For anyone who is just interested in the broadcast bands, the next section is for you. Twenty pages packed with useful data and explanations about powerful European signals on 49m and some exotic transmissions from southern locations on 60m.

The VHF and UHF bands section of the book is, in my opinion, not written with the same authority as the rest of the book - perhaps because Arthur is not known for his regular ventures onto these bands. However, there is a useful insight into some of the general coverage receivers that cover this part of the spectrum, and some facts on antennas which can be used for general purpose reception on these bands.

Those listeners who like to keep a logbook and send QSL cards will appreciate the comments in the 'Verifications' section. There is much information there about how to go about sending and obtaining a QSL card, a few tips on what not to put on your card (I hope anyone who sees the specimen SWL report will try to include more useful information than is actually depicted), and how to go about sending 'return postage' if sending your card direct. There is also an excellent piece on how a listener should prepare a report to a broadcast station. The next two sections go on to explore awards and contests in some detail.

There are ten appendices. Some give a wealth of information for the amateur listener about prefixes, zones, countries and call areas. Others provide details of interest to the broadcast listener such as addresses, English DX bulletins and frequencies used by selected broadcast stations.

All in all, an invaluable book which is ideal for any listener, but particularly for those who are just starting out in the hobby.

SHORT-WAVE LISTENING HANDBOOK

By Joe Pritchard, G1UQW

Published by Heinemann Newnes (ISBN 0-434-91550-5). Price: £12.95

JOE PRITCHARD attempts to provide a technical handbook which will give any newcomer an ideal grounding in the sort of things he or she will need to know to become a radio amateur or build his or her own receiver. There are 15 chapters. The first 10 deal with the technical issues and the last five take a view of listening techniques.

The first chapter provides a wealth of basic electrical principles, including atoms and electrons, volts, amps and ohms, DC and AC, and impedance. There are many helpful diagrams which explain the mathematics and equations. It follows with an interesting look at components and how they are combined to make useful circuits. An explanation and description of radio waves forms Chapter Two, together with details of types of modulation.

The book then starts helping you to build a receiver. The next chapter is most enlightening as it covers the tools you will need and gives hints on how to solder so that the circuit holds together! There are also a very useful few pages about components, especially a resistor colour code chart.

The next four chapters consider the different types of receiver; starting with the oldest type of crystal set, and moving through to regenerative receivers, direct conversion receivers, especially designed to receive SSB or CW signals, and concluding with superheterodyne receivers. All four chapters are packed with detailed explanations of how the circuits work and there are plenty of circuit diagrams.

This book provides a little more on antennas than Arthur's book. Both give the basics to enable the listener to experiment with simple designs in order to get started. A bonus in Joe's book is the chapter on 'add-ons', where he looks at the ATU, pre-selectors, frequency-measurement headphones, bandpass filters, BFOs and the fitting of a tape recorder output.

The next four chapters look in less depth than Arthur's book at operating techniques, including what you can hear on the bands. The final chapter looks at the use of computers in radio - an area which Arthur's book does not cover. There are details of log-keeping, QSL card format, learning CW, and CW and RTTY decoding programs.

Both of the above books are aimed at different listening audiences. Both cater for the newcomer, well written and are an easy read. Arthur's is more for the listener who likes to spend his time tuning the bands for DX, while Joe's is more for the listener who wants to know about the technical side of the hobby and who wants to build equipment. Both are well worth a place on your bookshelf. ***BRS32525***

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MFJ723	C/W Filter	48.54	2.50
MFJ752C	Tunable Filter	104.42	3.00
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A differential T - match antenna tuner

The use of differential capacitors in an ATU offers important advantages. Mike Grierson, G3TSO, explains

In the January 1987 *RadCom* I described a general purpose antenna tuning unit [1], based upon the 'T-Match' variant of the popular 'Ultimate Transmatch' ATU that has been featured in the *ARRL Handbook* for a number of years [2]. The Transmatch has undergone a number of circuit revisions over the years and the T-Match variant is one of three fundamental circuits, the most recent being the 'SPC' Transmatch [2].

Many commercial ATU designs feature the T-Match variant of the circuit which has the advantage of being the easiest to build with only three major components. As the T-Match is a high-pass filter network, it offers no harmonic rejection and serves purely as a variable impedance matching network, a task it performs very well over a wide range of frequencies.

The use of a roller-coaster type of variable inductance achieves flexibility in matching, but has the disadvantage of making band changing a little tedious. In addition, the adjustment of three interdependent tuning controls with more than one combination of settings for a matched condition can appear a little daunting to many of today's black-box operators.

After careful consideration of the T-Match circuit and some experiments using the original ATU, I decided to connect the two capacitors C1 and C2 **(Fig 1)** together differentially. Differentially means that C1 will be at a minimum value when C2 is at a maximum value and vice versa. At the halfway position both capacitors will be of equal value and 50% of each individual capacitance. This has the effect of providing a continuously variable tapped capacitive reactance between the input and output of the ATU to which the variable inductance can be connected.

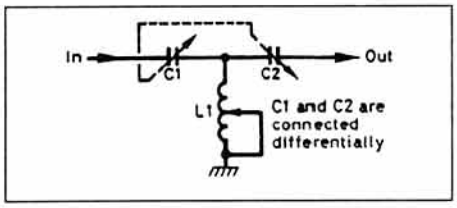


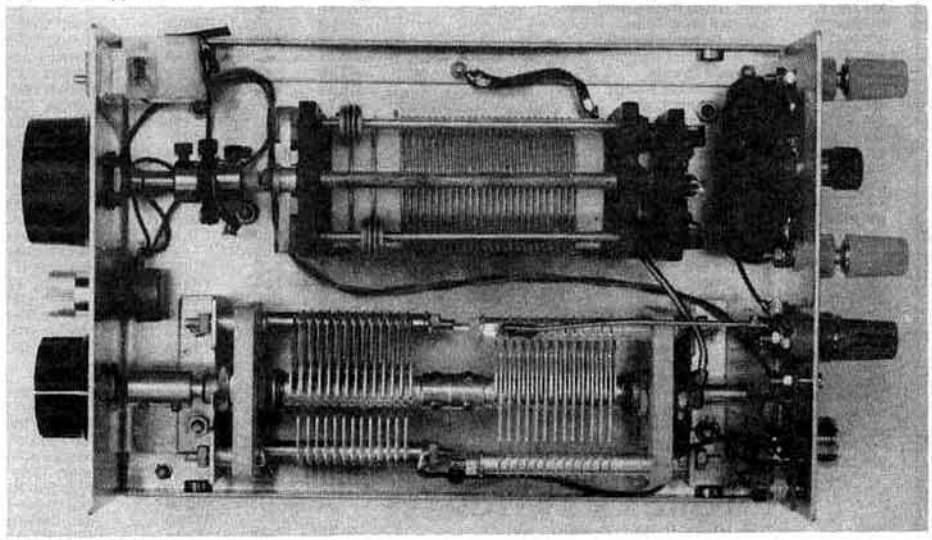
Fig 1. Differential connection of C1 and C2.

The T-Match functions by matching the series network C1, L1 to the input impedance whilst the output impedance is matched to the series network C2, L1, where L1 is common to both circuits. By making the ratio of C1/C2 continuously variable with a single rotating shaft, the requirement for two interdependent controls has been eliminated. For maximum effectiveness the inductor L1 must be of the roller-coaster type. A switched inductor will not give a perfect match, because two conditionally varied adjustments are always necessary.

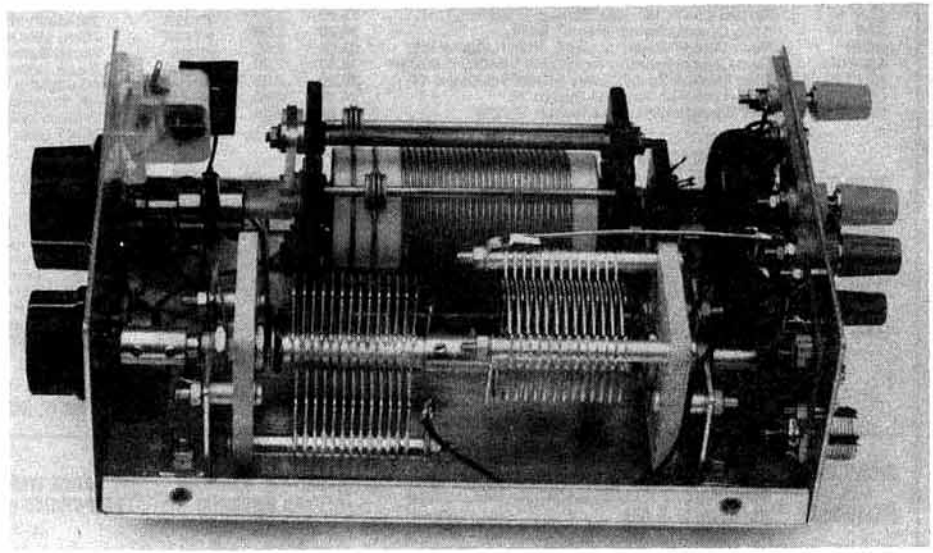
Tests have shown that the differential T-Match is capable of matching a similar range of impedance to that of the traditional T-Match - somewhat to my own surprise - but with considerably easier operation. The time taken to tune up is reduced, making band changing far less tedious. In addition, there is now only one possible setting of the controls for a matched condition.

Differential capacitors are not very common and should not be confused with split-stator types. Two Eddystone 250pF medium-spaced transmitting-type variables with a shaft at either end were obtained new from a rally for about £5 each. They are easily ganged together in tandem using a brass spindle coupler and may be arranged back to back or simply in line, phased 180° apart. The capacitors should ideally be of the linear type and not 'E Law' or logarithmic. Most transmitting capacitors will be of the linear type (with semicircular plates) so this is not likely to be a major problem. Suitable capacitors and roller-coasters can be purchased from at least two companies who advertise regularly in *RadCom*, and the 250 + 250pF types can easily be modified for different operations. The roller-coaster used by the author contained 28 turns, making it suitable for operation from 80 to 10 metres. For 160m operation at least 35 turns would be required.

It is important to use heavy gauge wire for interconnections in the ATU, keeping leads as short as possible. The earthy end of the roller inductor and the sliding tap should be grounded with a heavy-duty braid to reduce any stray



Plan view of tuner.



View showing differential capacitor.

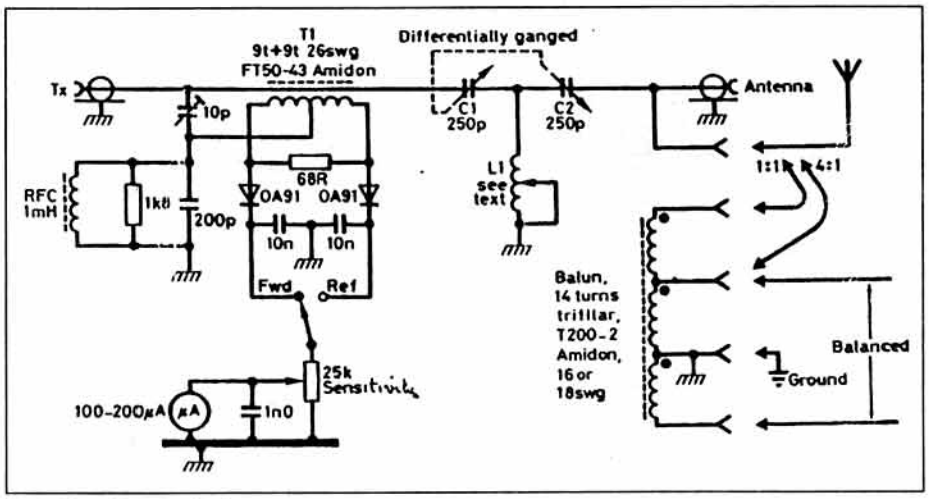


Fig 2. Complete circuit of tuner.

inductance which may prevent 10m operation. The photographs show a suitable layout.

Operation of the ATU is relatively simple. Set the capacitor to the 50% position and adjust the inductor for maximum noise on receive or for minimum VSWR on transmit. Now adjust the capacitor for a further improvement in noise or VSWR, and repeat the operation alternately using the inductor and the capacitor. Two to three adjustments are all that is normally required. Tuning is quick and precise and the use of slow-motion drives is not necessary. The majority of matching will occur with the capacitor between the 25% and 75% rotation positions. To change bands simply adjust the inductor, increasing for lower frequencies and reducing for higher frequencies and repeat the procedure described above.

Additional items such as a built-in VSWR bridge and a balun will enhance the ATU design and can be found in my previous article [1]. **Fig 2** shows the circuit of the complete ATU. Switches have been avoided to keep the size down and the balun can be brought in to circuit by the use of banana plugs and sockets on the rear panel. The balun may be used as either a 1:1 or 4:1 depending on the interconnections.

CONCLUSION

After a number of experiments with the traditional T-Match and the differential T-Match the following advantages have emerged.

The differential T-Match is easier to tune, making band changing less tedious and necessitating less time on the air during tune-up. There is only one position of the controls for a matched condition compared to the two or more with the traditional circuit arrangement. By installing two capacitors in tandem the width of the unit can be reduced, making it more compact and more suitable for portable operation.

REFERENCES

[1] M Grierson, G3TSO, 'A General Purpose Antenna Tuning Unit' *RadCom*, January 1987.

[2] *ARRL Handbook*, all recent editions. ❑

AF oscillator

continued from page 39

to be positioned over the spindle and fixing nut of the frequency-control potentiometer RV2.

Assuming that the values of the frequency-determining components are within the tolerances quoted in the components list, then the frequency-scale calibration should be accurate enough for most practical purposes. The omission of frequency-trimming facilities is deliberate in the interests of simplicity and cost.

Any significant deviation from the frequencies as shown on the scale would most likely occur at the extreme high-frequency end of the range, ie: at about 20kHz. If this were to be a problem, then some modest adjustment to the value of C1 by judicious selection should prove effective.

It should be borne in mind that this unit is intended as a low-cost, but functionally useful, portable signal source, rather than a sophisticated signal generator with inherently expensive frequency and voltage calibration facilities.

The *low*-frequency terminal of frequency-control potentiometer RV2 is the one which is connected to the 9V positive supply rail. The highest frequencies are produced when the wiper of RV2 is at the junction with R3.

Frequency calibration is to a modest extent dependent upon the voltage supply, but in real terms the current demand of 6mA is so minimal that the use of a 9V PP3 battery constitutes a near-constant-voltage supply source for a considerable lifetime of normal use.

No scale has been provided for the signal output voltage-level control potentiometer RV4, but the use of a linear-law potentiometer for this application means that under *no-load conditions* the scale is rotationally linear, as is the frequency scale.

SETTING UP

Before inserting the two ICs and connecting the PP3 battery, the wiring and component placement should be carefully checked and the circuit board inspected for solder splashes or bridges.

With the unit switched to the ON position (but without the battery and ICs), the circuit should be checked for short-circuits using an ohmmeter or continuity-tester connected across the terminals of the battery connector. The measured resistance should be about 7-10kΩ dependent upon the polarity of the test leads.

With the two ICs fitted, the measured resistance between the battery connector terminals should have fallen to about 5kΩ. It is then safe to connect the battery, and the unit should work.

COMPONENT LIST

Resistors		
R14	150R	0.25W metal film
R4,5,16	4k7	0.25W metal film
R1,2,10,12	10k	0.25W metal film
R6	15k	0.25W metal film.
R11,15	47k	0.25W metal film
R3	75k	0.25W metal film
R9,13	120k	0.25W metal film
R8	130k	0.25W metal film
R7	390k	0.25W metal film
RV1	4k7	miniature carbon preset
RV3	10k	miniature carbon preset
RV4	10k	miniature carbon potentiometer, linear
RV2	100k	look standard carbon potentiometer, linear
Capacitors		
C5	10pF	miniature ceramic
C1	1nF	polystyrene ±1% tolerance
C2	10nF	polystyrene ±1% tolerance
C3	100nF	polyester ±5% tolerance
C6	10nF	miniature 16V electrolytic
C4	47μF	miniature 16V electrolytic
Miscellaneous		
IC1		ICL8038CC waveform generator
IC2		741 operational amplifier
TR1		BC108 silicon NPN transistor
D1		BZY88 5V1 zener diode
4mm insulated terminals		Qty 3 - black, white, blue
Switch SW1		2-pole 4-way miniature rotary wafer
Switch SW2		1-pole 3-way miniature rotary wafer
DIL sockets		One 8-way and one 14-way
Container		ABS 150 x 85 x 45mm with removable flat lid
Battery		PP3
Battery connector		Twin miniature press stud, red/black leads

The only adjustments required are to set the two preset resistors RV1 and RV3; these are best made with the aid of an oscilloscope and high-impedance probe.

Set the waveform selector switch to triangular wave, the frequency control to its mid-way position, and connect the probe to pin 3 of IC1. A triangular waveform of about 2V peak-to-peak amplitude should be seen on the oscilloscope.

After adjusting the oscilloscope controls to obtain a stationary display, RV3 is adjusted until the triangular wave's upper and lower peaks are truly equally spaced. This should coincide with the preset potentiometer being at or near its mid-position. When RV3 is rotated away from mid-position the peaks of the triangular waveform will appear to tilt to one side or the other, to form a sawtooth with one sloping and one vertical edge.

Move the wave-selector switch SW2 to its sinewave position, and connect the oscilloscope probe to pin 2 of IC1. A sinewave display (slightly lower in amplitude than the triangular wave) will be observed. Adjust preset potentiometer RV1 to obtain equal amplitude on both positive and negative peaks of the sinewave. This should also coincide with the best symmetry at the peaks of the waveform, and the preset potentiometer should be at about mid-travel.

The unit is almost ready for service. With the oscilloscope connected to the common and RV4 wiper, check that a choice of sine, triangular or square wave is available according to the setting of the wave-selector switch SW2. Output-level control RV4 should allow the signal amplitude to be smoothly varied between zero and 2V peak to peak, under no-load conditions.

With SW2 in the square-wave position, and the oscilloscope probe transferred to the TTL output terminal, a 50/50 duty cycle rectangular wave of 5V amplitude should appear, the level of which is completely unaffected by the output-level control RV4. Its frequency is determined by the setting of frequency control RV2 in association with the frequency-range switch.

Switching SW2 to either the triangular or sinewave position should modify the duty cycle but not the amplitude of the TTL signal. ❑

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TOO MANY KITS!

We have too many kits in our range to be able to feature them all in one advert! So this month we are concentrating on just the transmitters. For every transmitting kit there is a companion receiver kit available too, plus a whole range of accessories (VFOs, speech processor, side-tone, digital readout, etc.). Our kits are designed to be compatible, so you can build a more complex item, a transceiver for example, by combining several kits together — a large project is much more managable in modular stages.

HTX10 SSB/CW EXCITER FOR 10 & 15M

This dual band exciter was reviewed in last July's PW. Combined with other *HOWES* kits it will enable you to build an SSB transceiver for 10 and 15 Meters, or a tunable I.F. for driving transverters. You could build a very useful satellite uplink using the HTX10 as your "prime mover". The HTX10 makes the home-built SSB rig a practical project for any constructor with the ability to use a soldering iron. As with all our kits, no fancy test equipment is needed by the constructor.

HTX10 Kit: £49.90 **Assembled PCB: £74.90**

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You can join in the fun on the Top Band AM Preservation Society nets with the AT160. It will also produce an excellent quality DSB signal to work those using SSB transceivers, and of course a nice sounding CW note for longer distance contacts. Use the MA4 mic amp kit with this kit for "phone" operation. Construction and alignment are both very straightforward.

AT160 Kit: £34.90 **Assembled PCB: £53.90**

CTX80 and CTX40 QRP CW TRANSMITTERS FOR 80 or 40M

These little transmitters have been the introduction to the fun of QRP working for many operators. Combined with a direct conversion receivers (*DcRx*) and VFO kits they can form a transceiver that gives very effective performance, and won't break the bank! Great for holiday and portable use! Just listen around the QRP frequencies — you'll hear them making plenty of contacts!

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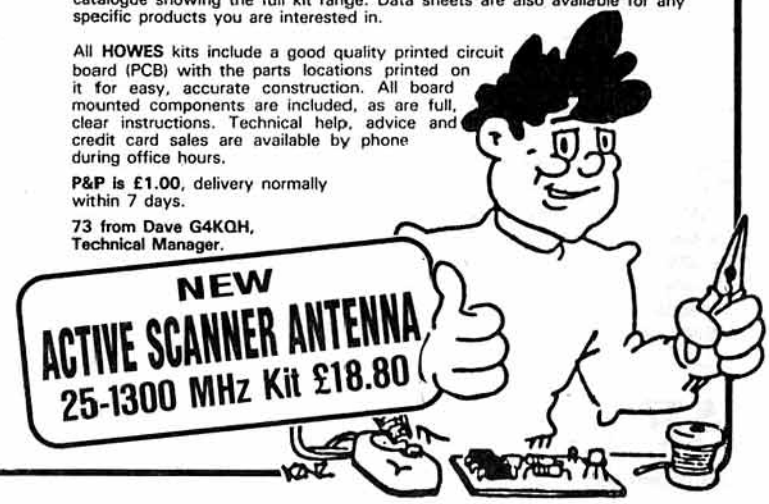
Matching VFOs, receivers and accessory kits are available for all our transmitters. SWLs can use the receivers on their own and add the transmitters later. Please send a good size SAE for a free copy of our catalogue showing the full kit range. Data sheets are also available for any specific products you are interested in.

All **HOWES** kits include a good quality printed circuit board (PCB) with the parts locations printed on it for easy, accurate construction. All board mounted components are included, as are full, clear instructions. Technical help, advice and credit card sales are available by phone during office hours.

P&P is £1.00, delivery normally within 7 days.

73 from Dave G4KQH, Technical Manager.



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UR76, 5mm dia, 50 ohm, stranded centre	25p/m (pp 3p/m)
RG58CU, 5mm dia, 50 ohm, stranded centre	25p/m (pp 3p/m)
RG174U, 2.3mm, 50 ohm, miniature coax	30p/m (pp 2p/m)
UR95, 2.3mm, 50 ohm, mini nylon coax	30p/m (pp 2p/m)
UR111, 2.3mm, 75 ohm PTFE mini coax	40p/m (pp 2p/m)
UR57, 10.3mm, 75 ohm low loss coax	70p/m (pp 6p/m*)
UR70, 6mm dia, 75 ohm transmitting coax	25p/m (pp 3p/m)
Double screened, 75 ohm coax, 8mm dia	40p/m (pp 5p/m)
UHF low loss TV downlead, 75 ohm	20p/m (pp 3p/m)
75 ohm twin balanced feeder, 400 w PEP	20p/m (pp 3p/m)
75 ohm twin feeder, screened, 6mm dia	40p/m (pp 5p/m)
UR67 50 ohm double screened	80p/m (pp 6p/m)
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RG62AU, 6mm dia, 95 ohm coax	50p/m (pp 4p/m)
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14 SWG HD copper 25p/m; 16 SWG HD copper	20p/m (pp 3p/m)
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CRAY VALLEY SWL CONTEST

Since the brief mention last month, G4DFI has provided more details of this event. There will be two contests - CW on 15 September and SSB on 22 September. Each event starts at 1500 and finish at 2400. These shorter style events are in keeping with current practice to prune the length of contests. This will, hopefully, encourage more listeners and Class B operators to participate as they do not take up an entire weekend. You will recall that the society wants to see a far greater level of participation this year to encourage them to keep the event in their annual calender of events.

As I have previously remarked, SWLs have lost the White Rose event for the time being, and it would be sad to see another event bite the dust. Even if yours is only a "token entry", it might well be the one which keeps the event in the listeners' contest calender for 1991. Please try to spend some time by the rig - both events have been timed to coincide with transmitting contests - and provide some support to the Cray Valley Society, who are the oldest sponsors of society-run SWL contests. G4DFI, who is OK in any Call Book, will provide full details of the rules if he is sent an SASE.

RADIO BYGONES

Looking through the latest copy of *Morsum Magnificat*, I was interested to see mention of this new magazine, which covers developments from the days of Hertz, Maxwell and Marconi to the recent past. *Radio Bygones* is published six times a year by G3GSR, editor of *Morsum Magnificat*. A yearly subscription will cost you £12, but if you would like to see a sample copy, £2.20 will get you one. The address is G C Arnold Partners, 8A Corfe View Road, Corfe Mullen, Wimborne, Dorset BH21 3LZ.

BARTG RALLY

News has come from BARTG that their 1990 Rally will be held at Surrey Hall, Sandown Park Racecourse from 1030-1700 on Sunday 16 September. The organisers have every hope that this year's rally will be the most successful yet, catering for those whose particular interest lies in Packet, AMTOR, RTTY and Fax. Further details can be obtained from Peter Nicol at 28 Mitten Avenue, Rubery, Rednal, Birmingham B45 0JB.

QSL TECHNIQUES

Mick Toms BRS31976, who is well known to regular readers of this page, offered his comments, from a QSL Manager's point of view, on SWL QSLing habits. He is the manager for GB2DTS, GB2LNE, G3XBF and G8XBF. The quality of some of the cards he sees is "appalling". He remarks that it is not always the Eastern Europeans, many of whom send cards for contacts made at their local club station whilst they were in the shack, but a number of G listeners who probably read the column are also to blame (harsh words indeed,but perhaps it will register more, coming as it does from a fellow SWL).

He referred in particular to one report received as a result of the 1989 GB2DTS from BRS***** who was only 15 miles away, and gave a 5x9 report for a contact on 3.5MHz which the station had with a station in the Midlands. As he says, it is the club's policy to encourage listeners, and they do therefore QSL all reports, but it is always much better to have useful reports.

MORE MARCONI NEWS

G3FWE sent information on the special event station, GB2MAR, which will be operating to celebrate "Families Day" from the Factory Site in Portsmouth on 1 September on 7, 14 and 144MHz SSB and CW. Listener reports will be very welcome and will count towards the Marconi Spectrum and Mary Rose awards. On the subject of awards, the society is shortly to announce the details of the "Marconi Trophy". I should have the details, and a photograph, in the column in a month or two. From the graphics sent with G3FWE's letter, it will most definitely be worth winning - it has cost around £1,000 to produce. Let us hope that SWL's will be able to partake in the competition so that one of us has a chance of winning this very prestigious trophy.

FINALE

This months column has been hurriedly compiled because of holidays, but I hope there is something for everyone. The next two deadlines are 10 September for the November issue, and 10 October for December.

Microwaves

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

UK 'FIRSTS' ON 5.7GHz

Chris, G4LOJ, wrote from Norwich to pass on good news about two new personal-callsign beacons on the 5.7GHz band. These are 'firsts' for the UK as, until the Jan 89 licence changes, the band was not available for beacon use. The new facilities have changed all that!

Ray, G3ZFP, near Dunstable and Chris, G4LOJ Norwich, have built similar beacons, each running a little over 0.5W output to stacked-slot waveguide, horizontally polarised antennas of nominal 10-12dB omnidirectional gain. Both also have transverters with 10W output available and GaAsFET receive front ends. They would be interested in any reception reports and Chris has offered to act as focal point for reports: he can be contacted on 05086-2025 at any reasonable time (my words!) and will be happy to pass any messages to Ray. More details are as follows:

G3ZFP, Locator IO91RT (NGR TL017156), frequency 5760.850MHz, keying "G3ZFP" every 30s in FSK. Height 600ft ASL, antenna at 25ft AGL.

G4LOJ, Locator JO02QN (NGR TG293022), frequency 5760.965MHz, keying "G4LOJ" every 15s in FSK. Height 100ft ASL, antenna 30ft AGL.

These sound to me as though they might just help stir up activity on this somewhat neglected band. Chris, of course, is well placed for the Continent whilst Ray is usefully inland. There could be some very interesting propagation investigation resulting from efforts like this and it is particularly good news at a time when part two of the civil spectrum review is about to take place - this time covering 3GHz to 30GHz. It is always good to be able to report such efforts as these - well done both stations. Chris even made hints about the possibility of extending the work to 2.3, 3.4 and 10GHz.

In the same letter he commented on his disappointment at the IARU Region 1 Conference decision to move the narrowband section down from 5760-5762MHz to 5668-5670MHz - necessitating filter realignment and new crystals - asking where the idea had originated from and why? The answer to both questions is simple: the search for frequencies considered 'safe' from professional 'takeover' AND which are common to the MAJORITY of Region 1 countries or, indeed, worldwide. The change has been particularly actively pursued in Germany and the Netherlands (both bigger users than we are), with the Region 1 coordinator, PA0EZ, playing a leading role in the search for such truly international usage. In the course of time, one of our objectives in the UK will be to seek Primary status for these valuable common allocations - whether that ever happens depends on coordinated amateur representation at both national and international level, and stands a better chance of success if common frequency usage can be agreed on as wide a basis as possible. WARC '92 isn't that far away!

AFRICAN 'FIRSTS' ON 47GHz

Arnold, ZS6BMS/G3HBW, sent details of "the small happenings on microwaves in the RSA". He first apologised for little follow-up to the 10GHz work reported here a year or more ago. Instead, it transpires that he's been busy "moving things up a bit" - to 47GHz.

Having built two transceivers, he and Chris, ZS6AVC, made contacts on 1 July, believed to be the first amateur millimetre QSOs in Africa. Julian, ZS6AOU, sat in Arnold's back garden - yes, high and open - whilst Arnold and Chris took the other transceiver to local high ground and immediately worked a 5.7km optical path at S9+.

On 7 July, trials between Arnold's back garden and various points along the Great North Road were tried without much success due to obstructions which had not manifested themselves in the earlier 10GHz trials over the same terrain: the Magaliesburg range, actually lower than Arnold's garden site but, nevertheless, an obstruction.

The next day ZS6AOU and Allan, ZR6AHL, took a transceiver portable to the top of the Magaliesburg whilst ZS6BMS and ZS6AVC continued along the road 'mobile'. Good signals were exchanged at 7km and then at 17km. At 21.5km "Murphy started to take a hand in the game" - with a bit of antenna juggling, the initial weak signals from the mobile pair were received fully quieting by the portable station, but no signals the other way. After "half an hour of fiddling, Chris noticed that the 12V supply to the post-mixer amplifier had fallen off! After replacement - S9+ both ways!".

At 45.5km, over a grazing path,

the mobiles' signals were received at best at R/S 4/3 with deep fading to zero signal over period of 20 to 30 seconds. The weather was calm, 25 degrees Centigrade and dry. No complete two-way exchange was possible, although under different weather conditions, the path may well 'go'.

The equipment used MACom Gunns at 16-17dBm output, fin-line mixers with co-planar junction in WR19, beam-lead diodes and 108MHz IF. Mixer losses were measured at 7.3 and 4.8dB respectively at about +6dBm drive. Circulators using a YGIG cylinder and rod magnets (machine tool-shop variety) were home-made. One had an insertion loss of about 2.5dB and isolation of 35dB, whilst the other measured at 1dB/15dB - "obviously some more work must be done on this side". Cassegrain-fed 35cm dishes were used with the primary horn design derived from an existing Ka-band design. The Gunns were "reflection-stabilised" using a separate cavity and remained stable for long periods in a 20-30kHz bandwidth "in the absence of wind!". However, for the time being, normal 200kHz bandwidth FM BC receivers are being used, so the full potential of the gear has not yet been realised.

Incidentally, to help in setting up the antennas - I quote directly from Arnold's letter ". . . we used the Ancient Method of Heliographs! It worked very well up to 17km, but I'm glad to say that radio won at 21km (it was slightly hazy) and we couldn't see the flashes from the 5cm square mirror but did make the contact". Trials will continue. Well done all stations! Is there anyone in the UK operational on, or seriously interested in experimenting on 47GHz? We'd love to know.

FROM ELSEWHERE

The last 1989 issue (No. 10) of the *Microwave Newsletter* contained several short items of technical interest as well as some important 'administrative' items. The latter, by Charles Suckling, G3WDG, our Microwave Manager, outlined the pressure on the amateur microwave spectrum likely to be experienced at WARC '92, a matter often aired here in the past months. Don't underestimate the value of these allocations and, above all USE THEM and REPORT THEM - here or in the *Newsletter*! The higher the level of usage, the more convincing will be our case for retention of the present facilities.

Technical items included a simple modification to the well known 'low-volts drop' regulator circuit, often used to stabilise microwave equipment. Under some ambient conditions, the circuit will not start properly, but the addition of a single additional diode cures this. Further ideas and 'desk designs' for a dual-band (5.7 and 10GHz) transverter in GaAsFET technology were given by JE1AAH, a Gunn control board design (part 1) by GW4JJW and details of a new source of spun 60cm dishes by G8AGN.

Hard on the heels of 10/89, came 1/90! This contained part 2 of the Gunn control article, an analysis of the past 13 years of 10GHz activity in the UK by G3YGF and our 'overseas correspondent', Steve, PA/G4KNZ. There was also an interesting brief account by Bob Platts, G8OZP, on the development of a proposed 10GHz TV repeater (GB3XT, near Burton on Trent). There seems to be a lot of interest in the 10GHz band by our TV colleagues in recent months: no doubt a "spin-off" from the nearby 11 and 12GHz technology! Nevertheless, valuable work which should greatly improve the regular use of the band from home stations - as distinct from the fairly frequent but irregular portable use experienced by most operators.

Microwave Newsletter

Contains technical information for microwave enthusiasts, plus operating news, events, along with a for sale/wanted column, and a regularly updated list of microwave components available from the RSGB. There are 10 issues a year.

Edited by Peter Day, G3PHO and Barry Chambers, G8AGN.

INTERESTED? LIKE A FREE SAMPLE?

If you would like a FREE sample copy, just drop a note to, or ring, the Membership Services Department at RSGB Headquarters. They will also send you an application form which lists all the various rates for members and non-members, both home and overseas.

RAYNET

RONALD M COWAN, GM4SRL
516 Clarkston Road, Netherlee, Glasgow G44 3RT

TACTICAL CALLSIGNS

The Raynet Committee has recently discussed the use of tactical callsigns (eg "Alpha 1") during Raynet emergencies and events. The committee feels their use should be encouraged because, should a large emergency arise, experience has shown that it is easier for a controller to follow the movement of a large number of tactical callsigns from members of groups foreign to him, than to deal with unfamiliar amateur callsigns. This, of course, does not remove the need for the controller to keep a list of callsigns involved in the event, together with the location of all personnel. It does, however, help him a great deal when he has to call a particular location. There is also an advantage when an operator is relieved at a given location as the callsign remains the same. This is equally true when the event continues for several days. Another advantage is that all similar positional duties can be given linked callsigns.

This does not, however, excuse any operator from giving his own callsign as laid down in the regulations, and this can easily be incorporated, eg "Control, this is Alpha 1, G0ZZZ; go ahead, over". It is far better to give this callsign too often rather than not often enough, as it is important that anyone listening to the transmissions is able to identify the source quickly and easily.

Try including tactical callsigns in one of your forthcoming events, especially if another Raynet group is involved, so that should the need arise in an emergency you will have had previous experience of this method of working.

RAYNET DISPLAY BOARDS

Display boards, showing Raynet activities, are now available for use at amateur radio shows, exhibitions, etc. They are also suitable for use a large events organised by user services, but as there is only one set, it should be booked in advance from me, GM4SRL (see box above). It is regretted that they are not suitable for use outdoors, nor is it practical to lend them out to small events owing to the cost of transport.

At present, they are moved about the country when a volunteer driver can be found. If you regularly drive about the whole country, and would be willing to transport boards on occasions, I would be delighted to hear from you!

WEST HIGHLAND WAY WALK

Tony Cushley, GM7GIE, a member of the Strathclyde Raynet Group, is intending to walk the West Highland Way between Milngavie, near Glasgow, and Fort William to raise funds for the group. He is hoping to complete the walk in four days, probably leaving on Tuesday 4 September. It is possible that Tony will be accompanied by two other group members, David Ross, GM7GRE, who will take part in the walk, and Neil Morgan, GM7GNR, who will be driving from section to section, keeping in touch with the walkers on 144MHz. Funding will be raised either by each mile completed, or by donation.

EUROPEAN SPECIAL OLYMPICS

At the time of writing, the Olympics are just a week away, and plans are changing daily. Thanks are due to all the operators who helped, and especially to Raynet team organisers, Anne, GM1UIR; Katie, GM7BOO; Crawford, GM8HBY; Mike, GM0ETC; Dave, GM0ADF and Tom, GM0BKX. A report will appear in *RadCom* as soon as possible.

MISSING THE BOAT?

Following my request for information from groups about their activities, Shirley, GM0ERV, the Secretary of the Argyll Group, wrote to tell me some of the problems faced by her group owing to the geography of the area. Argyll is one of the most beautiful areas of the country, but its mountains and lochs, not to mention the islands, sometimes makes travelling difficult and often very time-consuming.

The Argyll Group was recently working on the Isle of Mull and intended to get the last ferry of the day (and the weekend) back to the mainland at Oban on the Saturday evening. Missing it would have meant waiting until Sunday morning, having to take a small ferry to Lochaline, another ferry across Loch Linnhe and a long drive back to Oban via Glencoe. Owing to the event taking longer than expected, Shirley and her husband, Lex, were unable to leave Loch Scridain near the Ross of Mull when they had planned to, and it was obvious that the slow single track road through Glen More

RAYNET

would prevent them from arriving at the pier in time to catch the ferry. Other members of the group were concerned at their non arrival, but could not contact them owing to the mountainous terrain. Even the 144MHz repeater, GB3HI, on the island itself does not cover most of Glen More, but eventually simplex contact was made and on hearing their position, a plea was forwarded to the captain to hold the boat. This was done, and Shirley and Lex made it to Oban that evening, together with another family who would also have missed the boat if Raynet had not been working on the island that day!

ANTRIM REPORT

Ian Gibson, GI4MDD, Zone 11 Raynet Representative, tells of a serious incident at which Raynet was able to help.

The North East N.I. Raynet Group 11/AN/162, was providing cover for the British Red Cross during a twelve hour overnight shift for forest stages of a car rally. During the event, at 0415, two members, GI4LVC and GI0EUG came upon a road traffic accident. This involved a car which had left the road, gone through a fence and ended up on its roof, trapping the driver who was just conscious, in great pain and was losing a lot of blood from his injuries.

Raynet control was asked to call the emergency services, and GI0AZA, a local GP, also attended. The casualty had to be cut from the vehicle by the Fire Brigade before the Ambulance Service could take him to hospital. The incident had occurred at least one hour before it was discovered, and it was later learned that along with damaged ribs, the driver had lost the sight of one eye, and was fighting to retain the sight of the other. A victim of an unfortunate accident, the driver was more than grateful that the Raynet members had come along when they did, and quite possibly they saved his life.

TELL US ABOUT YOUR NEWS

If anything interesting happens in your group, drop a note to me at the above address. The Raynet Committee can now supply Press Releases for inclusion in local and national papers, and I will be happy to arrange this for you. Articles for the November column should arrive by Sunday 9 September.

DATACOMMS

We regret that, yet again, we are unable to bring you Neil Lasher's Datacomms column.

Satellites

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

OSCAR 13 PERTURBATIONS

There have been reports that OSCAR 13 has been showing a noticeable decrease in its perigee recently, since its last orbit change manoeuvre was carried out in mid-1988. It was then about 2500km high at perigee, but it is now down to around 1450km. The scare mongers who usually raise their voices at such events promptly ascribed this to be due to orbital decay and began to prophesy an impeding end to O-13's life. This, however, is not so. It is the result of having an elliptical orbit which goes out into deep space so far that the sun and moon are able to affect its orbit over a long term cycle. OSCAR 13 travels one tenth of the way to the moon before returning to its perigee orbit around the earth. Experienced amateur satellite enthusiasts are devoting much time to investigating this phenomenon and seeking professional astronomical help in an attempt to find out just what is happening, particularly with regard to OSCAR 13's life expectancy.

DOVE UPDATE

The tedious process of reloading software into DOVE has been progressing slowly due to the extremely low signal to noise ratio of the data modulation. "The new software will swap between the S band and the 144MHz transmitter in a configurable cycle and will have the latest and greatest battery management routine", reports Bob McGwier, N4HY. At the time of writing, loading of the DOVE's talking software, files of phonemes, digitised voice etc, into the file system, is taking place. It is hoped to have DOVE working again soon.

NEW SATELLITE EDUCATORS' ASSOCIATION FORMED

A new international education group, the Satellite Educators' Association, has recently been formed. Its President is Helen Martin. The Group is very interested and active in promoting the use of satellites of all types; amateur radio, weather and earth resources. Further details from Mrs Nancy McIntyre, Secretary/ Treasurer S.E.A, 302 D Recitation Hall, West Chester University, West Chester, PA19383, USA.

ZIMBABWE SATELLITE ACTIVITY

Promoted by Z21HJ/R, satellite activity has been planned for four weekends in September as follows:-

31 Aug to 2 Sep, Z21SAT from Pamuzinda Safari Lodge; 14 - 16 Sep, Z22SAT from Victoria falls; 21 - 23 Sep, Z21SAT from Bulawayo; and 28 to 30 Sep, Z21SAT from Harare. Operators are Z21GH and Z21HJ/R. Frequency is 145.905MHz Mode B, mainly on OSCAR 13, and OSCAR 10 when O-13 is not available.

QSLs should go direct to: G.Riepenhausen, Z21HJ/R, POB HG 395, Highlands, Harare, Zimbabwe.

SATELLITE TECHNIQUE

THE TRANSMITTER

Looking back at the contributions I have so far made for this feature, whilst the first two or three covered the reception of satellite signals, an abundance of satellite news has so far prevented my including anything about the transmitting side of satellite activity.

There is a number of ways in which the transmitting side of the satellite ground station can be set up.

On the principle of not trying to run before one can walk, the obvious thing to do is to concentrate on getting on those satellites which are the easiest to work - viz the Russian ones. For these we need a 144MHz tuneable transmitter suitable for CW. FM is not used for transmission over amateur satellites, and SSB adds its own complications such as more power and elaborate aerial systems. The best place to look for a suitable transmitter is at one of the radio rallies or exhibitions, when you might find something suitable. I had the good fortune to obtain a nice little tuneable 10W TX - a Telford Communications TC10 at one of the radio exhibitions some years ago. It has given years of good service and is still in use. Such a rig will drive a 50W linear nicely, and this into a simple rotatable Yagi antenna will give a good signal into the satellite. However, this happy state of affairs is unlikely to come your way unless you are very lucky!

You are most likely to have a typical HF amateur bands transceiver as the basis of your amateur radio station. The 28MHz output of this can be used to drive a transverter to give an output on 144MHz which can then be amplified to 25W or so. Alternatively, the transmit part of a dedicated 144MHz radio could be employed. This will, of course all be a bit more expensive, but at least you will be using existing gear.

Once you have gained some experience with such a system you can contemplate going up the scale a bit and trying the '430MHz up, 144MHz down' mode. Again, you could use one of the dual band VHF transceivers which are now readily available, but this is likely to prove expensive. Most folk use their HF transceiver to transvert to 430MHz.

Separate antennas must of course be used for reception and transmission. You can get by by using a crossed Yagi dual band antenna in which the 144MHz and 430MHz elements are fixed to a single rotatable boom, at right angles to each other. Separate feeders go to each set of elements. This will do very well for a start, but as you gain experience you can think about a more elaborate aerial system. This must be rotatable in the horizontal plane, azimuth as it is called. Later on, you must be able to rotate it in the vertical plane so that you can point more accurately at the satellite. To start with you can get away with azimuth rotation only, but tilting the beam up about 30 degrees from the horizontal is quite a good idea, as this is an average amount of satellite elevation. If you confine your activities to working satellites when they come more or less overhead, you can do very nicely with a crossed dipole array when you do not have to worry about directing the antenna at all.

It helps a lot if you can find someone who has had satellite experience to give you a hand when you first take up satellite operation. Some folk write in and complain that they have spent a lot of money buying all the equipment for satellite working, but have never managed to hear a satellite, let alone work one. They are usually those who have had little or no previous amateur radio experience, and think they can pick up satellite techniques straight away. This is not possible and someone who can give practical help is invaluable.

Just recently, there have appeared on the market some really beautiful VHF transceivers designed specifically to appeal to the satellite enthusiast. They are designed for the 144, 430 and 1200MHz bands. Only snag is, you'll need a very, very, deep pocket to purchase one!

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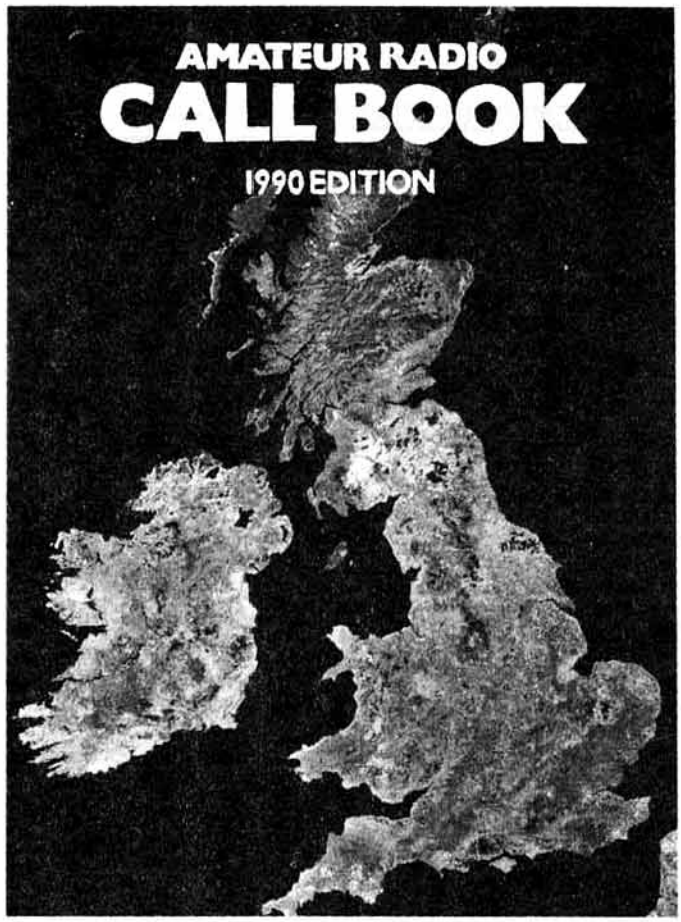

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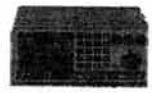

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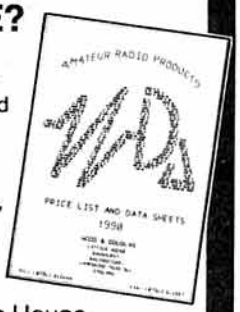

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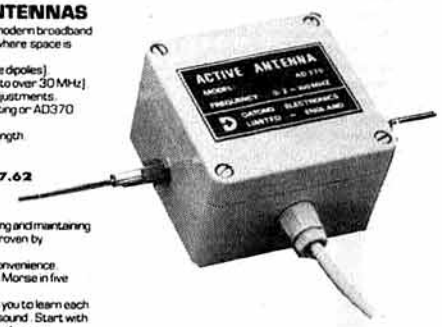

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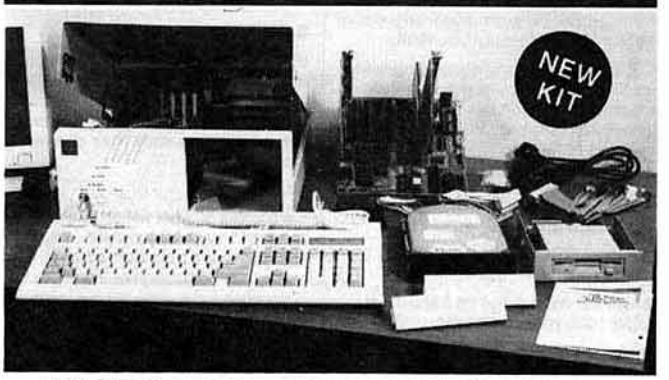

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CONTEST NEWS

RULES

SECOND 28MHZ CUMULATIVES 1990 RULES

The format for this event is unchanged from the first 28MHz Cumulatives 1990.

1. Entrants: Single-operator, UK stations only. If desired, entrants may operate from a "portable" location, but this must be the same for all sessions. All entrants must be members of RSGB.

2. Dates & Times (GMT):

Session 1, Monday 10 September
CW 1900-2000, SSB 2030-2130

Session 2, Tuesday 18 September
SSB 1900-2000, CW 2030-2130

Session 3, Wednesday 26 September
CW 1900-2000, SSB 2030-2130

Session 4, Thursday 4 October
SSB 1900-2000, CW 2030-2130

Session 5, Friday 12 October
CW 1900-2000, SSB 2030-2130

3. Frequencies:

CW 28.0 - 28.1MHz, SSB 28.5 - 28.6MHz

4. Sections:

(a) CW, (b) SSB, (c) Combined.

5. Exchange:

RS(T), serial number beginning with 001 on each evening (running continuously through both modes if appropriate) and County Code as published in Radio Communication or the RSGB Call Book. Entrants may work stations worldwide, and the same station may be contacted for points once on each mode on the same evening. Each day is treated as a separate event.

6. Scoring:

Three points for each completed contact, plus a bonus of ten points for each new county and each new country (outside the UK) worked. Where a county or country is worked on both CW and SSB on the same evening, the bonus may be claimed twice. Duplicate contacts for which points have been claimed (except as permitted in 5) will be penalized at **ten times** the score claimed. Entrants for the CW and/or SSB sections should submit logs for the THREE best sessions out of the five on that mode, and for the Combined section should submit logs for the THREE best evenings out of the five. A contestant may enter any one, any two, or even all three sections if desired. Entrants' logs for sessions other than those constituting the entry would be most welcome as checklogs.

7. Logs:

Logs should be typed or clearly written on (ideally) RSGB HF contest log sheets (HFC1), or prepared to the same format, with columns headed: Time, Callsign of station worked, RST/Serial sent, RST/Serial received, Bonus (if claimed), and Points claimed, and with 40 QSOs per page on A4 paper. Computer-printed logs on normal-width fan-fold paper are perfectly acceptable if formatted as above. Both modes for the same evening may go on the same log, following on without a gap. A callsign checklist ("dupe sheet") is not required for this event, although a list of bonuses claimed for each mode/session would be useful. Each entry should be accompanied by a cover-sheet (HFC2) bearing the usual signed declaration. One cover sheet will serve for each entry, regardless of the number of sessions. Copies of these forms are available from RSGB headquarters, or may be photocopied from publications, eg Call Book.

8. Entries:

Entries must be postmarked not later than Tuesday 30 October 1990, and sent to HF Contests Committee c/o David Hill G4IQM, 14 The Garrones, Worth, CRAWLEY, West Sussex, RH10 4YT.

9. Data Protection Act:

Entrants should note that the adjudicator may enter information from their logs into a computer for the purpose of checking or preparing tabulations. Entrants objecting to this must clearly state their objections on the cover sheet.

10. Awards:

Certificates of merit will be awarded to the entrant in each section with the highest checked score. Further awards may be made at the discretion of the HF Contests Committee if the entry for any section exceeds 20.

SECOND 1.8MHZ CONTEST 1990 RULES

1. Date and Time:

2100GMT Saturday 17th November to 0100GMT Sunday 18th November 1990.

2. Sections:

Single-operator entries only.

(a) British Isles. All entrants must be members of RSGB.

(b) Overseas including EI.

3. Band and Mode:

1820 - 1870kHz, CW only.

4. Exchange:

RST plus Serial Number starting at 001. British Isles stations must also send their County Code as printed in the May 1990 issue of Radio Communication and other current RSGB publications.

5. Scoring:

(a) British Isles - Three points for each completed contact, with a bonus of five points for the first contact with each British Isles County, and for the first contact with each country outside the British Isles.

(b) Overseas - Three points for each completed contact with a station in the British Isles excluding Eire, with a bonus of five points for the first contact with each British Isles County.

6. Logs:

Entries should be typed or written in ink on one side only of standard (A4) size paper or pre-printed log sheets and should contain 40 QSOs per page. Columns to be headed: Time GMT; callsign of station worked; RST and serial number sent; RST and serial number received; County Code received; bonus; points claimed. Computer-generated logs are welcomed provided they are formatted as above.

Duplicate contacts must be clearly marked and not claimed for points. Each unmarked duplicate contact found for which points have been claimed will result in the deduction of ELEVEN times the points claimed. Entries containing more than 5 such duplicates will be liable to disqualification.

Each entry must be accompanied by a cover sheet and the following declaration, signed by the entrant and dated: "*I declare that this station was operated strictly in accordance with the rules and spirit of the contest, and I agree that the decision of the Council of the RSGB will be final in all cases of dispute.*" UK entrants must further state "*I have no objection to the information from my log being entered into a computer for the sole purpose of the contest adjudication.*" (Data Protection Act).

7. Address for logs:

Peter Hobbs G3LET, 22 Outram Rd, Southsea, Hants., PO5 1QY

8. Date for Entries:

All entries must be postmarked not later than fifteen days after the end of the contest.

9. Awards:

(a) The Victor Desmond Trophy will be awarded to the leading station in the British Isles. Certificates of Merit will be awarded to the second and third-placed entrants.

The Maitland Trophy will be awarded to the Scottish entrant with the highest aggregate number of points in this contest combined with the First 1.8MHz Contest 1991.

(b) Certificates of Merit will be awarded to the leading three entrants in the Overseas section.

RECEIVING SECTION

The rules for the Transmitting Section apply except as modified below.

Eligible entrants:

(a) British Isles - RSGB members only

(b) Overseas - all SWLs

Holders of transmitting licences for frequencies ONLY ABOVE 30MHz may enter the receiving section. *Holders of UK Class B licences are particularly encouraged to enter.*

Logs:

Columns to be headed: time GMT; callsign of station heard; report/serial number/County Code sent by that station; callsign of station being worked; bonus; points claimed. NOTE- In the column headed "station being worked" the same callsign may only appear once in every three contacts unless the station heard is a new bonus.

Declaration: The declaration must include the following:- "*I do not hold a transmitting licence for frequencies below 30MHz.*"

Awards:

Certificates of merit will be awarded to the leading entrants in each section. Additional certificates may be awarded at the discretion of the HF Contests Committee dependant upon the number of entries.

7MHZ CW CONTEST 1991 RULES

TRANSMITTING SECTION

1 General: All entrants should note that there are significant **CHANGES IN THE RULES** compared with those of the 1990 event. The UK County Code replaces the previous UK Prefix and overseas entrants should calculate their multipliers on the number of different county codes received from UK stations. The event has also been shortened by three hours.

2 Eligible entrants: Overseas (including EI) - all licensed amateurs. British Isles - Class A licence holders, who must be members of RSGB. Single-operator entries only will be accepted.

3 When: 1500GMT Saturday 23 February to 0900GMT Sunday 24 February 1991.

4 Sections: (a) British Isles, **(b)** Europe including EI, **(c)** North America, **(d)** South America, **(e)** Africa, **(f)** Asia, **(g)** Oceania.

5 Frequency/Mode: 7.000 - 7.030MHz CW only.

6 Contest Exchange: RST and serial number, commencing with with 001. UK stations must also send their County Code as printed in the May 1990 edition of *Radio Communication* and other current RSGB publicatons. No points will be lost if the full information cannot be obtained from a non-competing station, but any contest exchange sent by that station should be logged.

7.1 Scoring:

(a) British Isles stations. Each completed contact with a station in section (b) will count 5 points, in sections (c), (d), (e) and (f) fifteen points and in section (g), thirty points. British Isles stations may not work each other for points.

(b) Stations in Europe (including EI) score five points for each completed contact with a British Isles station.

(c), (d), (e) and (f) Stations in the Americas, Africa and Asia score fifteen points for each completed contact with a British Isles station.

(g) Stations in Oceania score thirty points for each completed contact with a British Isles station.

7.2 Multipliers:

(a) British Isles stations - One for each country worked. The ARRL Countries List will apply, with the exception that USA call areas 1 - 0 (irrespective of prefix), VO1, VO2, and VE, VK, ZL and JA call areas will all count as separate multipliers.

(b - g) Overseas stations - One for each different British Isles County Code received.

8 Logs: Entries should be typed or written in ink on one side only of standard (A4) size paper or pre-printed log sheets, and should contain 40 QSOs per page. Columns to be headed: Time GMT; callsign of station worked; RST and serial number sent; RST and serial number received; County Code received(if applicable), multiplier (if new); points claimed. Computer-generated logs are welcomed provided they are formatted as above.

Duplicate contacts must be clearly marked and not claimed for points. Each unmarked duplicate contact found for which points have been claimed will result in the deduction of ELEVEN times the points claimed. Entries containing more than 5 such duplicates will be liable to disqualification.

Each entry must be accompanied by a cover sheet (HFC2 or equivalent indicating the section entered and power used, as well as the usual details of equipment and aerials. Also don't forget the operator's name and address!) and a list of the multipliers worked.

Entrants making more than 80 QSOs are requested to include a check-list of the callsigns appearing in the log, sorted into alphabetical order and with either the serial number sent or the time of contact beside the callsign.

9 Declaration: Each entry must be accompanied by the following declaration, signed and dated: "*I declare that this station was operated strictly in accordance with the rules and spirit of the contest, and I agree that the decision of the Council of the RSGB will be final in all cases of dispute.*" UK entrants must further state "*I have no objection to the information from my log being entered into a computer for the sole purpose of the contest adjudication.*" (Data Protection Act).

10 Address for logs: RSGB HF Contests Committee, PO Box 73, Lichfield, Staffs, ENGLAND.

11 Closing Date for logs: British Isles entrants, 26 March 1991; Overseas entrants, 23 April 1991.

12 Awards: The leading British Isles station will be awarded the Thomas (G6QB)

Memorial Trophy. Certificates of merit will be awarded to the second and third-placed British Isles stations, and to the leading entrants in each overseas section. Additional certificates may be awarded at the discretion of the HF Contests Committee.

RECEIVING SECTION

Rules as for the transmitting section except where specified below.

2 Eligible entrants:

(a) British Isles - RSGB members only

(b) Overseas - all SWLs

Holders of transmitting licences for frequencies ONLY ABOVE 30MHz may enter the receiving section and UK Class B licence-holders are particularly encouraged to have a go!

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

11 Logs: Columns to be headed: time GMT; callsign of station heard; report and serial number sent by that station; County Code sent by that station (if applicable); callsign of station being worked; multiplier (if new); points claimed.

NOTE. In the column headed "station being worked" the same callsign may only appear once in every three contacts except when the logged station counts as a new multiplier.

9 Declaration: The signed declaration must include the wording:- "*I do not hold a transmitting licence for frequencies below 30MHz.*"

12 Awards: Certificates of merit will be awarded at the discretion of the HF Contests Committee to the leading three entrants from the British Isles, and to the leading entrants in the overseas sections.

RESULTS

1ST 28MHZ CUMULATIVES 1990 RESULTS

With 35 counties and 14 countries active, the HFCC were disappointed to receive only 15 logs representing 9 counties. Future contestants are reminded that these short events provide an opportunity to work counties for the 28MHz Counties Award. The HFCC are considering means to improve participation and suggestions are welcome.

Conditions were reported as generally average, although ZL, ZS and VP8 were worked, in addition to many countries in the Americas. As befits Murphy, the evening *after* the first session saw an aurora extending to 10M when much of the UK was workable from the adjudicator's QTH in SXW!

Logs were, on average, good with only one written in pencil (no points deducted *this* time) and only one incorrect cover sheet received. Very few points were lost for inaccurate logging.

The adjudicator enjoyed the comments amongst the logs, especially G4AGQ's comprehensive report on his mobile forays!

Congratulations and certificates go to the following:-

Section	Call	Equipment	Antenna
CW	G4WVX	IC-781	3/4 wave vertical
SSB	G3WEY	TS830S + amp	TA33jnr
Combined	G0CPE	FT1 (+ amp for SSB)	TH3jnr

We hope to see you all (and a few more!) in the second series.

G4IQM

SECTION A - CW

Posn	Call	Cnty	9/4	17/4	25/4	3/5	11/5	Total
1	G4WVX	BKS	chk	chk	177	115	148	440
2	G0CPE	SRY	126	chk	131	chk	126	383
3	G4AGQ/M	SXW	chk	chk	128	122	122	372
4	G3MCX	LDN	-	100	109	chk	123	332
5	G0BON	BRK	100	chk	129	chk	100	329
6	G6NK	SRY	107	chk	chk	87	120	314
7	G3OXC	SRY	84	97	116	-	-	297
8	G4RFR*	DOR	149	71	-	74	-	294
9	G4DJR	SRY	52	chk	68	65	chk	185

* Op G3SQX

SECTION B - SSB

1	G3WEY	DOR	249	288	-	123	chk	660
2	G0CPE	SRY	214	236	chk	chk	165	615
3	G4AGQ/M	SXW	chk	139	177	167	chk	483
4	G0GDU	NOT	chk	185	68	91	-	344
5	G3PRI	IOW	52	55	55	chk	chk	162
6	G3UJG	SOM	52	chk	39	39	chk	130

SECTION C - COMBINED

1	C0CPE	SRY	340	345	chk	chk	291	976
2	G4AGQ/M	SXW	chk	245	305	289	chk	839

Check Logs received with thanks from G2FWX, G2HLU and G0AEV (on leave from CT1!).

CORRECTION

21/28MHZ PHONE CONTEST

The date given on page 67 of the May *Radio Communication* for the 21/28MHz Phone Contest is incorrect. The contest will be held, as usual, on the second Sunday of the month - 14 October.

DIRECTION FINDING

RESULTS OF BANBURY D/F QUALIFYING EVENT

Skies were grey and heavy, rain forecast, but eighteen teams assembled at Drayton School, Banbury. All thoughts of the weather were soon forgotten when two good signals were received and teams prepared to leave the start. Most teams chose to head north for the next transmission, following a bearing tracking along the Oxford canal.

Station 'A', G4KBB/P, operated by Graham Nicholls, was located 9km, SW of Banbury, near Hook Norton Village. The hidden station was situated in a mass of hawthorn bushes, within a sea of nettles and wild rhubarb, in places up to six feet in height. The aerial was threaded around the thicket, causing contestants much pain and operators much enjoyment. The wire then ran along the course of a stream into a wooded area where 700 feet of wire and several 'Tee' points caused contestants to lose valuable time searching for a transmitter which was still some way off. All teams found the station, but one nationally known competitor, intending a speedy exit from the hidden station departed in the wrong direction, became totally lost and bewildered. He eventually hitched a lift to his car, but still dazed and in his haste to find the 'B' station, he left without his navigator.

Station 'B', G4MDF/P, operated by Mick Mallinson, was located 11km, N of Banbury, on a disused railway embankment. Once again, hawthorn was used to great effort to conceal the station. Disaster nearly struck when the operators had difficulty finding their hide - but with just two minutes to spare the hide was found and the aerial connected. The Oxford Canal also bisected the bearing line at which point a long demolished bridge was 'dressed' with an inviting aerial. A bridle-way would have given teams a short walk in from the road but most teams took long and tricky routes along the canal tow paths. Some found themselves the wrong side of the water, and the presence of aerial wire both sides of the canal, and footbridges padlocked in an unusable position, caused a few heated comments from teams. One of these teams flagged down a passing barge and gained a lift to the transmitter site. Nearly 1000 feet of wire was used, drawing teams away from the transmitter and into some very marshy ground.

All went well during the event, the rain did not fall and 46 people sat down to a fine tea at Hardwick Community Centre. Alan Simmons was presented with champagne and the Banbury ARS Shield, whilst Peter Lisle explained how he almost came first. Lorraine Metcalfe received the ladies' prize. Trevor Gage then summed up the day's events and thanked the Banbury Club on behalf of the RSGB for running the event.

RESULTS

	Name	Club	Time at TX 'A'	Time at TX 'B'
1.	A Simmons	Mid Thames	15.44	14.52
2.	P Lisle	Mid Thames	15.50	14.53
3.	C Plummer	S Manchester	15.52	14.54
4.	B Bristow	Mid Thames	15.52.30	14.51
5.	G Foster	Mid Thames	15.54	14.53
6.	A Collett	Colchester	15.54.30	14.52
7.	T Judd	Mid Thames	15.55	14.55
8.	S Holly	Salisbury	15.56	14.51
9.	M Standen	Mid Thames	16.06	14.55
10.	B Gray	Mid Thames	15.07	16.06.30
11.	G Whenham	Coventry	15.13	16.07
12.	D Newman	Northampton	14.58	16.08
13.	T Gage	Mid Thames	15.06	16.16
14.	Mrs L Metcalfe	Mid Thames	15.13	16.16.30
15.	B Pechey	Mid Thames	16.17	15.13
16.	J Hall	Ripon	16.27	14.55
17.	C Merry	Dartford Heath	15.10	16.27.30
18.	A Mead	Colchester	15.24	-

G Foster and T Judd qualify for the National Final to be organised by the South Manchester Radio Club on 30 September.

RESULTS OF RIPON D/F QUALIFYING EVENT

For the first time ever, a D/F qualifying event came up to North Yorkshire. The weather at the start (Ripon Racecourse car park, NGR 332701) was overcast but the rain held off. Twelve teams took part and good signals from both transmitters were obtained.

Station 'A', G4MDF, was hidden in a small wood near the village of Helperby. Plenty of aerial wire was strung around an adjacent wood which kept some competitors busy.

Transmitter 'B', G3UHF, located some twelve miles north-west of the start and three miles north of Masham, was situated on the edge of Arklow Hill, up a tree near an old deserted farm house. Some 700 feet of wire close to the tree had the desired effect of misleading most searchers.

Tea was laid on at the Half Moon Inn, Sharrow, where the Ripon Cup and other prizes were presented. Much discussion followed with brief descriptions from the winner; second place, T Gage, B Bristow, and C Plummer in matters pertaining to D/F. Thanks go to Mike, G0MKK; Mike, G4IUF and Jerry and John for their help in manning and setting up both transmitters.

RESULTS

	Name	Club	Time at TX 'A'	Time at TX 'B'
1.	G Whenham	Coventry	14.05	14.48
2.	M Hawkins	Chelmsford	14.12	15.00
3.	D Holland	S Manchester	14.20	15.06
4.	D Newman	Northampton	15.31	14.27
5.	B Bristow	Mid Thames	15.34	14.27
6.	C Plummer	S Manchester	15.35	14.49
7.	C Wells	S Manchester	15.36	14.49
8.	B Gray	Mid Thames	14.30	15.42
9.	T Gage	Mid Thames	14.28	15.48
10.	G Nicholls	Banbury	14.11	16.17
=	G Foster	Mid Thames	15.35	16.17
12.	G Smith	Ripon	-	15.10

M Hawkins and D Holland qualify for the National Final to be organised by the South Manchester Radio Club on 30 September.

see page 65 for Contests Calendar

North Pole 90 Expedition

continued from page 12

with a 599 report over a distance of nearly 3100km. These distances are very large indeed and the results are being keenly investigated to see if another, maybe F-layer refraction/ reflection, process may have occurred. To give you an idea of the distances involved, if we had turned our beams east, the equivalent distances worked would be into Alaska. Geomagnetic, proton and flux data from the days when openings occurred are being studied. We still continue to look for some correlation and forecasting technique for this strange form of opening.

ICE STATIONS

During the expedition, some 3000 stations were contacted over the frequency range of 1.8 to 435MHz. Special callsigns were set up by Morag, with the co-operation of the DTI, RSGB and the Soviet authorities. For the first time ever, GB callsigns were allowed to be used from foreign soil, and GB4MSS and GB4ICE were obtained after much hard work. Both were prefixed with the Asiatic Arctic callsign UA0 (now 4K4 for Soviet Asiatic Arctic islands). GB4MSS denoted our fund-raising activities for the Multiple Sclerosis Society. HRH Prince Charles had chosen this worthwhile charity as the beneficiary for any money we could raise, and it is hoped to fund a research chair at a UK university to find a cure for this debilitating disease. Donation and sponsorship forms were given out by many organisations, including the RSGB, and special QSL cards have been printed giving additional information about this expedition. If you did make a contribution, thank you.

GB4ICE was to have been operated by Morag and her team from a forward ice camp at 86°N on the Arctic Ocean. However, Mother Nature, in her infinite wisdom, deemed that the sea ice would break up any runway constructed, therefore not allowing any aircraft to land with safety. This was unfortunate in many field, but primarily for forward field communications and also for research work she was to conduct on sea ice on behalf of the Scott Polar Research Institute. It was decided to run GB4ICE in parallel with GB4MSS on the HF bands, thus allowing even more contacts to be made. A second 15m CSA portable mast was erected, and another large vee and wideband dipole unit was plumbed in; these were tuned using a CapCo SP300 ATU. We used the FT747 on this link and had no problems working both stations on 14MHz with separations down to 50kHz. The main HF station consisted of our veteran transceiver: the FT757GX2, now on its third polar expedition. We fed this into a TOKYO 2K amplifier, severely throttled back, honest!

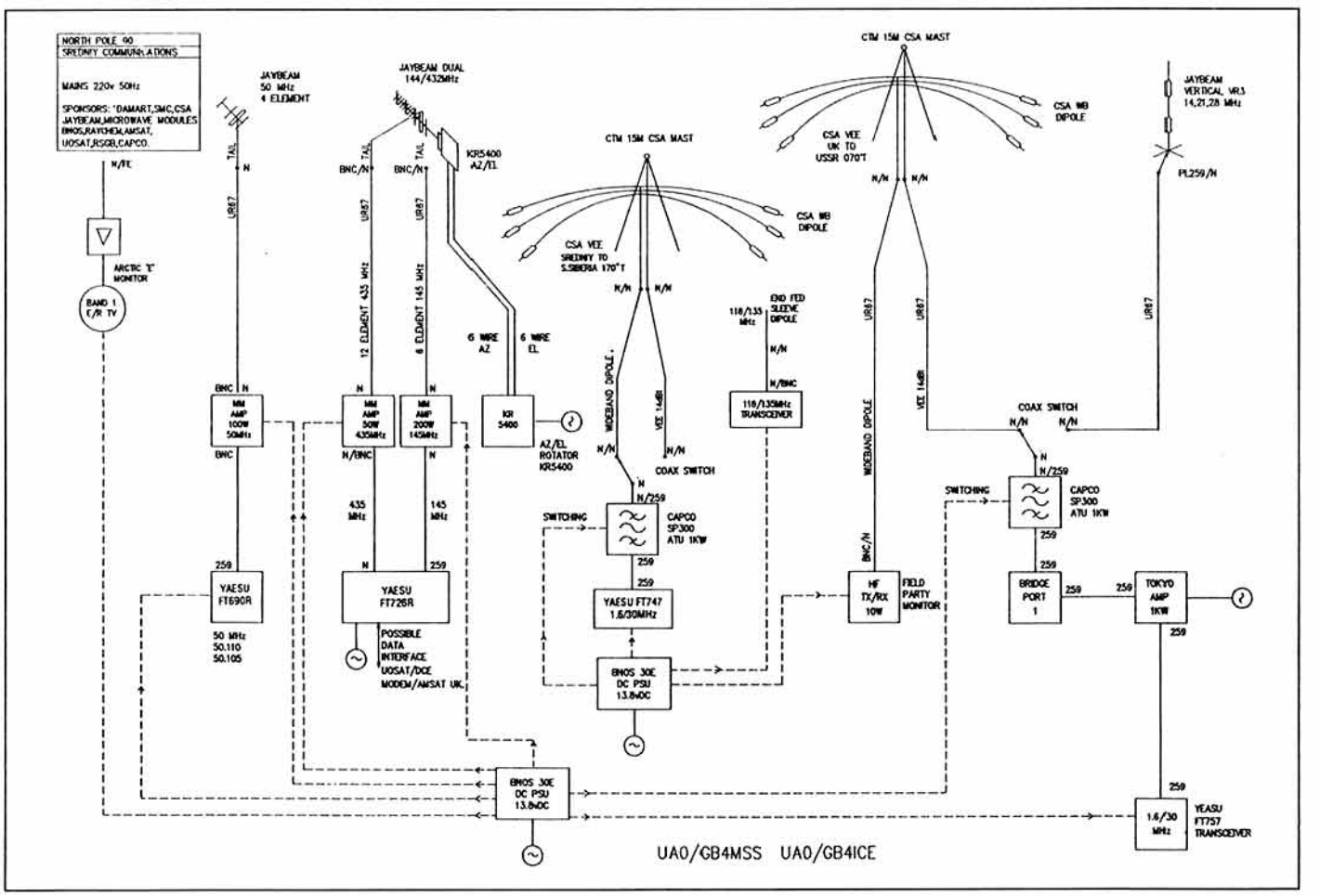
The antennas, as with previous expeditions, were very diverse. Verticals, deltas, vees, all provided something slightly different in radiation patterns when the ionosphere was playing games. The choice of which aerial to use and when is paramount in high Arctic communications. Flexibility and rapid switching are the order of the day. The choice of frequency for long-distance links (over 3000km) takes on a new meaning: a 100kHz in dial movement can make the difference from a strong, clear, commercial signal to one completely inaudible. Two or three complete HF blackouts on the frequency range 1-10MHz were common this year. So any small reduction in radio conditions during March and April this year at the UK temperate latitudes normally meant a lead shield of a D-layer over Sredniy.

There were days, however, when things did quieten down considerably and, if you like listening to Radio 1 and Radio Scotland on medium wave, you were given good strong signals. The Soviet guards' interest in music seemed to be an almost passionate interest in picking up Radio Luxembourg. We were told it reminded them of happier days spent some 3000km to the west, near Finland and Norway.

Pile-ups on 15 and 20m were common, with Morag, Nick (UA3DJG), Serge (UZ0AA), and myself indulging ourselves. Nick and Serge stuck mostly to the key and the rest of us to phone. Time for amateur radio was often all too short, with many hours per day of commercial traffic (especially to Moscow) and our aircraft operations.

BACK IN THE USSR

In the high Arctic, aircraft and helicopter communications take place around the 500kHz area, this frequency band chosen perhaps to keep away from the solar effects present in higher frequency ones. This does, however, prove problematic for



The station set-up at UA0/GB4MSS and UA0/GB4ICE.

helicopters where a large efficient aerial is necessary. It was like turning the clock back, with wire suspended on lead weights below the helicopter fuselage (Zepp?). The equipment inside the helicopter was of the HRO vintage, CW exclusively being employed by a dedicated telegraphy operator.

On our flight from a military airstrip north of Moscow to Sredniy in a Soviet Air Force armed Antonov freighter (tail-gunner and all!), we were allowed free access to the cockpit, the crew being extremely friendly. Morag sat in the navigator's seat and watched a memorable display of visual aurora as we slowly moved north-east. I was allowed access to the radio operator's position and did attempt to call Portishead radio, but there was a magnetic storm in progress, so no contact ensued. I wonder what the UK operator would have said if we had made contact from this Soviet aircraft from the middle of the USSR! The crew offered us fresh tea made with boiling water from a stove in the small passenger area. Lumps of fat were offered and gratefully accepted. Our Mars Bars became a well-known British delicacy, and were often sought after by the Soviets in return for their delicious handmade truffles.

Early one stormy morning, the local airport on Sredniy was put into a turmoil when a relatively modern aircraft asked permission to refuel and transit the local area. Unfortunately it was not equipped with 500kHz, only VHF AM and HF SSB. A phone call was put through to us at our radio station and we were asked whether we could provide a "little communication for a few hours". Flight following on 7MHz then commenced; the pilot didn't seem to worry that communications over the North Pole were being provided by our Soviet radio amateurs. The amateur radio perspective in the USSR is very different: the military controls the licensing, and the line between amateur and commercial operations is far less clear, especially in the high Soviet Arctic!

LAST WORDS

The expedition ended just short of its goal, Mike and Ran finally running out of food just 90 nautical miles short of the Pole, having walked 439 miles carrying all supplies. This established a new world record for an unsupported North Pole expedition. They sensibly called for a support helicopter to remove to a nearby floating ice base. We were all bitterly disappointed for them, having worked so hard and getting so close. However, we also felt very proud of them having achieved so much, and going on just to raise money for the charity, even with Ran nearly losing his sight permanently and each having lost a staggering 15kg in weight.

Other expeditions later claimed to have reached the North Pole unsupported, but severe doubts in some and proof of cheating in others means that the goal of a totally unsupported expedition with no outside contact still remains. We have no worldwide body or association to shout "foul" or "fair-play". This year, for the first time, outlandish claims and untruths abound. We in the base team left the USSR shattered both mentally and physically, wiser in the ways of the Russians and their system. We made many friends, Soviet friends, who we will be ever grateful to, but also aggression and deceit was experienced from other sources, who were determined at any cost to trick and lie about who reached the Pole first, by any method. This too will never be forgotten.

My impressions of Sredniy?...The vivid visual auroras at night were like nothing I had ever seen at more temperate latitudes, often being visible when still fairly light. I missed the beautiful views and wildlife of the Canadian Arctic and the quiet and cleanliness due to the lack of human habitation. Sredniy was certainly very different to the mountainous lands just over the Arctic Ocean. It just seemed to lack spirit and life. During some periods of the expedition,

I would have given anything to be back on Ward Hunt Island and to be in full control of some of the situations we had to deal with.

To those persons who supported us in any form, or those thousands who we contacted over the few months we stayed, including a good many SWLs, thank you. Special thanks must go to Serge, UZ0AA, and a number of unnameable military personnel on Sredniy, who were determined that truth prevailed, and kept us going. Also to Damart, our excellent main sponsors, and to our long-suffering communications sponsors who supplied our distinctive and sometimes difficult needs.

"What are you doing in Spring 1992?", they ask. Yes, it probably will be somewhere cold!

SWL

continued from page 24

been heard during June and early July.

There were: *28MHz* - F2JD/CE7 (Chiloe Is), FR5ZU/T, FT4WB, FT5XA, HC8GR, JY5EC, V51P, YI1BGD and ZP5CF.

21MHz - A43KM/0, BV2NB, BZ7AA, TA5C, T30BC, V73AT, UZ0ZWA/UA0X (Karagirsk Is), V31OA, 5H3OH/A, 7Q7JM and 9M8MG.

14MHz - BZ1AJ, FH4EH, KB51JT/HR1, OA4ED, SU1HN, V31JP, V63AY, ZY0TK (Tridade Is), AK2/UV2CC, 6V1A and 9J2NDA.

50MHz

This month, I have left the best till last. David Whitaker provided a fine list of DX heard on the band from mid-June to 1 July. 19 June gave him a fine Scandinavian opening, including OY9JD and OY7ML, OE8TPK and assorted GM's from the north of Scotland. 9H2BT was the last station heard at 2208. 26 June was another reasonable day with QZ's and DL's in northern Germany, plus I7IWN in JN90 for a new Italian square. 1 July was by far the best day of the summer with DX audible all day. Stations were heard from 9H, ZB, IT9, I, DL, ON, SM, OH and OZ.

Down in London, apart from these openings, I can mention 18 June when OE7S and DL's were heard, together with some Scandinavians after 1920. Pick of the bunch was DK5QI/SM7 from JO87. The 27th gave OE's and DL's from 1847 to 1934, when ZB2HN (G3ZYY) was heard at 1946. Unusually, the band opened very late on 30 June when SM's and OH's were audible from 2202 to 2324.

Finally, a brief mention of the opening on 1 July from here in London. The rig was turned on at 0810 and Italians were 5x9. Later in the day, SM3BTU (an exile from the height of my 3.5MHz days) was heard from JP73, followed by OH's in KP01, 11, 12, 20 and 30. LA6BQ (Karmoy Is - JO29) and OZ1CFT (Bornholm Is - JO75) were logged too. The final OH was heard at 2140.

FINALE

I hope for even more news from listeners next month. The deadline is Monday 10 September.

1990 HF TABLE

Station	DXCC	28	21	14	7	3.5	1.8	Total
BRS25429	259	176	191	228	172	110	51	928
BRS8841	253	181	193	204	134	101	49	862
BRS25209	-	73	98	113	123	83	43	533
BRS52543	165	66	68	79	120	96	34	463
BRS1066	129	67	68	86	84	43	36	384
G1VDW	125	38	79	79	38	20	1	255
BRS32525	113	56	34	64	33	23	-	210
BRS40292	-	29	17	31	33	24	8	142
BRS92755	73	-	-	73	-	-	-	73

It would be good if we could have a little more support for this table.

GB2RS . . . .
Your Amateur Radio News on
Your Amateur Radio Station

CONTESTS CALENDAR
RSGB HF CONTESTS

26 Aug	ROPOCO 2 (Jun 90)
1, 2 Sept	SSB Field Day (Jul 90)
9 Sept	Torbay DF
10 Sept	2nd 28MHz Cumulative (Sep 90)
18 Sept	2nd 28MHz Cumulative (Sep 90)
26 Sept	2nd 28MHz Cumulative (Sep 90)
30 Sept	DF National Final
4 Oct	2nd 28MHz Cumulative
12 Oct	2nd 28MHz Cumulative
14 Oct	21/28MHz Phone Contest (May 90)
21 Oct	21MHz CW Contest (May 90)
10 Nov	Club Calls Contest (Aug 90)
17 Nov	2nd 1.8MHz Contest (Sep 90)
1991	
23-24 Feb	7MHz CW Contest (Sep 90)

RSGB VHF CONTESTS

All Sep	1296MHz Activity (Jun 90)
1,2 Sep	144MHz Trophy/SWL (Jun 90)
5 Sept	144MHz CW Cumulative (Aug 90)
9 Sept	10GHz Cumulatives (Jul 90)
16 Sep	70MHz Trophy/SWL (Jun 90)
21 Sept	144MHz CW Cumulative (Aug 90)
30 Sep	50MHz CW (Jun 90)
5 Oct	144MHz CW Cumulative
6,7 Oct	432MHz - 24GHz SWL & IARU (Aug 90)
7 Oct	10GHz Cumulatives (Jul 90)
9 Oct	1·3 & 2·3GHz Cumulatives (Aug 90)
17 Oct	432MHz Cumulatives (Aug 90)
21 Oct	70MHz CW (Aug 90)
25 Oct	1·3 & 2·3GHz Cumulatives
26 Oct	144MHz CW Cumulative
2 Nov	432MHz Cumulatives
3,4 Nov	144MHz CW 8-hr Marconi/RSGB (Aug 90)
10 Nov	1·3 & 2·3GHz Cumulatives
11 Nov	144MHz CW Cumulative
2 Dec	144MHz AFS/Fixed/SWL (Aug 90)
4 Dec	432MHz Cumulatives

There will be an SWL section in every VHF contest even if not mentioned in rules

NORTH WALES RADIO RALLY

AND ELECTRONICS FAIR

Fourth two day event to be held in North Wales at the

ABERCONWAY CONFERENCE CENTRE, LLANDUDNO

on

Saturday/Sunday, 20th/21st October, 1990
11.00am-4.30pm

Bring and Buy at ground floor level in the new Arcadia Theatre, raffles, snack bars, etc.

146 stalls including RSGB Book Stall, many Club Stands, Computers, Components, Radio Electronics, 27/234MHz, Satellites, Data Transmission, TV and lots more.

Bring the family for the weekend. Ample accommodation at low winter rates. One hour from Manchester via new dual carriageways all the way to rally.

Ample Free Parking. Talk-in on S22 and SU8
Admission £1.00
(OAP 50p. Children under 14 free)

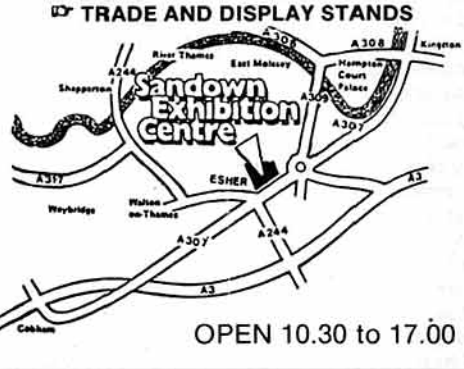
B.A.R.T.G. RALLY SANDOWN PARK

SUNDAY SEPTEMBER 16th 1990

AT

Sandown Exhibition Centre Esher, Surrey

- FLEA MARKET
- ON-SITE CATERING
- EASY ACCESS BY CAR
- TALK-IN S22 & SU22
- TRADE AND DISPLAY STANDS



OPEN 10.30 to 17.00

THE RALLY OF THE YEAR FOR DATA COMMUNICATIONS

Further details from: Peter Nicol G8VXY, 38 Mitten Avenue, Rubery, Rednal, Birmingham, B45 0JB. Telephone: 021-453 2676

NORTH WAKEFIELD RALLY

Sunday 30th September at 11am

OUTWOOD GRANGE SCHOOL, OUTWOOD, WAKEFIELD

Trade Stands, Repeater Groups
Licensed Bar and Refreshments, Bring and Buy
TALK-IN ON S22 & RB15

Details — evenings and weekends
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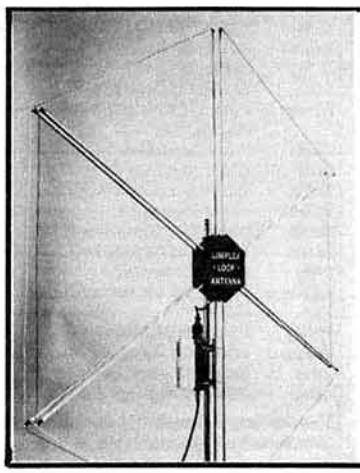

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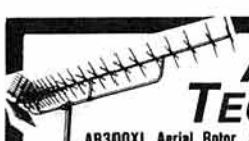

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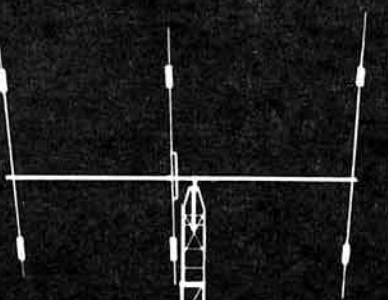

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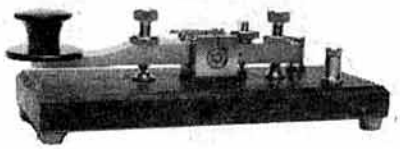

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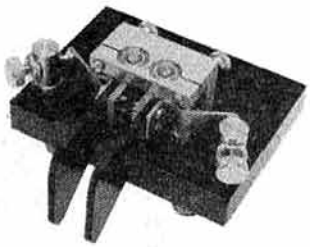

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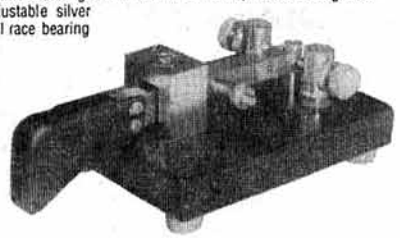

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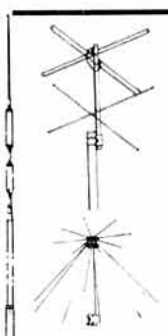

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● AMPEX prof tapes 1200ft 1/4in. 30 new, 60 used once scientific. G6CJ QTHR. 0747 85471.

● AMTOR-1 terminal unit, Eprom s/ware, leads for BBC-B computer unit recently serviced by ICS: £100ono. G4RLZ QTHR. (Coads Green) 0566 82420 eve.

● AR88: £60. Redifon R408 comm.rcvr. 13kHz-28MHz cont: £150. Trio 599TX: £60. All in good cond. All with manuals. (Cleethorpes) 0472 602335.

● AR88: £65. Hammerlund SP600: £80. Racal RA17P: £80. Trio 9R59: £35. HRO coils: £7.50ea. A.H.Baker, 34 Wenny Est, Chatteris, Cambs.

● AZDEN PCS6000. 2m mobile 5/25W tcvr. Plus RX aircraft band 118-136MHz. Also 136-174MHz. M/mount, insts, boxed, as new: £250. Trio TM201A 2m mobile 5/25W tcvr. M/mount, insts, boxed: £170. MH1B8 mic, new: £15. Delivery extra. G6XRL QTHR. (Macclesfield) 0625 876192.

● BARGAIN, complete HF station comprising Kenwood TS430S 100W tcvr, Kenwood FM430 FM unit, Kenwood AT250 auto ant tuner, Trio PS430 PSU, mic. All units mint cond and in orig.boxes. Also 2 Pye mobile spkrs, aviation type phones with mic attached, morse key, full insts and connections. Complete package incl sending insured Datapost: £1000. (Nottingham) 0602 204083 after 6pm.

● BBC Master 128 computer. Extra cartridges and tech manuals: £270ono. Acorn Telextext adaptor with latest V3.01 ATS ROM: £60ono. Both mint cond with orig s/ware, leads, manuals and packing. G4BLT QTHR. (Wakefield) 0924 255515 anytime.

● BBC-B computer, ATPL sideways RAM board, several ROMS, single drive (Viglen) 80/40, 50+ disks, 2 boxes, joysticks, BBC computer books, mags: £310. G4EYA. (Dereham, Norfolk) 0362 694537.

● BBC-B computer. DFS. 128KB sideways RAM. Series 7 board. Twin 40/80T disk drives. Colour VDU. Kaga-Taxan printer. Incredible quantity s/ware. WPs, databases, disk/file management, speech synth, packet, morse, RTTY, plus radio utility programs too numerous to mention. User manuals programming books. Prefer sell genuine amateur. Complete outfit VGC ready to go. Orig.cost over £1100. For sale: £550ono. G3AUV QTHR. (Shirrell Heath, Hants) 0329 833069.

● BC221 freq.meter c/w mains PSU and insts. All working and presentable. Buyer collects: £50ono. G3DSX. (Andover) 0264 52603.

● BRUEL & Kjaer audio freq analyser 2105. 48Hz-13kHz high selectivity, high sensitivity. 40x51x27cm: £50ono. Honeywell Brown mV meter for thermocouple signals. -2.000mV to +2.000mV. Resolution 1uV. 42x46x35cm: £40ono. Philips voltmeter GM6012 2Hz-1MHz. 1mV-300V. N-connector in and outputs. 36x25x21cm: £30ono. Assorted 8-bit punched papertape equip: £25. Jon G1RLZ. (Abingdon, Oxon) 0235 528349.

● BURNDEPT UHF 3ch tcvr yellow button: £25. Dot matrix printer Radio Shack DMP2100. Cond as new: £75. JVC nicad pack and chrgr NBP3U for camcorder: £15. Electronic DIT LCO federal mod DE1, new: £60. Atari comp tape deck, unused: £15. (Birmingham) 021-360 9307.

● BUTTERNUT HF5B. Compact beam ant covering 10/12/15/17/20m New in box, never assembled: £170. Also Butternut HF6V vert covering 10/15/20/30/40 and (part) 80m: £80. (N.Wales) 0244 541303 after 6pm.

● CAPCO AMA3 80-40-30. Good cond, reason for sale off HF bands: £290 with control box. FT209R h/h mint c/w s/mic PA3, Vox headset, chrgr, c/case, strap. Boxed with manual: £280. Brian. (Blackpool) 0253 45460 0253 62925 after 6pm.

● CED 4A CR tube tester/reactivator c/w i/face unit: £45. Liner 2 SSB 2m tcvr in GWO: £65. Philips B/W TV camera with sound and zoom lens in orig.packing. Incl PSU and modulator: £80. GW4TNF QTHR. (Wrexham) 0978 361830.

● CLARK type 73 mast system 30m high c/w all accs. Like new: £800 or swap HF equip WHY. G4HXU QTHR. (Thame) 084421 3381.

● COLLINS 51J2 rcvr VGC: £270. Marconi wide range RC oscillator TF1370A: £40. incl spare set Marconi valve voltmeter: £12. Numerous valve radios 1937-1960. GWO: £15-£40. (Manchester) 061-962 7577.

● COMMODORE 64/PK232 drver s/ware ROM cartridges by ICS. Supports all PL232 modes incl on-screen fax (zoom, scroll, save to disk). Incl Comfax, Pakratt cartridges. Motherboard, interface and insts. Cost new £115. Sell for: £55 incl p+p. George, GM4DYZ QTHR. (Luncarty by Perth) 0738 828991.

● COMPUTER sale. Tandy model 100 laptop computer: £200. Tandy model 100 portable disk drive: £100. Ramdisk 320k solid state disk drive for Apple: £200. G3PJT QTHR. (Cambridge) 0223 263137.

● CREED 444 teleprinter: £10. RAM GWO: £150. DX100 with sideband adaptor: £100. Eddystone 770R: £70. STC18 aircraft HF radio units. G3CWT. (Burton-on-Trent) 0283 44677.

● CUSHCRAFT A3 3ele tribander. VGC. Partially disassembled: £150. G4VHK. (Oxford) 0865 56856.

● CYLINDER fan 60mm 115V 230VAC 50Hz, as new: £9. Woden modulation transformer UM1: £8. Grampian mic DP4L: £5. Ammeter HF No1 ZA0204: £5. Valves Cossor 220SG: £5. Cossor 210HL: £4. Mullard S4VB: £5. Mullard SD4: £4. Masda ACSG: £5. G3OEG. (Staines) 0784 454757.

● DATONG FL3: £60. AEA MBA/TOR ROM cartridge for RTTY/CW/AMTOR. Matches CBM64: £25. ST5MC TU: £40. G3GZQ QTHR. (Buckfastleigh) 0364 43608.

● DELIGHTFUL 1965 detached bungalow, 2 large beds, garage, large brick shack, mast with permission. Very pleasant gdns, wonderfully centralised village. Due to ill health must move unfortunately nearer to family: £68,000. Barney G0EFY. (Eastoft, Humberside) 072475 465.

● DRAKE MN2000 ATU 2kW: £250. QTHR. (Cannock) 0543 278902.

● DRAKE T4XB, R4B, MS4, MN4, AC4 comple line. Exc. working station. Also spare AC4 PSU: Offers. G4PKB QTHR. (Norwich) 0603 501939.

● EARLY mags SWM and RadCom back to the 50s and a few 40s. Pract.Elect 1966 many in bound vols. For list SAE to G5UM QTHR. (Leicester) 0533 416473.

● ELECTRONIC organ, Maplin, 2 keyboards, pedals, rhythms, drawbar voicing, rotor sound, mint cabinet, bench, circuit data. Offers around: £150. G3XKA. (Woking) 773620.

● EMOTATOR 103LBX refurbished: £90. Yaesu FL2100Z: £450. Stalker 9 AM/SSB 28.400-28.700, mic, ant. G4HBI QTHR. (Manchester) 061-370 6836.

● FDK 750X 2m multimode with h/book. G4GKU minibeam still boxed: Offers. 20-15-10m. Will travel. G4WKT QTHR. (Durham) 091-527 2702.

● FERGUSON 3CO2 deluxe auto focus video camera (not camcorder), boxed. JVC CGP50 character gen. Ferguson PSU adaptor. JVC 10m extension lead. Superb for ATV work. Total cost £800. Sell for: £300. Pye 15W FM base on R5 (VT): £35. PRO2004 scanner: £240. Hitachi picture in picture VHS video, remote: £240ono. Buyer collect. Chris, G1EZJ QTHR. (Stoke-on-Trent) 0782 46570.

● FL3 by Datong. Superb SSB/CW/RTTY multimode audio filter. Perfect cond: £85. Ask for G4EZG. (Wirmbledon) 081-946 9553.

● FRG9600 Raycomm mods to Mark V, incl HF band. TV board fitted: £450ono. G3BDK QTHR. (Towcester, Northants) 0327 52309.

● FT101Z with fan and YM21 h/held noise cancelling mic: £320. IC260E 2m multimode with little used m/mount, ICHM10 search mic and MM100W linear: £300. Daiwa search 9 2m FM RX (VFO & xtal) with m/mount: £50. Cheap stereo system, SP25 turntable with Sinclair Stereo 60 amp and pair KN800 (3-way) spkrs: £50. Txmfrs; APT Ltd, type TX474 0-230V in, 7kV/3mA out; Parmeko Ltd, 0-200 to 240V in 450-0-450V 250mA out and many heater windings: £10ea. Offers are invited for the following. 123set with spare valves, 123V391 PSU and accs but no canvas, 128BR391 RX and 33CW276 TX with canvas and morse key, Telefunken RT77 TX/RX (GRC-9-GY) 2000-11700kcs with DY88 amotor PSU and GN58 pedal pwr gen. Graham G4MFX. (Gt.Yarmouth, Norfolk) 0493 730854 6-7pm only.

● FT101ZD Mk3, FC902 ATU, SPI phone patch ext spkr, all match, fan and FM/AM with 101ZD acc, mint: £600. Or exch 757GX or Icom 720A or similar mobile HF with FM and gen.cov rcvr. G0JAU QTHR. (Banbury) 0295 250169.

● FT101ZD Mk3, FM, fan, CW filter and xtals. Carefully looked after and maintained: £450. Buyer collects. G0MJX QTHR. (Kidderminster) 0562 743481.

● FT208R h/h NC8 PSU, chrgr, 5/8 whip and magmount, spkr, mic and rubber duck: £175. New AT300 ATU by ICS 30/300W cross-needle swr pwr. Boxed: £150. New AMT3 by ICS c/w s/ware for IBM and communicator for BBC, c/w leads BBC/440S: £150. Newstar masterkey CMOS: £50. STSMC and Creed 444 with perforator and reader: £50. SP3 Yaesu spkr: £5. Bremi 13.8V/3A PSU: £4. Nikkai 5in TV TLG 045: £30. All items can be del with carr at extra cost. Not QTHR. Mobile phone 0860 260917 day.

● FT225R c/w Mutek F/E, h/book: £400. FT780R c/w h/book: £300. Property of Yeovil ARC. Contact Chairman G4JBH. (Yeovil) 0935 28341.

● FT290R immac, 1 set nicad batts. Plus 2-100W 2-10W linears, 2x mics, one new. G.Comm Series 2 13.8V/12A PSU. Datong model D70 morse tutor. Mobile 5/8 ant. All mint cond: £450ono. Buyer collects. G0ITF QTHR. (Coventry) 0203 683669.

● FT720RV/RU tran/curs. Complete cables, switch, box, mic, ant diplexer in WO: £225ono. G6PEH. (Keelby) 0469 60606.

● FT726 HF unit: £185ono. (Ware) 0920 871639 anytime.

● FT780R 70cm multimode with Tono 45W linear: £330 the pair. Howes 2m/6m tvtr 10W input for 10W out: £100. G0DLR QTHR. (Meopham, Kent) 0732 823483.

● FTDX401. Lovely listener. OK on low pwr or to tvtr. A little erratic on full pwr. Compete set of spare valves and manual. Good value at: £50. G3UVS QTHR. (Plymouth) 0752 774405.

● FTV901R tvtr 2m/6m/70cm. 2m module fitted. Manual. As new in box: £150. G0DRG. (Southampton) 0703 666133.

● FULL size 20m 3ele mono yagi 7dB gain front to back ratio 25dB: £60. G3RRD QTHR. (Amberley, Glos) 0453 872365.

● G4OBK'S HF amp 2x3/500Z at 3.6kV. Separate heavy duty PSU, reliable contest winner: £450. Not QTHR. (Lancs) 0772 436086.

● GRAND shack clearance of equip and components. Buyers to collect. Phone or write for list. G3TGF QTHR. (E.Sussex) 0435 830484.

● H/HELD brand new standard C528 twin band 2m/70cm tcvr with 2 sets of nicad batts and chrgr: £340. Cost £410. Also latest Revco slimline dual-band 2m/70cm mobile ant with magnetic mount: £34. Cost £47. (nr.Chester) 0244 541303 after 6pm.

● HEATHERLITE Hunter linear amp. All HF bands. V.little used, only 3mths old: £795. (Nr.Stowmarket) 0728 76736.

● HEATHKIT free-standing 32ft tower with ladder, both galvanised plus AR40 rotator and all attachments: £175. QTHR. (S.Birmingham) 021-445 1405.

● HEATHKIT HMZ141 VSWR meters 50-175mcs: £45. AEG SWR50 twin meters: £25. KW Match ant swr meter: £25. G3OAZ QTHR. (Basingstoke) 0256 465126.

● HEATHKIT SB1000 linear. Unopened kit: £650 or will build: £725. M/M 432MHz tvtr MMT432/28S: £90. Datong PC1 gen.cov cvtr: £70. Int'l reply coupons, 50 for: £16. Chris Pedder, G3VBL QTHR. (Preston) 0772 612289.

● HEATHKIT SB303, SB401, spkr, mic, literature (complete HF station of the late G4CNC). All in working order. Nearest: £300 secures. (London) 081-882 5125.

● HF Kenwood TS820: £340. Kenwood ATU AT180: £90. VHF FM mobile: £80. Dymatic mic: £15. Heathkit swr bridge: £5. IC2E h/held: £160. All this equip is 1st class cond. FT707 FM fitted HF: £350. C.A.P.Fenton G0NAR, Oakwell, Newtons Hill, Hartfield, E.Sussex. 0435 22498 day 0892 770638 eve.

● HIGH pwr linear builders! PR QY4-400, bases, anode connectors, HTR transformer: £80. 80+80pF split stator, wide spaced (ex TU5B) for G3ISD 813 linear: £10. 6-pole HD ceramic switch (ex TU5B): £5. 2.5in Eddystone ribbed former 26T: £10. Mem keyer 8x50 characters sidetone pos/neg outputs, mains or batt: £65. 2300V/1A transformer (collect!): £20. All post extra. G3RB QTHR. (Whitley Bay) 091-253 0504.

● HY-GAIN 153BA 15m beam, perfect: £70. 2 new 752B: £70. 3 used 811A: £25. New tubes 6146B: £6. 5U4GB, 5R4GYB: £3. 150 various valves, some new, bargain: £30. Variac 0-270V, perfect: £40. Collins noise blanker ant: £5. Collins manuals 62S-1, 32S-3, SX101A: £5ea. BC221AJ modulated model PSU, charts, manual, spare valves. All post extra. 71, Lichfield Ave, Evesham.

● ICOM 290D 2m multimode 25W O/P, boxed, as new. Orig cost £450. Accept: £325. Also Alinco h/held DJ100E 2m; £120. (Orpington) 0689 76733.

● ICOM 735, under guarantee: £825. Yaesu FT707 tuner: £70. Butternut HF6V vert: £100. Eddystone 830 spare valves: £125. Phil G0JXR. (Hoddesdon) 0992 468522.

● ICOM 781 HF ultimate supreme tcvr, 1yr old: £3500ono. Romano Eisen. (Dublin City) 732380.

● ICOM IC-2set with extra batt case, tone squelch unit, telescopic ant and spkr mic: £250. GM7FJS. (Edinburgh) 031-334 3127 after 6pm.

● ICOM IC-R7000 scanning rcvr 26-2000MHz WBFM/NBFM/AM/USB/LSB/CW, 10/6/4/2m 70/23cm. VGC: £675. Trio R1000 HF gen.cov rcvr 100kHz-30MHz AM/USB/LSB/CW: £190. Marconi TF995/A AM/FM sig.gen 1.5-225MHz compact design, stable can be used up to GHz region with harmonics: £70. Telequipment D53A dual-beam 10MHz scope. Clean cond: £60. Pye SG3V portable solid state sig.gen 70-170MHz AM/FM, clean: £40. Pye SG5V portable solid state sig.gen 400-480MHz FM, clean: £30. Martin. (Southampton) 0703 262246 6-10pm.

● ICOM IC04E, in orig.packaging, c/w chrgr, ext DC cable and spare batt pack: £190. Tony GM4ZMU. (London) 071-387 7050 x3192 11am-4pm.

● ICOM IC735 HF tcvr. Mint cond. BNOS PSU, type 12/20E. Both used for RX only: £850ono. Also H/B high pwr ATU: £100ono. GW3YKZ QTHR. (Newport, Gwent) 0633 858314.

● ICOM IC740, mint cond, fitted with FM, FL44A & marker, with desk and hand mics, w/s manual and PSU: £690. MMT144/28: £65. G3TSO tcvr needs finishing off, works OK: £190. Telequipment DS3A DB scope: £60. For spare PRO2008: £20. W/S manuals, SX200(N), FTC1610, FTC4610, FT208R, FTC725A, FRG9600, FRG8800, FT757GX, FT708R. Inst manuals IC3200, IC490, ICR71, IC271, FT708R, FRG9600, FC700, FT707, FTV901R, FTV707, R600, FRG7000. Most as new: £6ea + p+p. MFA Sport 500 model helicopter, ready to fly: £180. Trainer: £65. Both new engines and incl R/C only one TX. Phil. (Sandbach) 0270 761978 after 6.30pm.

● ICOM ICO2E 2m h/held in LC11 case with BP3, chrgr and h/held mic. As new and boxed: £175. HS10/105A headset + Vox, never used: £20. FT290 with case, nicads and chrgr. Unmodified and in orig.box: £240. MML144/30LS, 2 at: £50ea. GW6NSK QTHR. (Brecon, Powys) 0874 5288 after 6pm.

● ICOM R70 gen.cov RX, c/w active ant. Mint: £450. G3PTN QTHR. (Leeds) 0532 654644.

● IDEAL QTH for discerning ham worldwide contacts. EX/YL dream luxury bungalow, south facing slope to beach 200yds. Beautiful gdns, outstanding uninterrupted views across countryside Lyme Bay, Golden Cap, Lyme Regis, Dartmoor, Exmouth.

Walking, swimming, fishing, golf: £165,000. G2FMW. (W.Dorset) 0308 897798.

● JAYBEAM TB3 Mk3, unused, as new, manual, boxed: £195. Altron AQ620/E HF minibeam 10-15-20, spare spokes. VGC: £95. G0FRM. (Welwyn Gdn City, Herts) 0707 322862.

● JP Electronics RTTY program by G4OIL 48k Spectrum. Also terminal unit, never been used, with insts: £20. ZX Spectrum +2 128/48k computer. Also programs for morse tutor, logbook, black tapes, joystick, c/w green screen monitor and manuals: £180. Sony ICF2001D synth rcvr AM FM/Air. 150kHz-30MHz, 116-136MHz, 76-108MHz. 32 program mem, batt/mains: £250. Selina 215 8-band Russian rcvr, batt/mains. As new: £25. LR2 vert aerial by Jaybeam, never been used: £40. Collect only. G7GGC. (Calne) 0249 816334.

● JRC NRD525 used only few times. Boxed, genuine reason for sale: £750. G3IRQ QTHR. (Colchester) 0206 392957.

● JST135 tcvr + BWC board WBD520 HD PSU, spkr, mic, manuals, boxes, new 12.1.90. Lowe warranty, mint cond. Minimal QRP use: £1255. Save £550 on new Yaesu FT980 tcvr, mint cond, mic, manuals, boxes: £1050. Both incl Interlink insured delivery. GW4RLP QTHR. (Caernarfon) 0286 5264.

● JST135 tcvr BWC option, WBD520G PSU/spkr, mic, manuals, mint, warranty. New 12.1.90. Lowes minimal QRP use, boxes: £1350. Save £450 on new Yaesu FT980 tcvr. Mint cond, mic, manual, boxes: £1150. GW4RLP QTHR. (Caernarfon) 0286 5264 eve.

● KENWOOD SW200A swr/pwr: £50. Welz SP15 swr/pwr: £20. Both mint and boxed. Capco ATU SPC 300: £120. Mint. QTHR. (Cheshunt) 0992 32434.

● KENWOOD TS520SE 6-band xcvr c/w MC50 table mic, fitted 250Hz filter: £400. Buyer collects. (Peterborough) 0733 73374 after 6pm.

● KENWOOD TS530SP HF tcvr 160-10m, WARC bands with matching AT230 ant tuner. In orig boxes, mic, immac cond. Spare PA valves: £650. Advanced electronic Morsematic model MM1 keyer: £100. Reason for sale, going QRP. G3DOT QTHR. (Grimsby) 0472 825899.

● KW2000A. Recent full service by KW. Mint cond c/w PSU and h/book etc: £155. FT23R h/held, 2m tcvr. 2x nicads, mains chrgr. Car batt chrgr, leather case: £225. (Sheffield) 0742 553103 eve.

● KW2000E with PSU. GWO: £190 plus carr. Some spare valves. G3TDW QTHR. (Exeter) 0392 70936.

● KW500 linear amp less cabinet: £160ono. Nevada TM1000 ATU: £100ono. Nevada TC3529 MHz FM amp 25W: £25ono. G4GCJ QTHR. (Milton Keynes) 0908 644253.

● MARCONI S640 RX plus orig. manual, perfect: £70. (Maidstone) 0860 243329 day 0622 756331 eve.

● MARCONI sig.gens TF801B 10-500MHz: £40. TF995A5 1.5-200MHz: £90. Marconi xtal filters 100kHz USB/LSB: £12ea. Collins X250KF440 filter: £10. OKI83A printer: £100. CBM64/128 Basic and Pascal compilers: £30ea. Xtals, music equip, lots of components. SAE for list. Will consider exch for Heathkit equip, 9MHz xtal filters etc. G3OOU QTHR. (Coulsdon) 0737 552170 eve-w/e.

● MICROWAVE relays, DC-18GHz, new mini coax c/o, VSWR 1.5:1max, SMA female, 28V coil. Circuit for simple DC cvtr to allow 12V operation incl: £35ea. No offers. No traders. G6CMS QTHR. (Chelmsford) 0245 76801 after 6pm.

● MOBILE MT31 telescopic mini tower mounted on light duty trailer, all by Altron. Winch operated telescopic tiltover facility. Hardly used. Head unit incl guying points and mount for rotator: £375ono. G4JZH QTHR. (Burgess Hill) 0444 242965.

● MOBILE rig TR2200GX, property silent key G3LJN: £95. Collect or carr.extra. Herbert, 63 Waterside Gdns, Hopwood Alvechurch. 021-445 4258.

● MOBIRA 2m FM radio full cov: £60. Pye Motaphone 70.260AM: £15. HB9CV 6m: £8. VGA monitor PC2000 series: £75. Peter G7AGM. (Exeter) 432675.

● MOTOR generators both 240V 50Hz. Honda 1kVA petrol, little used: £200. Pettermarkon 2kVA diesel, reliable, heavy: £300. Both ono. G3TCL. (Loughton, Essex) 081-508 1958.

● MUTEK TVVF144A 2m tvtr: £230. Yaesu FT780R 10W 70cm multimode MWM MML432/50 70cm 50W amp: £80. Tonna 19ele 70cm : £20. Tonna 9ele 2m: £10. Tonna 9ele X/Y: £10. All ono. (Nailsworth, Glos) 0453 833411.

● NAVICO AMR1000S exc.cond: £220ono. Ten-Tec Century 22 QRP rig, exc.cond: £250. Genuine reason for sale. Can deliver. Mike, G0JXX QTHR. (Southampton) 0703 443781.

● NETWORK analyser 0-300MHz, full Smith chart display, dig readout of freq and also complete kit of lines and connectors. Orig. price over £4000. Any sensible offer considered. Also 60ft 3-section tower, with ground post, head unit and winches. Already dismantled, ready to be collected. IBM portable laptop computer, case, colour adaptor, IBMDOS3.3: Offers around £500. Tektronix 475 150MHz dual trace scope, fault on vert trace: Offers. G1ZAA or G8OAV. Fax 0948 6162 or phone QTHR. (Whitchurch, Salop) 0948 4671.

● NEW boxed, unopened, indicator type 62A: Offers. Consider swap. G3VPT QTHR. (Norwich) 0603 898715.

● OMNI Ten-Tec complete station with PSU, ATU and mic. Also TR44 rotator with control unit: Offers. G4PKB QTHR. (Norwich) 0603 501939.

● ONE Philips D2935 dig rcvr: £119. (Birnie) Longmorn 391.

● PHILIPS VC60/120 tapes suitable N1500, N1700. Approx 100: Offers. G4JDH QTHR. (Maldon area) 0621 779498.

● PORTABLE sectional alum masts. 42ftx2in c/w guys, stakes, top/bottom fixings. All in canvas bag: £135ea. Unused 50m reel 3x6mm mains cable, ideal for fieldday: £25. Marine VHF RS7000 12V/25W, complete but needs attn: £85. 10kV 1600/500pF ceramic caps: £5ea. Roller Coaster precision made: £35. 50Hz hourmeter: £6. Would exch with 2m mobile rig. G3SWC. (Horsham) 040373 2444 eve.

● PYE W15AM freq 172.8MHz PSU type A/704404/1, 2 pocket phones PF2AM with 3 batts and chrgr type BC11A. Prefer sell complete: £75ono. Stereo cassette mechanism: £6. 3BPI CRT: £4 etc. John, GW7DWR QTHR. (Barry, S.Wales) 0446 792091 after 7pm.

● PYE Westminster, portable, incl carrying case, nicads, ant, mains chrgr, on 86MHz: Offers. Xerox computer keyboard and VDU, silent fault. G1RLA. (Oxon) 0608 643558.

● QTH 3 bed semi, Melksham, Wilts. Garage, corner plot. Playfield rear. G5RV masts. M4 15 miles. UPVC windows: £57,000/ G0LJS. (Melksham) 0225 706795.

● QTH sale. Bungalow 1/3 acre, quiet cul-de-sac, near bus stop. Modern kitchen, bathroom, 2 WCs, lounge, 3 beds, exc.cond. Built 1960. Dble glzd. Secluded gdn, cedar chalet. Greenhouse, forest gate. Garage 24x12ft, inspection pit. Parking 4 cars: £130,000. G3FK QTHR. (West Moors)) 0202 873175.

● R2000 by Trio: £325. CWR 600 decoder: £100. Spectrum + outfit, comprehensive: £100. Marconi TF2012 sig.gen: Offers. GWOAQR QTHR. (Caernarfon) 0286 3576.

● RA17 comm. RX 500kHz-30MHz in VGC: £120ono. G3NIR not QTHR. (Gravesend) 0474 320118.

● RA17 Racal serviced for GCHQ then little used. VGC, h/book: £175. Revox A77 2-track, user + tech h/books, VGC: £250, incl lots NAB spools. Teac AN180 Dolby syst: £30. Marconi TF144H 20kHz 72MHz gen. VGC, h/book: £40. TF801A 10-300MHz, old: £20. Scope tubes VCR97, 5ABPI, 4EPI, VCR517A: £5. Airmec 702 10mV, 10VAC VVM: £10. Sparta Studio turntables, fast start, old: £15. Xformers LT HT. Ring details: £2-£5. Piezo tweeters 3in dia: £1. Phil Moss. (Surbiton, Surrey) 081-337 7309.

● RACAL RA17. No case. H/book: £100. Tranny 1850-0-1850 1.6kVA heavy! Buyers collect or meet. G3NOH QTHR. 081-997 4756.

● RACAL system comprising RA1771 synth HF comm.rcvr, MA1720 synth HF drive unit, MA1040A drive unit remote controller. MA1724 10ch HF drive unit (fallback). MA1105 panoramic bargraph display unit. MA1002 operators control unit. All housed in 2 19in racks with various other Racal bits. All units as new, in perfect WO with h/books for TX/RX. Prefer to sell as one lot: £1200ono. G8CAN. (Reading) 0734 783827 or 0734 781782.

● RACAL VLF cvtr for RA17 10kHz-1MHz: £60. TEK 454 150MHz 2ch scope, manual: £190ono. G8YMR QTHR. (Tewkesbury) 0684 295189.

● RADIO shack with house attached. Purpose-built sound-proofed shack in loft of semi-detached house in secluded position. 3 beds with fitted wardrobes, bathroom with shower. Kitchen plumbed for washing machine and dishwasher. Downstairs cloakroom, hall with phone point (2 other phone points in bedroom and shack). Living/dining room approx 18ft sq, warm air heating and dble glazing throughout. Landscaped walled gdns with telescopic mast 66ft from shack. Separate garage. George G0ICR. (Worcester) 0905 25131.

● RE-ADVERTISED due to time-wasters. Going QRT. Icom 720A all-mode HF tcvr 0-30MHz gen.cov, solid state PA: £550. G4RNI. (Gateshead) 091-469 0724.

● ROTATOR, heavy duty by CDE on base mount with winch. Can support and turn complete mast and beam. Buyer collects. G3BDH QTHR. (Ilford) 081-554 8012.

● RSGB Bull/RadCom, bound vols complete yrs 1953-1983: £150. Short Wave Mag Do 1955-1970: £75. Heathkit 10-102 scope with manual: £40. Ericsson H1Z phones, BBC stamped, orig.lead/plug: £15. All carr.paid. VGCono. Ian, GM3LGU QTHR. (Dunoon) 0369 87341.

● RTTY system comprising TI99/4A computer with Hamsoft i/face, Eprom s/ware giving RTTY/ASCII/CW TX/RX, Type Ahead, Message Stores etc. Also printer port, joysticks and numerous Basic programs: £75ono. Force CPU1C VME CPU card, 10MHz 68000 processor, Basic, Forth, Assembler languages on board, 128k RAM, 3 RS232 ports, PIO, RTC, 160x220 Eurocard. Can be used stand alone or as VME controller, c/w full documentation, PSU and smart green screen terminal: £100ono. (List price of CPU board £800). (Oxford) 0865 890066.

● SAVE 30% off list prices. Silent key sale. Brand new equip. IC2KL/PSU TS940S, ICPS250, IC251, FT211 ICHM11. SAE list other goods. Some new, orig.packing. DM501 mic ICHU9 spkr/mic, SP50 spkr, ICCF1 fan, KTBP Kenpro + nicads, 30A/13.8V PSU. 3 working Telequipment scopes. D82D43 D43S. (Milton Keynes) 0908 313379.

● SB101 10-80m SSB/CW 90W CW filter. One owner. £110. RSGB 1970 h/book: £3. 807s: £2ea. G3KTH QTHR. (Droitwich) 774624.

● SCOPE Hameg HM203 20MHz dual-beam. VGC: £180. G3ZYL. (Hertford) 0992 582307.

● SEM QRM eliminator: £48. KW1000 linear amp: £320. AR88D rcvr: £48. Creed 444 teleprinter: £5. Eimac 4CX250B tube, unused: £18. AKD 2m preamp: £12. Channel Master ant rotator model 9500 offset type, made USA, unused: £35. Homebrew audio filter: £7. Hygain TH3JR triband beam: £90. Jaybeam Q6/2m 6ele quad: £15. (Norfolk) 036288 506.

● SHACK clearance! All must go. Prof S100 Z80 development system, c/w all s/ware: Offers. WHY? Brand new 8in disk drives: £35ea. Apple IIE Vista drive, c/w all data and disks -6MB storage for: £60. Various S100 boards, please call. Data Products Paper Tiger printer 136col, 24pin, 400cps, 100cps NLQ, friction or tractor feed: £300. Lots more bits incl Ham, SAE for list. Futaba/Super Tiger radio controlled trainer plane, cost £400, never crashed, will accept: £280. Simon, G8POO QTHR. (Stocksfield) 0661 842389.

● SHACK clearance. Tokyo HT106 6m tcvr, 3mths old: £250. FDK 750X 2m tcvr, VGC: £225. Hallicrafters HT37 SW TX: £100. Kenwood PSU with mem backup: £35. Cirkit 50MHz tvtr kit with RF amp kit 28MHz IF, boxed: £45. Maplin dip meter: £35. Monacor DMT870 dig multimeter: £27. Advac DBM and RMS meter: £35. Maplin universal counter timer 1GHz, 6mths old: £145. Hartley type 13A scope, needs attn: Offers. Capacitance meter: £25. Many other items. G1VKC QTHR. (Ripon, N.Yorks) 0765 701268 after 6pm.

● SHIMUZU SS105S HF tcvr, 80-10m, CW filter, N/B, FM, boxed: £245ono. Icom IC260E multimode tcvr: £210ono. GI4SJQ QTHR. (Portadown) 0762 334648.

● SIG.GEN Marconi TF2015 10-510MHz AM/FM/CW. Compact, lightweight. GWO, transistorised, manual available: £230ono. Carr.extra. G0CMF. (Padstow) 0841 532620.

● SINCLAIR PC200 computer CGA monitor 512k. Some s/ware, going hard disk!: £375. Nevada ATU 2kW balun, surplus: £95. Yaesu YS60 pwr meter, 2kW: £50. Icom ICSM5: £20. G3LIV RTTY interface: Offers (reasonable). Gone packet. Spare RTTY unit: £25. Works. Norman G4SFO QTHR. (Rugby) 0788 810344.

● SIRIUS PC with quality Qume 55 daisywheel printer. Both in exc.cond. 10MB disk, 384k RAM, MSDOS. S/ware galore (Zortech C, Wordstar, Communications, ProPascal, Z80 and 6502 cross assemblers, programmers and graphics toolkits, utilities). Tech ref manual. Full schematics. Spare daisywheels and ribbons. Built-in HDLC controller chip. Ideal for packet radio. Any demonstration: £330 the lot. Free delivery 50 miles Bedford. G3NRW QTHR. 0345 333111 (pager 0228034) anytime.

● SONY HVC4000P camera, SLF1UB portable video recorder, ACF1UB PSU/chrgr, remote controller, 3x nicads. Exc.cond: £350ono. (Enfield) 081-805 8868 eve.

● SONY ICF2001D RX gen.cov SSB/AM/FM/air band. As new: £200. Datong auto speech processor, v.little used, as new: £40. G3UFO QTHR. (Solihull) 0564 777802.

● SONY ICF7600DS rcvr FM/LW/SSB/AM PLL synt 76-108MHz 153-300kHz, clock, keypad and scan tuning. Perfect cond, boxed c/w PSU, Sony compact ant, soft cloth holder: £95. Also Smith Corona SL500 electronic typewriter as new, boxed, spare daisywheel, different font, spare ribbon incl word and letter correction facility. Will pt/exch for portable thumper. 1/2 price: £75. John. (S.London) 081-857 8096.

● ST5M6 RTTY terminal, cased: £45. TRS80 plus Radsoft RTTY s/ware, RTTY interface board, games, s/ware: £35. G3ROG QTHR. (Winchester) 53450.

● STANDARD 8900C 144MHz mobile rig 10W c/w mounting brkt and mic: £150. G3SAH QTHR. (Redditch) 0527 541593.

● STANDARD C500E 2/70 handie, nicads, case etc: £230. Selection 2m and 70cm mobile ants: £10ea. Kawai organ: £1000ono. G3XLL not QTHR. (Diss) 0379 652043.

● TANDY 102 laptop computer. Exc.cond. Orig. packing. Built-in BASIC, WP, address book, appointments scheduler. Int modem with cable. RS232 interface. Mains pwr unit. Tech ref manual. Ideal for travelling businessman or as packet terminal. Free delivery 50 miles Bedford: £110. G3NRW QTHR. 0345 333111 (pager 0228034) anytime.

● TANDY TRS80 Mod III, twin disks, RS232, s/ware: £150ono. Z80 assembler: £25. Seikosha disk drive SD321 5.25in 320k: £15. QTHR. (Bolton) 0204 43999.

● TEKTRONIX type 547 dual-trace scope, with type 1A6 differential amp plug-in unit. WO with manuals. No reasonable offer refused. Genuine reason for sale. (Langport) 0458 250217 after 6pm.

● TEN-TEC Argosy 2, matching PSU, CW filter fitted and mic. VGC. Genuine reason for sale. GM4OSS QTHR. (Stwearton) 0560 83800.

● TEN-TEC Century 21 (45W CW) with 240V transformer: £90. Also Yaesu FRG7700 rcvr with ATU and VHF cvtr: £275. All VGC. Buyer test and collect at Humphries, 3 Abingdon Drive, Caversham Park, Reading, RG4 0RU.

● TEN-TEC Corsair 2, 1.8MHz, 500Hz, 250Hz filters, ext VFO, matching PSU/spkr. All little used and in mint cond: £1200. Prefer buyer collects. (Edinburgh) 031-665 7287.

● TET Japan HB33DX 3-band 3ele broad banded. Has 2 active eles, new: £175. GM7FTK QTHR. (Dunfermline, Fife) 0383 725905.

● TH41E 70cm mini h/h. Exc.cond. 2 std plus hvy duty nicads, pair soft cases, BC6 desk quick chrgr/PSU, ext ant adaptor, 2 whip ants, mini helical, box, manual. Bargain: £195ono complete. G0HXD QTHR. (Cheshire) 0606 77426 eve-w/e.

● THE ultimate black box? DST100 reception set. 50kcs-30MHz cont, c/w HB PSU and spkr. Also Tiger G8VB TR60B CW/AM transmitter built to v.high spec: £45ea. (May haggle). Both items v.heavy. Larry, G0HTR QTHR. (Tamworth) 0827 898024.

● TR9000 2m multimode c/w mic, m/mount, h/book, boxed. Recent Lowe spec check 100%. Exc.cond: £275. G3GEJ QTHR. (Bedale, N.Yorks) 0677 22316.

● TRIO 221ES 2m FM mobile 45W, mint cond. Complete, all accs etc: £210. Paul, G4XHF QTHR. (Crawley) 0293 515201.

● TRIO 520S, mic MC35S, CW filter, manual, orig.box. GWO no ext PSU reqd. Ideal beginners rig: £325. Not QTHR. (Banwell) 0934 820828.

● TRIO 9000 all-mode 2m tcvr plus Lunar linear, 10 in 80 out: £250. Belcom LS20XE 2m handie plus Daiwa LA2035R linear and 7/8 gutter mount: £125. £350 the lot. ZX81 16k RAM, Crofton keyboard (require interconnection), plus Alphacom 32 printer, spare paper: £125. ZX81 32k RAM, Maplin keyboard, (require interconnection), ZX printer: £75. £265 the lot. Akai 7in reel-to-reel tape recorder (pots noisy): £25. Zorki 6 35mm camera plus Hanimex flash and 135mm lens: £40. Halina Super mini flash 127 camera: £7.50. G0FVE QTHR. (Dereham, Norfolk) 0362 696993.

● TRIO LF30A LP filter: £15. AC adaptor 6V/200mA: £1.50. Videoguard: £5 brand new. Nicad batts AA size, 3 for: £1. 4Ah size: £75p each. Phones. S.G.Brown type-F: £3. DLR type, mint: £2. Ex WD mic type-3: £1. Various transformers, Weir PSU + 12V-12V, 5V, Kingshill U505 industrial PSU, other PSUs. 7ele parabeam band II brand new, brass sheet approx 50mm wide. Computer caps 10000uF 40V: 50p. Small motors, reversible, exc.quality. Some with gears. Green monitor, keyboards, mem, connector, IF boards for Puma. All open to offers if no price given. Don G4KXW. (Dronfield) 0246 416988 after 3pm.

● TRIO TR7930 144MHz FM tcvr 10W with mic and manual: £120. M/M 144MHz RX cvtr 28MHz IF. Denis Jones. (Wirral, Merseyside) 051-652 7454 day 051-342 7880 eve.

● TRIO TS430S HF tcvr. Exc.cond. Fully meets orig.spec. Fitted NSB AM filters and FM. Receives 0.2/30MHz: £595. G3XJN. (Chichester) 0243 672814.

● TRIO TS530S, CW filter fitted, VFO120, MC50 desk mic. All boxed in VGC: £550. Yaesu FRG7700 comm.rcvr plus Yaesu FRT7700 ant tuner: £235. G4PBN. (Taunton) 0823 259573.

● TRIO TS780 V-UHF all-mode dual-band mains DC pwrd tcvr, CW mic, boxed, manual: £695ono. MC60 desk mic, boxed as new: £65. G0HXD QTHR. (Northwich, Cheshire) 0606 77426.

● TRIO TS780 VHF/UHF rig, boxed: £600. 2off 20ele yagis for 70cm: £10ea. 5ele tonna for 2m: £5. SX200N scanner: £90. Tonna 4-way 70cm pwr splitter: £18. 100ft Andrews FSJ250B +2 N-type sockets: £60. MET 17ele 70cm yagi and 50ft H100: £25. Noise bridge: £10. 1:1 balun new, unused: £10. 4:1 balun new, unused: £10. 2-way aerial switch: £10. 2m phase harness for 2 aerials by Jaybeam: £5. Transformer 0-1250 @ 1A, 6.5V @ 2.5A, 125V @ 100mA: £15. Martin G1GYC. (Stockport) 061-483 2330.

● TRIO TS940S HF tcvr with v/syn, few minutes use only, mic, boxed, as new: £1325. Matching SP940 spkr available. (Dunstable) 0525 222163.

● TS430: £585. ALR206E 2m FM HI/LP mic control, all functions: £100. Datong FL3: £70. All manuals. G3BVW QTHR. 0647 40223.

● TS430S AM/CW filters, DC lead. VGC: £550ono. Datong FL2, VGC: £55. Pair Philips 6146B: £15. 3 more various mics: £5ea. G0EGR QTHR. (Bournemouth) 0202 302698.

● TS430S HF tcvr 160-10MHz incl WARC bands, gen.cov, CW/AM filters, box, manual, PS430 PSU. Exc.cond: £750. G4MWP QTHR. (Coventry) 0203 462035.

● TS440S: £800. PS50: £125. AT230: £125. IC3210E dual-band: £330. PK232: £100. CP1 TU: £45. Hanson P/P pwr/swr meter: £45. Star Masterkey: £40. Bencher key: £35. Toni-Tuner: £40. Bartg R5 filter: £45. All mint cond. G3KNJ. (Watford) 0923 244069.

● TWO CD4511 rotators at: £90ea. Also 30yds 8-core cable for them. Buyer collects as carr. expensive. A meal will be provided for long distance buyers. Swim in sea at Weymouth afterwards. Blue flag beach. G2FNK QTHR. (Dorchester) 0305 889608.

● UNIDEN CR2021. HF RX. AM 150-2999kHz. SSB FM 76-108: £90. AOR scanning RX. 25-500MHz with magmount: £195ono. FB cond. G2DRT. 0494 813831.

● VERSATOWER 3-sect 30ft base mounted lattice tower with brand new Kenpro RC400 rotator and 10XY beam ant also unused: £350 the lot. Will not split. G6RLH QTHR. (Barnehurst) 0322 523668.

● VERSATOWER 40ft complete unit. Jaybeam tribander TB2: Offers over £200. Buyer dismantles. Also 200ft 1in diam coax. Location NW London. Have moved onto onion patch so no room for the above. Onion sets may be taken in lieu! G4AKT. 081-907 6913 or 0227 794148.

● VIDEO equip. Sony DXC1800P ind. camera: £500. Hitachi SV340 U-matic portable: £250. JVC CR4400E U-matic portable: £300. Exc. Nigel G6CWV. (Ipswich) 0473 311259.

● WS No.19 MkIII complete station. TCS12 TX/RX and PSU. WS No.52 RX. Eddystone EB35 comms.RX. Pye h/held TX/RX 160MHz. PFI TX/RX and nightcall. Racal TX/RX 1338. (New Malden) 081-949 2317.

● YAESU 2100Z (FL2277Z), mint, little used: £490ono. 10m multimode, exc: £135. 6m txr with ant: £55. G4VIO QTHR. (BP Auckland) 0388 763501.

● YAESU 2m tvtr FTV700 new 2m module fitted: £100. MMT144/28R 2m tvtr 25W O/P: £160. Vibroplex bug key, chrome base: £45. G0LHW. (Chester) 0829 40020.

● YAESU 757GX II, unused: £710. KW1000 linear: £410. HF5 vert, new: £50. Yaesu YS60 swr/PEP meter, new: £60. All boxed, h/books. (Swansea) 0792 872054.

● YAESU FL7000 linear, exc.cond, boxed with manual. Genuine reason for sale (not TVI):

£1000ono. G1RVH QTHR. (Hull) 0482 500430 after 7pm.

● YAESU FRG7700 rcvr with Datong FL2 filter and AD170 indoor active ant. Also MM cvtr 28-144: £300 cash only. Buyer collects. (Leicester) 0533 883232.

● YAESU FT101ZD, fan, mic, manual. Clean, VGWO, exc.reports: £395. Inspect/collect. G0MZI. (Salisbury) 0722 337711.

● YAESU FT211RH 2m TX 45W: £275ono. Icom IC28H 2m TX 45W: £290ono. Yaesu FC1000 auto ATU: £300ono. Drae slow scan TV TX/RX: £125. Various 2m beams: £20ea. Vic20 incl tapes, recorder, manuals: £45. NEC PC8201 laptop, manuals: £100. Many other bits, buyer collects or pays carr. G4SXU QTHR. (Harrogate) 0423 566430.

● YAESU FT230R 2m FM mobile, with mic, m/brkt and manual. All good cond in box: £180ono. Rob. (Halesowen) 021-550 1527.

● YAESU FT290R with nicads: £220. Tokyo Hypower 2m linear with GAASFET preamp, 3W in, 30 out: £40. FT690R 6m all-mode: £220. Trio TR7500 2m FM 10W: £90. AEA PK88 packet TNC: £90. Prefer buyer collect. Graham, G1ULB QTHR. (Manchester) 061-789 1604.

● YAESU FT290R, case, m/bracket, nicad batts, chrgr. M/M 30W amp, 5/8 whip ant: £350. Mike G1UAX. (Hatfield) 0707 265025.

● YAESU FT290R: £230ono. Tokyo HL37V 2m 32W linear: £65ono. Would exch above plus cash for good Yaesu FT77(S). (St.Helens) 0744 893034.

● YAESU FT290RII case, batts, chrgr 2m linear amp, FL2025 m/mount brkt MMB31, headset YH1, PTT switch, SB10. Sandpiper 5/8 wave ant. All mint cond and boxed: £350. Andrew G0LLR. (Much Hadham) 3125.

● YAESU FT301 HF tcvr 1.8-30MHz solid state. Good cond: £280. Ideal first rig. Mutek 6m tvtr, 2m IF, c/w RN 25W linear and 3ele met beam. VGC: £185. No splits. Bencher key c/w electronic keyer: £52.50. Eddystone paddle key c/w Eddystone electronic keyer: £40. Jaybeam 8/8 slot for 2m, new: £20. Jaybeam 2m LW10, used: £15. Trio MC50 base mic: £22.50. Solartron CD1014 D/B scope, faulty: £15. Solartron DC-50MHz sig.gen. VGC: £22.50. Marconi dig multimeter c/w chrgr: £17.50. All above inspect/collect or carr.extra. Dave, G0MJK QTHR. (Northampton) 0604 711647 eve-w/e.

● YAESU FT707 tcvr, Yaesu FTV707 tvtr, Kenwood SP70 spkr: £550. Jaybeam 6ele 2m quad: £20. Jaybeam 48ele 70cm beam: £20. 9RV7 70cm colinear: £20. (Mansfield) 0623 794568.

● YAESU FT720RVH 2m FM 25W mobile TX/RX c/w boot mount kit etc: £150. Yaesu FT720RU 70cm FM 10W mobile TX/RX c/w boot mount kit etc: £150. VHF/UHF switch unit to make above dual-bander: £25. Complete package: £300. G3FSN QTHR. (High Wycombe) 0494 24835.

● YAESU FT726 with 2m/70cm fitted. Comes with matching SP102 spkr and MD1 desk mic: £600. Altron AT42, 3.5yrs old with new ground post, Max height 44ft: £350. G4ZEK. (Colchester) 0206 851343.

● YAESU FT727R no toneburst, hence: £285. Incl chrgr, case, batt pack, manual. Jaybeam 10ele 2m: £17. Ham Intl 6m multimode: £105. MM144/30LS linear: £25. Various mobile ants 2m-10mm. RT852 incl boxes and manual. Adrian, G0KHG. (Preston) 0772 813458 eve.

● YAESU FT77 100W 8-band, FM board, mic and boxed: £420. (Telford) 0952 243839.

● YAESU FT77 HF mobile rig, FM board fitted. Perfect cond. Yaesu FC700 ATU also perfect with m/brkt: £375. FRB707 relay unit for use with linear: £25. Colin QTHR. (Wallasey, Wirral) 051-678 6052.

● YAESU FT77 HF tcvr, works but would benefit from attn. Buyer must inspect: £150. (Berkhamsted) 0442 862814.

● YAESU FT770RH 70cm FM mobile TX/RX 25W. 10mems, scanning, voice synth. VGC: £250. Peter G3YXZ. (Watford) 0426 915264 day/eve.

● YAESU FT901DM tcvr, CW filter, matching spkr, mic, good cond: £450ono. FTV901R tvtr, incl modules for 4-bands: £300ono. All manuals incl. Delivery negotiable. GW3NYY QTHR. (Cardiff) 0222 704739 eve-w/e.

● YAESU FT980, ex spkr, CW board, mic: £1000. As new with box, little used. David G4XWZ. 0453 752057 after 7pm.

WANTED

● AVO valve characteristic meter or Avo valve tester type 160. 1st class cond essential. Knapp, 4 Venture Close, Bexhill-on-Sea. 0424 215556.

● BENCH mounting trays for R1475 and PSU. Someone somewhere must have a set. Dick Fixter, 18 Linley Dr, Boston, Lincs, PE21 7EJ.

● BIRD Thruline modules and accs. Cushcraft HF and VHF aerials. Maybe pt/exch some of LP collection? 0467 25365 after 8pm.

● BUY or borrow manual for Panadaptor EP17R. Also FSK board for EC-958/5. G3ICB QTHR. (Thatcham) 0635 64345.

● COLLINS PSU 516F2 Round Emblem. Must be VGC. Top price paid. G3GBB. 0284 753049 day 037983 657 eve-w/e.

● DETAILS of conversion of Motorola SX300 UHF h/held (450MHz) to 70cm. All costs paid. GM1XHZ QTHR. (Montrose) 0674 76503.

● DIAMOND KB105 vert ant tuning insts wanted. G0MQC QTHR. (Birmingham) 021-458 7751.

● DOCUMENTS, photos, uniforms, equip (especially pre 1950s) and other items for inclusion in the Royal Signals Museum of Army Communications. Donations gratefully received but funds may be available for particular items. Colborn, 31 Long Walk, Ashford, Kent, TN23 3HJ. 0233 640616.

● DRAKE R4C noise blanker. Comdel, Magnum Six or DX Engineering speech processor. Drake CM4 console. Gavin Williams, G3YCP QTHR. (Hove, Sussex) 0273 728322.

● EARLY wireless sets wanted. Also horn speakers, xtal sets, valves, clandestine radios. Any cond, will collect. Jim G4ERU, 5 Luther Rd, Winton, Bournemouth, Dorset. 0202 510400.

● EMOTO controller for 1102MXX/1103MXX rotator. G8HQF QTHR. (Wisbech) 0945 65601.

● EQUIP for 6m only. Commercial or homebrew. GM4AGS QTHR. (Newport-on-Tay) 0382 543113.

● EXPANDER 430X tvtr unit for FDK multi 750X tcvr. G0ILE QTHR. (Peacehaven, E.Sussex) 0273 582364 eve/ansaphone day.

● FILM equip 16mm cameras, lenses. Ex-govt aircraft gun cameras USA Bell & Howell type commercial Bolex etc. G0LJS. (Melksham, Bath) 0225 706795.

● FT726R c/w 6m/2m/70cm sat unit for Yeovil ARC club stn. Contact Chairman G4JBH. (Yeovil) 0935 28341.

● FV102DM VFO wanted to complete line up. Must be VGC. Will collect SW England or pay carr. G0HIW. (Barnstaple) 05986 445.

● HF low pwr rig about 10/20W suitable for use in static caravan. Must have 80m band. G0HHH. (Kidderminster) 0562 67026 anytime.

● ICOM BC30 nicad chrgr for my IC02E. Dave, G4ABU QTHR. (Barrow-in-Furness) 0229 822044.

● ICOM IC735. Also looking for morse keyboard sender eg Datong. Also want to buy Datong FL3 filter. Ed G3SQX. (Bournemouth) 0202 891656.

● INFO on TF867A sig.gen. (Maidstone) 0860 243329 day 0622 756331 eve.

● OAP urgently requires loan of service/maint manual for FDK multi 2000. All expenses reimbursed by return. G8LDB QTHR. (Leicester) 0533 374455.

● OLD Acorn Atom computer. Also a suitable debugging Eprom or program with single step facility and processor register display. GW3WWB. (Angle) 0646 641438.

● PYE PF9s wanted by Pye collector. Must be in exc.cond, but converted/unconverted unimportant. Tony G8UZJ. (Cheltenham) 0242 676789 anytime.

● RAF air publications relating to H2S/ASV radars, navigation equip, ie Babs, Oboe, Loran, Gee etc. Also ex-RAF radio stores index publications AP1086 Sec.10 Issue 1, 1938-48. Exc.prices offered. Would purchase post-war magnetrons, klystrons, T/R cells, TWTs, thyratrons and special types of M-OV/EEV valves and CV types. Many thanks. M.Gee, 6 Verbena Close, Pretoria Rd, Canning Town, London, E16. 071-511 4786 or 071-790 2846. (Kindly note new address and phone no).

● RECORDS or tapes of the opera singer Kirsten Flagstad. GW0EKA QTHR. (Chester) 0244 550660.

● RECRUITING 24 would-be club members. All British amateurs, to share in the enjoyment as well as the running costs of a radio amateur exotic tropical island beach villa. QTH c/w HF station to be shared at the rate of two weeks per member annually. Hurry, only a few more required. 0908 668169.

● SERVICE/operators manual for Eddystone 770 Mk2 rcvr. Copy and return with costs. Also IF gain knob and tuning cord plus re-stringing details. Spare valves. Rod G8CXV, 19c Arlington Dr, Mapperley Pk, Nottingham. 0602 606235.

● SP901/P spkr for 902DM station. Good price paid. Dennis G1VRO. (Birmingham) 021-355 6775.

● TRIO/Kenwood R1000 rcvr or similar. G3JBU QTHR. (Northampton) 0604 401800.

● URGENTLY reqd. Ferranti AF4, AF3 and AF3C transformers. Alternatives for exch. Bernard Litherland, G4IMT QTHR. (Chippenham) 0225 891254.

● VERSATOWER telescopic 40ft, 10ft sections, headload 56kg. Prefer base plate mounted. D.Furniss, 50 Camborne Cl, Mossley, Congleton, CW12 3BG.

● WEATHER sat cvtr M/M MMK1691/137.5. Amp MMG1691. WWII radar indicator 162, 182, 184 etc. G4EZM QTHR. (Blackpool) 0253 47176.

● WWII spy sets, also later models wanted or exch for German WWII equip. Write G.Huetter, Box 2129, D-8990 Lindau, W.Germany. 010 49 4223 2856.

● YAESU FT225RD with Mutek F/E. GU8GGC QTHR. 0481 822650.

● YAESU FT730R UHF, Icom IC24G VHF tcvr. Must in good cond c/w h/book. Mike Watson, G8CPH QTHR. (Ipswich) 0473 831448.

● YAESU FT730R VHF tcvr. Must be in good cond and c/w h/book. Mike Watson, G8CPH QTHR. (Ipswich) 0473 831448.

● YAESU h/book for FRG7 RX. 3-core plug and lead for TR2200 txvr, ext 12V I/P. Collins G3THX, 60 Alexandra Rd, Skegness, Lincs.

EXCHANGE

● 3 Motorola HT220 UHF h/helds + chrgr for Kam or similar multimode TNC/Atari ST WHY?. Cash adjustment where necessary. G1VVU QTHR.

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COLLINS INFO REQUIRED

Steve, G3ROZ, has some scrap Collins gear to play with and requires circuits/info for KWM2-A, 32S1, 75S1; 11-pin PSU plugs (female); exciter tune knob assy; SSB mech filter; AM band xtals; cabinets for 32 + 75S1. If all else fails, he wonders if Collins still exist and where they are. He is QTHR, phone 0767 680828 (weekends).

TELEQUIPMENT S51B SCOPE CIRCUIT

Paul Martin, G4AZC, is desperate for the circuit and/or handbook of the Telequipment S51B valve scope to repair a timebase fault. He would also like any info whatsoever on the Storno 9000 series VHF transceiver (ex-System 4) and/or any help in bringing this superb bit of kit onto either 2m or preferably marine channels. All expenses will be refunded. He is QTHR, phone 0843 61448.

EHT CAPACITORS WANTED

Norman Porter, G0IRK, is severely disabled but still manages to enjoy the constructional side of the hobby, although hunting down rare components at rallies is very difficult. He is at present trying to construct the HF linear designed by E J Hatch and featured in the May 1982 issue of *RadCom*, and is having difficulty locating a source of the blocking capacitors in the pi-tank output circuit, ie 400pF 2.5kV mica, 0.002uF 5kV disc and 0.005uF 3kV disc. If anyone can assist, he would be most grateful. He is QTHR, phone 081-390 2650.

INTERFACING AN STC NOVATEL TO AMSTRAD CPC6128

Mr E Auty, G4DYM, would be very grateful for info to enable him to interface an STC Novatel to an Amstrad CPC6128 computer for RTTY and general-purpose use. He has an RS232 connected and a PNP Communications MF2DX RTTY interface. G4DYM is QTHR, phone 0934 833478.

SKYWOOD 1000 CIRCUIT, ANYONE?

Steve Fletcher, G4RFC, is trying to rebuild an old Skywood 1000 five-valve HF linear, made in Japan. He would like any info on this linear, particularly a copy of the circuit diagram. He is QTHR, phone 081-293 4989.

ROHDE & SCHWARZ POWER METER DETAILS SOUGHT

Ken Smith is looking for the technical details and operating instructions for the Rohde & Schwarz microwave power meter, type NRD-BN2412. He knows it has a thermistor power head and an internal calibration source, but that is all. His address is Staple Farmhouse, Staple, Canterbury, Kent, CT3 1JX.

THORN-EMI R-174/URR DETAILS, PLEASE

Rag, OZ8RO/LA5HE, asks if anyone can provide a source to obtain the description, schematics or technical manual for an old miltary radio made by Thorn-EMI in the UK. It is a R-174/URR with power supply PS/PP 308/URR. His address is R Otterstad, Vejdammen 5, DK-2840 Holte, Denmark.

NRD-515 MEMORY UNIT WANTED

Brian Moore, GI8DGB, is looking for a memory unit for an NRD-515 receiver, in any condition. He has contacted all the usual retail outlets and has been told that this expensive receiver is obsolete, even though it was still being advertised in 1984. He would be most grateful if someone could help or put him in touch with someone who can. He is QTHR, phone 0247 852413.

RAE AND MORSE HELP OFFERED

Paul Salt, G0MBN, would like to help any disabled people in the Cheltenham/Gloucester area, either to prepare for the RAE or morse test, or alternatively just to learn about basic radio and electronics. He would be happy to help anyone in their own home if required or to undertake more practical work at his home. Paul is the local representative of the RAIBC, and is at present running an introductory radio course which is loosely based on the Novice Licence; he finds that helping others gives him tremendous satisfaction. He is QTHR, phone 0242 520054.

PTFE SHEET SOURCES

Several readers have kindly written in with sources of supply, following the query in the February 'Helplines'.

Mr M C Readings, G1YDT, suggests the Metric Company, Unit C8, Innsworth Technology Park, Innsworth, Glos, phone 0452 731342, which has PTFE available in 10 and 20 thou thicknesses plus a bewildering variety of other sheet gasket materials. Offcuts may well be available for modest sums.

Mr P Denning, G0MAO, writes that Fluorocarbon, Stretford Motorway Estate, Barton Dock Road, Stretford, Manchester, M32 0ZH, phone 061-865 8311, will supply PTFE sheet.

Richard Sharp, G1GGT, came up with Goodfellows of Cambridge, phone 0223 420631. Their 1989 catalogue lists a wide range of polymers in sheet and rod form, as well as metals, composites and ceramics. PTFE sheets are stocked in various sizes, eg 100 by 100mm and 150 by 150mm, in thicknesses of 0.025 to 2mm. A sample one-off price is £11.60 plus VAT inclusive of postage for a 0.5mm thick sheet, size 100 by 100mm.

Finally, Brian Beaven, G4BZU, gives the phone number of another source of supply: 0242 526530.

HELP WITH CIRKIT DFM REQUIRED

Norman Cliff, G3GRB, has a Cirkit digital frequency meter, type DFM7 Mk2, which has various IF offsets, and wishes to use it with a homebrew receiver with an IF of 1.620MHz. He would be grateful if a fellow owner can tell him how to obtain this offset. He is QTHR, phone 0902 20322 (Wolverhampton).

YAESU 902 DM CIRCUIT, POR FAVOR

Alan Davies, GW3INW, who is at present living in Columbia, has a friend who cannot obtain a copy of the circuit diagram for the Yaesu 902 DM, and Alan wonders if a UK amateur could oblige. His friend is Norrman Hernando Jaramillo, HK3KZP, PO Box 48913, Bogota, Columbia.

ANY GEC RECEIVER OWNERS OUT THERE?

Mr E M Zimmerman, ZL1AGQ, has a GEC receiver, type RC410/R, which has given many years of service but it has recently lost its sensitivity. He has the operating manual but not the technical and service manuals, and would like to know a source of these. He is more than happy to pay any reasonable costs involved. His address is PO Box 31-261, Milford, Auckland 9, New Zealand.

SERVICE MANUAL FOR TRIO TS520D, PLEASE

Mr P Harvey, G3FLG, who is QTHR, would like to buy or borrow a service manual for the Trio TS520D, and is willing to repay any expenses involved.

BOUQUETS . . .

G R Gauntlett, G3VLL, had a "fantastic" response to his request for a copy of *Elektor*, and would like to thank all those who phoned with help. He received two copies of the magazine plus several photocopies!

Brian Thompson, G1YAE, wrote to thank us for printing his recent request in this column, and to express his thanks to GM4DMK who has helped him get info on the Scarab RTTY unit. He is also grateful to G3BLE who is doing the donkey work on his behalf!

. . . AND BRICKBAT!

Sorry, we garbled the phone number of Bert McCann in his plea for help with the Dymar Lynx PMR, published in the August 'Helplines'. It is just as well he was QTHR in all editions of the *Call Book*! The correct number is 0772 37815.

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.

CLUB NEWS

DEADLINE - Items for inclusion in the November 1990 issue must be sent to HQ marked "Club News - DIARY", to be received by 20 September latest. If news is received by the published deadline, it will appear in the listing. It is your responsibility to ensure that items are sent DIRECT to HQ in good time. News items should be sent in writing, preferably typed or written legibly, and be signed by the club secretary or the person responsible for publicity.
NOTE: This is primarily a service for clubs affiliated to the RSGB, to whom priority will be given.

AVON

- Bristol RSGB Group - 24, talk "Working with the RIS" by Mike Blake, G3OUK; Oct 29, Annual General Meeting.
- North Bristol AR Club - 2, MOTORAMA; 14, QSL card display; 16, Bristol Temple Meads rally. Details 0454 616267
- South Bristol ARC - 5, AGM; 12, Bristol Rally planning evening; 19, video evening on "Railways"; 26, VHF activity evening; 3 Oct, computer and audio bring and buy.
- Weston-Super-Mare RS - 3, talk "Air Traffic Control" by G. Booth, G6HKA; 17, constructors night; Oct 1, talk by Tony Griggs, G4KMB. Details 0934 514429.

BEDFORDSHIRE

- Bedford & DARC - 4, talk "Home Construction" by Richard, G1ZOJ; 8-16; Special Event Station GB4BOB - Battle of Britain - Hawkinge - Kent coast; 18, de-briefing GB0BOB; 25, social evening; Oct 2, talk "Etching" by Stuart, G0GOF; 9, social evening.
- Shefford & DARS - 6, welcome back; 13, mobile DF hunt; 20, talk "PSU's - Design and Construction" by Terry, G4OXD; 27, talk "CM Howes - An In Depth Look at their New Range" by Dave Howes, G4KQM, Technical Manager; Oct 4, TBA; 11, talk "What's on 80?" by John Allen, G4PDP. Details 0767 80043.

BERKSHIRE

- Maidenhead & DARC - 6, talk by Derek, G3ZOM of Jandek Kits; 18, talk "UOSAT Satellites" by Neville, G8NOB, member of the UOS Ground Station Staff. Details 0628 25952.

BUCKINGHAMSHIRE

- Aylesbury Vale RS - 5, Used equipment sale; 19, talk "Matching, and its implications to the radio amateur".
- Chiltern ARC - 12, HF and VHF Operating Technique Presentation. Details 0494 776420.
- Milton Keynes & DARS - New venue, North Bucks Youth Sports Hall, Haversham Road, Wolverton. Meetings every second Monday at 8pm.

CHESHIRE

- Warrington ARC - 4, beginners night/mini statement by Mike Mansfield; 11, open forum; 18, open forum; 25, pie and pint night; Oct 2, beginners night. Details 0928 715070.

CLWYD

- Delyn RC - 11, talk "The Art and Science of Photography" by Glyn Jones of G&G Photographers; 25, Ladies night - subject to be decided. Men welcome!; Oct 9, demonstration of wares by a major equipment manufacturer. Details 0244 819618.
- North Wales Radio Rally Club - Meets 7.30pm each Thursday. HF/VHF on the air.
- Wrexham ARS - 4, hf activity night; 18, talk "Raynet" by Peter, GW4IGF. Details 0978 261482.

CO.ANTRIM

- Ballymena Amateur Radio Club - Meets each Thursday at 8pm, 70 Nursery Road, Gracehill, Ballymena.

CORNWALL

- Cornish RAC - 6, CRAC main meeting - Perranwell Village Hall; 10, CRAC computer club - Treleigh Church Hall; 11, radio constructors workshop - Perranwell VH; Oct 4, CRAC main meeting - Perranwell VH; 8, CRAC computer club - Treleigh Church Hall.

CUMBRIA

- Eden Valley RS - 27, presentation on "Dunfell Radar" by John Begg of the CAA. (provisional) - BBC Club; Oct 25, talk "Satellite Communications" by Andrew Sellers, G8TZJ - BBC Club.

DERBYSHIRE

- Buxton RS - 11, mystery talk. Details 0298 25506.
- Derby & DARS - 5, junk sale; 28, illustrated talk "The Green Radio Society" by Allan Clayton; Oct 3, junk sale; 10, visit by Birketts of Lincoln. Details 0332 669157.

DEVON

- Axe Vale ARC - 7, talk "Automating the manufacture of glass pipettes"; 5 Oct, AGM.
- Exeter ARS - 10, talk "Working on the Market Reef" by Steve, G4EDG, Oct 8, Annual General Meeting. Details 0392 78710.

ESSEX

- Chelmsford ARS - 4, talk by Stan Woods, Marconi; Oct 2, Annual General Meeting. Details 0245 260831.
- Loughton & DARS - 7, TBA; 21, talk "A Homebrew VHF - HF Converter" by Ray Pedley, G0LWF. Details 081-504 4581.
- Colchester Radio Amateurs - 13, talk "What's New"; 27, Meet RSGB Liaison Officer G0AZF; 11 Oct, AGM. Club meets alternate Thursdays at 7.30pm in the Board Room, Colchester Institute, Sheepen Road. More details from G3FIJ, tel: 0206 851189.

GREATER LONDON

- Acton, Brentford & Chiswick RC - 18, talk and demonstration "Home Brew QRP Transceiver" by G4HMC
- Coulsdon ATS - 10, talk "Local Radio" by Martin Charman, G4FKK; Oct 8, quiz v Sutton & Cheam RS.
- Edgware & DARS - 1/2, SSB Field Day; 13, TBA; 27, TBA.
- Southgate ARC - 13, talk "Power Distribution" by Roger Platt of CEGB; 27, inter-club darts match. Details 081-360 2453.
- Sutton & Cheam RS - 20, talk "Facts and Fallacies of Learning Morse" by Tom Mansfield, G3ESH; Oct 8, inter-club quiz - CATA v S&C.
- Wimbledon & DARS - 14, talk "Back in the USSR"; 28, night on the air.

GREATER MANCHESTER

- Eccles & DARS - 4, demonstration "V22 Modems" by G6MEI; Oct 2, talk "Sheffield Today" by G4UOT. Details 061 773 7899.
- Stockport RS - 12, talk "The Hong Kong Connection (QRP)" by Keith Ranger, G0KJK; 26, surplus equipment sale. Details 061 439 3831.

HAMPSHIRE

- Basingstoke ARC - 3, Talk by DTI inspector; 29/30, DF foxhunt weekend in New Forest.
- Fareham & DARC -
- Horndean & DARC - 6, talk "Army Communications"; Oct 4, Annual General Meeting. Details 0705 483676.
- Itchen Valley RC - 14, Open meeting; 28, open meeting.
- Three Counties ARC - 12, talk "Mapping the World's Oceans" by Andy Harris; 26, talk "Retaining the Magic" by Nick Scott; Oct 10, club night for your own activities.

HEREFORD & WORCESTER

- Bromsgrove ARS - 11, talk and demonstration "Jaybeam Antennas"; 25, talk and demonstration "Satellite TV" by Roy Williams, G4IUX; Oct 9, constructors fair. Details 0527 503024.
- Bromsgrove & DARC - 1, SES - GB0BC - Blue Cross Animal Welfare Centre, Wildmoor; 2/3, SSB NFD; 14, talk "Op. Raleigh" by G4AAL; 15/16 SES - Avoncroft Museum of Buildings; Oct 12, talk "Simple R.F. Measurements" by G. Lloyd, G4RBL. Details 0527 33173.
- Vale of Evesham RAC - 6, talk "Underground Radio" by G3ZLM; Oct 4, talk "Reliability" by G4YIG.;

HERTFORDSHIRE

- Cheshunt & DARC - 5, video evening "Battle of Britain"; 19, talk "EMC and The EMC Committee" by Dave Lauder, G1OSC; Oct 3, talk "Packet Radio" by Mike Dennison, G3XDV from RSGB HQ; 17, TBA.
- Verulam ARC - 25, "Nostalgia Night" - a display of radio equipment from bygone days.
- Welwyn-Hatfield ARC - 3, talk "Birth of Radio"; 17, informal; Oct 1, junk sale. Details 0707 324958.

HUMBERSIDE

- Goole R&ES - 14, construction competition; 21, Annual General Meeting; 28, social evening.
- Hornsea ARC - 5, barbecue with "Serendipity"

ISLE OF WIGHT

- Binstead ARS - surplus equipment auction first Monday each month; quiz night third Monday each month.

KENT

- Bromley & DARS - 18, back to square one.
- Medway ARTS - 4, Satellite TV, 2 Oct, Packet radio.

LANCASHIRE

- Fylde ARS - 13, construction competition; 27, Kent keys.
- Preston ARS - 6, lecture "In the Footsteps of Telsa, Herts and Marconi"; 20, fire prevention talk; 4 Oct, Kent morse keys.
- Thornton Cleveleys ARS -

LEICESTERSHIRE

- Leicester RS - 3, Hands on test equipment evening; 10, Committee meeting, HF/VHF activity night; 17, Lecture; HF/VHF night on the air.

LINCOLNSHIRE

- Lincoln SWC - 26, Amateur radio on a shoe string.

LOTHIANS

- Lothians Radio Society - 12, President's Address "The Novice Licence"; 26, visit to Glenkinchie Distillery.

NORFOLK

- Fakenham ARC - 4, Visit to Eastern Communications in Happisburgh; 18, Crime prevention; 2 Oct, Moonbounce.
- Norfolk ARC - 1, HF SSB FD; 5, Town and Country show final briefing; 9, demonstration at Town and Country show, Cotessey; 12, talk "G5RV on the G5RV"; 19, talk "Weather satellites"; 26, Project Year final briefing; 3 Oct, talk with Zonal Council member John Greenwell, G3AEZ; 7 Oct, Project YEAR at Hewett School.

NOTTINGHAMSHIRE

- ARC of Nottingham - 6, Forum and activity night; 13, talk "VHF expedition to WL square"; 20, Foxhunt and night on the air; 27, talk "Radio data systems".

POWYS

- South Powys Radio Club - Meetings first Tuesday each month. September, talk "The history of radio"; October, AGM and talk "Panel marking techniques".

SOMERSET

- West Somerset ARC - 4, talk "Alarm systems".
- Yeovil ARC - 6, Lambda diode projects; 13, mobile WAB operating; 20, manufacture of printed circuits; 27, natter night; 4 Oct, design and use of an absorption wave meter.

SOUTH GLAMORGAN

- Cardiff RSGB Group - 10, Packet radio talk.

STRATHCLYDE

- West of Scotland ARS - Each Friday, 7.30pm. New venue, The Martyr's School, Parson Street, Townhead, Glasgow, G4 0PX.

SUFFOLK

- Felixstowe DARS - 3, Night on the air at Orwell Park School; 12, three way quiz challenge; 17, visit to Suffolk Ambulance Centre; talk "Do you know how fast it's going".

SURREY

- Dorking & DARS - 25, lecture "Computers and Communications in Aeronautical Engineering".
- Surrey Radio Contact Club - 3, Radio astronomy; 1 Oct, Surplus equipment sale.

TAYSIDE

- Dundee ARC - 6, Visit to Tayside Police radio workshops.

WARWICKSHIRE

- Mid Warwickshire ARS - 11, Demonstration of Raynet talk through unit; 25, illustrated talk on vintage radio components.
- Rugby ATS - 11, 144MHz DF contest; 25 presentation of club awards and cups.
- Stratford-Upon-Avon RS - 10, Introductory meeting; 24, talk "Raynet"; 8 Oct, talk "Electrical safety.

WEST MIDLANDS

- Coventry ARS - 7, talk "Operation Raleigh, part 2"; 14, 2m DF contest; 21, alphabet contest & night on the air; 28, indoor DF contest; 5 Oct, AGM.
- Midland ARS - "Novice Licence" by G1ZCY.
- Stourbridge - 17, Aerials.
- Walsall Raynet Group - First Monday each month. Turf Tavern, Boxwich.

WEST YORKSHIRE

- Halifax & DARS - 18, AGM.
- Keighley ARS - 18, Planning meeting; 19, Quiz; 22/23, special event at National Trust, East Riddlesden Hall; 25, intruder alarms.
- Northern Heights AR&ES - 5, talk "How do aircraft navigate.
- Pontefract & DARS - 6, Video "RAF 50 Glorious Years"; 20, talk "RFI/TVI"; 27, Raynet AGM; 6 Oct, Raynet, Scouts Went Valley Hike.
- Spen Valley ARS - 6, Night on the air; 20, demonstration of BBS satellites.
- Todmorden & DARS - 3, talk "Antique Radios"; 17, Bob; 1 Oct, talk "Guess where I've been".

WILTSHIRE

- Blackmore Vale ARS - 11, Homebrew contest; 25, equipment operating evening.
- Trowbridge & DARC - 5, talk "Mysteries of the wire antenna"; 19, club progress meeting.

MOBILE RALLIES

This is a list of all rallies, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Rally News - DIARY'.

2 SEPTEMBER

- Milton Keynes & DARS 4th AR Car Boot Sale - Cranfield Airfield, Cranfield, Bedford MK43 0AL. Opens 10am. Bar & refreshments. Talk-in on S22. Details from Tony, G6WXM, tel: 0908 316435, Mike, G0FMC, tel: 0908 566796, Ray, G1LRU, tel: 0908 660798.
- Preston ARS 23rd Annual Rally - University of Lancaster. Details from Godfrey, G3DWO, tel: 0772 53810.
- Telford Radio Rally & Exhibition - Telford Exhibition Centre, Telford, Shropshire. Details from G3UKV, QTHR, tel: 0952 255416.

8 SEPTEMBER

- Ballymena ARC Rally, Ballee Community High School, Ballymena, starting 12 noon. More details from GI4CRL, QTHR.

9 SEPTEMBER

- Lincoln Hamfest - Lincolnshire Showground and Exhibition Centre (4 miles north of the City on the A15 Lincoln to Scunthorpe road). Opens 10.30am (10am for disabled visitors). All the usual trade stands. Bring & Buy. Refreshments. Real ale bar. Helicopter rides (provisional), model cars and model aircraft displays. Caravans welcome by prior arrangement. Talk-in on 2M by West Lincs Raynet Group. Further details from Sue Middleton, c/o G8VGF, tel: 0522 531788.
- Vange ARS Annual Rally - The Laindon Community Centre, Aston Road, Laindon, Basildon, Essex. Opens 10am. The centre is a short walk from Laindon Station on the London (Fenchurch Street) Shoeburyness line. Approach roads will be signposted. Talk-in on S22. Adequate parking. Usual traders. Bring & Buy. Free raffle.

15 SEPTEMBER

- Annual Wight Rally - Arreton Manor, near Newport, Isle of Wight. Details from Douglas Byrne, G3KPO, QTHR, tel: 0983 67665 or 0983 616503.

16 SEPTEMBER

- Bristol Radio Rally - Brunel's Great Train Shed, Temple Meads Station, Bristol. Doors open 10.30am. Usual attractions. 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.
- BARTG Rally - Surrey Hall, Sandown Park Race-course. Details from Mr. Peter Nicol, G8VXY, 38 Mitten Ave, Rubery, Rednal, Birmingham B45 0JB. Tel: 021 453 2676.

22 SEPTEMBER

- QRP Beside the Seaside - The Garnham Centre, The United Reformed Church, Back Chapel Lane, Gorleston on Sea, Nr. Great Yarmouth. Details from G3OEP.

23 SEPTEMBER

- Centre of England Autumn AR Rally 1990 - British Motorcycle Museum, Bickenhill, nr Birmingham, opposite NEC on the M42 Jcn 6. Opens 10.30am. All the usual favourites. Bring & Buy. Raffle. Refreshments. Licensed Bar. 3 large halls with ample parking. Over 60 traders. RAIBC/Club stands. Admission £1. Concession for RAIBC members and senior citizens. Special rates for those wishing to visit the museum with over 500 cycles on show. Talk-in S22. Details from Frank, G4UMF or Margaret, tel: 0952 598173.
- Peterborough 1990 Mobile Rally - Wirrina Sports Stadium, Peterborough. 10am - 5pm. Talk-in S22 and SU22 by G3DQW. All the normal traders. Bring & Buy. Details from Robert Maskill, G4PYR, tel: 0733 230412 or 0836 542630 any evening.

30 SEPTEMBER

- Harlow AR & Electronics Mobile Rally - Harlow Sports Centre. Doors open 10.30am. Bar. Hot Snacks. Facilities for disabled visitors. Giant Bring & Buy. Special Interest Groups. Talk-in on 2M & 70cm by G6UT. Free parking. Admission £1. Details from Alf, G7FNY, tel: 0279 418392 (weekdays) or Mike, G7BNE, tel: 0279 722569 (evenings and weekends).
- 6th North Wakefield R.C. Rally - Outwood Grange School, Potovens Lane, Outwood, Nr. Wakefield. Doors open 11am (10.30 for disabled visitors). Admission 50p. Fully licenced bar with real ale. Refreshments. Raffle. Bring & Buy. Radio, computer and electronics traders and repeater groups. Talk-in on S22, club callsign G4NOK. Venue is 2 miles from M1 and M62 motorways. Details from Richard, G4GCX on 0532 622139.

7 OCTOBER

▶Armagh & Dungannon DARC Annual Rally - Drumsill House Hotel, Moy Road, Armagh. Doors open 12 noon. Details from T.E. Hall, GI0MSJ, tel: 0861 523454.
▶Blackwood AR Rally - Oakdale Community College, Blackwood, Gwent, NP2 0DT. Details from B. Matthews, GW0JWF.
▶Great Lumley Radio Rally - Community Centre, Great Lumley, Nr. Chester-le-Street, Co. Durham. Doors open 11 a.m. (10.30 for disabled visitors). Trading Stalls. Refreshments. Entrance fee 50p. Details from Barry, G1JDP, tel: 091 388 5936.
▶South Devon RC. Sixth Annual Ham Radio Computer Exhibition and Rally - Hillhead Campsite on the Dartmouth Road in Brixham. Doors open 10 a.m. Trade Stands. AR supplies. Bring & Buy. Raffle. Refreshments. Unlimited parking. Overnight camping. Car boot sale (weather permitting). Talk-in on S22 by G7FDC and G4SSD. SES GB4CPU. Details from 0803 5222116

14 OCTOBER

▶ELHOEX Hamfest - Hornsea Floral Hall. Details from Jeff, G4IGY, tel: 0964 533331.

20/21 OCTOBER

▶4th North Wales Radio Rally - Aberconway Centre, Llandudno. Doors open 11 a.m. on both days. Entrance fee £1, OAP's 50p, children under 14 free. 64 exhibitors and 163 stalls. Large bring & buy on the ground floor. Details from B. Mee, GW7EXH, Anncott, Hylas Lane, Rhuddlan, Clwyd, LL18 5AG, tel: 0745 591704.

21 OCTOBER

▶Blackmore Vale ARS Grand Sale. Charlton Musgrove Village Hall, near Wincanton, Somerset. 11am to 5pm. Talk in on S22. Details from Norman, G4YXX, tel: 0963 32389.

11 NOVEMBER

▶MARS Birmingham Mini Mobile Rally - Stockland Green Leisure Centre, Erdington, Birmingham. Details from Norman, G8BHE, tel: 021 422 9787.

18 NOVEMBER

▶Bridgend & DARC Annual Rally - Bridgend Recreational Centre. Details from Don, GW3RVG, tel: 0656 860434 after 5pm.
▶West Manchester RC Winter Rally at Bolton Sports and Exhibition Centre, Bolton. Details from Dave, G1IOO, tel: 0204 24104 (evenings only)

25 NOVEMBER

▶Bishop Auckland Radio Rally - Sunny Dale Leisure Centre, Shildon, Bishop Auckland, Co Durham. Details from Ernie, G4TYF, tel: 0388 607500.

20 JANUARY 1991

▶Oldham ARC Rally - Queen Elizabeth Hall, Civic Centre, Oldham. Details from Kathy, G4ZEP, tel: 061 624 7354.

9 DECEMBER

▶Verulam Christmas Rally - Hatfield Polytechnic. 11am - 5pm. Details from Steve, tel: 0923 249456.

27 JANUARY 1991

▶University of Lancaster ARS & Central Lancs ARC. The Lancastrian Rally - Lancaster University. Details from Sue Griffin, G1OHH, tel: 0524 64239 or Mike Sherlock, G4ZYN, tel: 0257 452287.

3 MARCH 1991

▶Welsh Mobile Rally - Barry Leisure Centre, off Holton Road, Barry. Details from Ceri, GW0JCB, tel: 0446 721304.

31 MARCH 1991

▶Centre of England Easter Amateur Radio Rally - Motorcycle Museum, Bickenhill, nr NEC Birmingham. Details from Frank Martin, G4UMF, tel: 0952 598173.

14 APRIL 1991

▶Trafford Rally "The Great Northern Rally" - G-Mex, The Greater Manchester Exhibition and Events Centre, City Centre, Manchester. Details from Graham Oldfield, G1IJK, tel: 061 748 9804.

9 JUNE 1991

▶22nd Elvaston Castle Mobile Radio Rally - Elvaston Castle Country Park, near Derby. Details from John, G4PZY, tel 0332 767994 - Trade enquiries to Peter, G3WFU, tel 0332 700265 (evenings).

30 JUNE 1991

▶Longleat Amateur Radio Rally. Longleat House, near Warminster, Wiltshire. More details from Shaun, G8VPG, tel: 0225 873098.

29 SEPTEMBER 1991

▶Harlow AR&E Mobile Rally - Harlow Sports Centre. Details from - weekdays: Alf, G7FNY on 0279 418392; evenings & weekends: Mike, G7BNF on 0279 722569.

OTHER EVENTS

15 SEPTEMBER

▶Scottish AR Convention - Cardonald College, Glasgow. Official opening by the RSGB President, Frank Hall, GM8BZX. RSGB stand and bookstall. 11 am start (10.30 for disabled visitors). Trade Stands. Lecture programme. Bring & Buy. RSGB Morse test. Meals and snacks. Licensed bar. Ample free parking. 3 exhibition halls. Talk-in S22 by GM9OCC. Facilities for disabled visitors. Live demo station. Details from Tom P. Hughes, GM3EDZ, QTHR, telephone: 041 427 0122..

29/30 SEPTEMBER

▶RSGB HF Convention - Coventry. Details from G3ZAY (see page 18).

13 OCTOBER

▶RNARS Annual General Meeting - HMS Mercury, 2.30pm, followed by 30th Anniversary Dinner, Royal Sailors Home Club, Portsmouth. Information from G3JFF, QTHR, tel: 0705 593994.

26/27 OCTOBER

▶Leicester AR Show - Granby Halls, Leicester. Same format as last year with the two halls. Details from Frank, G4PDZ, tel: 0533 553293 or 871086.
▶RAF ARS Annual General Meeting - RAF Cosford. Further information from Warrant Officer M.J. Street; tel: Albrighton 2393, extn 2472.

GB CALLS

The list below shows special event stations licensed for operation during this month and up to 7 October. It was taken from the HQ computer on 7 August. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

1 SEPTEMBER

▶GB2CDY	Coastal Defence Yarmouth	G3RJK
▶GB2GAF	Gloucester Air Force	G3MA
▶GB2MAR	Marconi Amateur Radio	G3RDR
▶GB2RRP	Red Rose Platinum	G4NRN
▶GB2SSK	25yrs St Kenelm's	G4XOM
▶GB4RAF	RAF station Stanbridge	G4SNQ
▶GB4TRG	Telford Rally Group	G0JCN
▶GB50BOB	Battle Of Britain	G0KUC
▶GB6CDQ	Coastal Defence 'Q'	G6MWY

2 SEPTEMBER

▶GB2ATP	Advanced Turbo Prop	G4XTO
▶GB4TDY	Taxi Driver of the Year	G4KAB

3 SEPTEMBER

▶GB2MBF	Mini Bus Fund	G0HVH
▶GB2VGG	Original club callsign	G4IVJ

5 SEPTEMBER

▶GB2OWM	Orkney Wireless Museum	GM3IBU

7 SEPTEMBER

▶GB5CS	Cardiff Show	GW3EPF

8 SEPTEMBER

▶GB0RAF	Royal Air Force	G4NVD
▶GB0TM	Tockington Motorama	G0GZW
▶GB2NM	Gerald Marcuse, G2NM	G4EHG
▶GB2WMF	Winscombe Michaelmas Fair	G0KBT
▶GB4RMR	Romney Miltary Railway	G4TGK
▶GB50BOB	Battle Of Britain	G0EYM
▶GB50HAW	50 years Hawkinge	G0GBI
▶GB5AW	Activities Week	G0EVJ
▶GB5BOB	Battle of Britain	G0BZJ
▶GB8SPP	St Peter and St Paul	G8ZUI
▶GB0SMC	St Martin's Center	G0HTR

9 SEPTEMBER

▶GB4VMR	Vange Mobile Rally	G4NVT

10 SEPTEMBER

▶GB2BCB	Black Country Boats	G2BXP
▶GB4RAF	Royal Air Force	GW4SRO

14 SEPTEMBER

▶GB10GRP	10 Group ROC	G3HFG
▶GB1LAS	London Ambulance Service	G1DKX
▶GB2BB	Battle of Britain	G0FBW
▶GB2CMG	Cumbria North Guides	G3MNL
▶GB4BAM	Brenzett Air Museum	G0LAD
▶GB4FDS	Fun Day Swanley	G4RVV
▶GB5SH	Summerlee Heritage	GM3MTH

15 SEPTEMBER

▶GB0SCA	Stakes Community Association	G0JRN
▶GB4ATG	Amateur Teledata Group	G4SKA
▶GB4EAF	Earlsheaton Autumn Fair	G4MLW
▶GB4FMF	Friends of Moira Furnace	G4CRT
▶GB4HH	Hinwick Hall	G0EAE
▶GB50BOB	Battle Of Britain	G0BDG
▶GB50RAF	Royal Air Force	G6ZH

16 SEPTEMBER

▶GB50BOB	Battle Of Britain	G4PUI

18 SEPTEMBER

▶GB5LOF	League Of Friends	G1WAE

21 SEPTEMBER

▶GB2BG	Berrylands Group	G4ULD
▶GB2NTS	National Trust for Scotland	GM3MTH
▶GB2NTU	National Trust Ulster	GI0BFO

22 SEPTEMBER

▶GB2FOI	Festival Of Interests	G0KBT
▶GB50BOB	Battle Of Britain	GM4UZP

23 SEPTEMBER

▶GB0COE	Centre Of England	G4UMF
▶GB2FD	Fire Day	G0EVD

26 SEPTEMBER

▶GB2BDS	Blackburn Division Scouts	G0GSN

27 SEPTEMBER

▶GB0CSG	Clapham Scout Group	G0BMG
▶GB1WMS	West Mercia Scouts	G7ANL
▶GB2LC	Linnet Clough	G3WFW
▶GB4CSG	Clapham Scout Group	G0BMG

28 SEPTEMBER

▶GB1PLY	Plymouth	G1FBH
▶GB2GFM	Go For a Million	G3XVV
▶GB2GMC	Go for a Million Camp	G0DQI
▶GB2SAM	Sleep A Million	G0KCB
▶GB4GFM	Go For a Million	G4ZEP
▶GB5HD	5 Hertfordshire Districts	G4KGP

29 SEPTEMBER

▶GB2GCS	Grimsby Cleethorpes Scouts	G3RGC
▶GB2IRC	Ipswich Radio Club	G4IFF
▶GB4FC	Frylands Wood Camp	G6HC

1 OCTOBER

▶GB0CSR	Civil Service Radio	G3XWK
▶GB2BSG	Blakedown Scout Group	G0AGH
▶GB2SOS	Second Olton Scouts	G4VMQ
▶GB4MCS	Metheringham Club Scouts	G4MUY
▶GB6CDR	Coastal Defence 'R'	G6MWY

4 OCTOBER

▶GB4WCH	Weobley Cubs Herefordshire	GM0ALS

5 OCTOBER

▶GB0AGR	Aylesbury Group Raynet	G0FCV

6 OCTOBER

▶GB0CDU	Coastal Defence "Uniform"	G0DHZ
▶GB4XXX	'X' Net DXpedition	G4LPX

the last...

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.

SIMPLE SPECTRUM ANALYSER

Since the article describing the SSA was published in *RadCom* last November, I have received a steady trickle of enquiries from constructors; I estimate that over 300 units have been built so far. I am always happy to help constructors who are experiencing problems with my designs. During the development of the SSA, I worked closely with Bonex, ensuring that all the components would be available to intending constructors. To this end, I arranged that a kit of parts would be available, hopefully allowing intending constructors to reproduce the SSA exactly.

It has come to my notice that a number of other suppliers are offering kits for the SSA. I wish to make it clear that in no way am I connected with any other kit supplier, have no knowledge of the suitability of the components supplied and that the suppliers in question have not sought my advice. In other words, these kits do not have the approval of the designer. Caveat Emptor!

To all the people who have written to me about the SSA, I would like to express my thanks; if any builders of the SSA are having problems, then please write to me, QTHR.

Roger Blackwell, G4PMK

[Since the reproduction of text, diagrams and board layouts from RadCom *articles requires permission from the RSGB as copyright holder, we hope to be able to publish a list of approved suppliers for our construction projects in due course - Ed]*

CANNOT AFFORD?

I would like to comment on the letters from Mr English and Mr Dick, (*The Last Word*, August 90). Although I am fully aware of the ever-widening gap between the "haves" and the "have-nots", I grieve to learn that there are some who cannot spare 51p per week (this includes the initial joining fee), and even less in the case of Associate and Student grades, towards joining their National Society, whilst no doubt enjoying some of the facilities negotiated for by the RSGB.

I think one needs to differentiate between "cannot afford" and "does not want to pay". Being an OAP myself now, I find no difficulty in paying the subscription at its present level, which is ridiculously low when compared with certain other radio magazines and other societies.

It is unfortunate that for many years the Society was loath to increase subscriptions each year as in the case of everything else one buys, for fear of losing members. Well, we are still losing members and, having at long last increased the sub last year, it may be difficult to impose another increase too soon.

Is it not time for the RSGB to keep its members in the picture more. If it is not possible to maintain present services without imposing a sub of, say, £50 per annum, so be it. I have long maintained that everyone in full-time employment could afford the equivalent of a pint of beer or a packet of cigarettes each week. Perhaps if we concentrated on quality rather than quantity, those who were prepared to put more into the hobby than they took out would stand up to be counted.

With regard to the club members who are keen enough (and presumably experienced enough) to take part in contests but cannot do so, surely this shows a need for the committee members to "preach the gospel" more and boost RSGB membership.

One thing I cannot understand is why some do not want *RadCom*. Are they not interested in reading of the latest developments in the hobby?

Finally, I am against any form of selective membership or non-members being able to use the Bureau or any other RSGB service, even on a commercial basis. Not only would this be an administrative nightmare, but would encourage what the Americans call "freeloading" and what my old dad on the Somme would have called "dodging the column". One either supports the Society, warts and all (we all have some of these) or else one goes elsewhere.

E G Allen, G3DRN

MEMBERSHIP SHARING?

With regards to G1OAP's letter (*The Last Word*, August) about not wanting *RadCom*, he might be interested to know that the main reason I joined the RSGB was so that I could obtain *RadCom*. Perhaps we could come to some agreement . . . ?

P F Gascoyne, RS92452

...word

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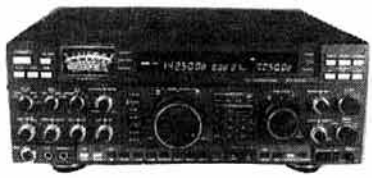

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