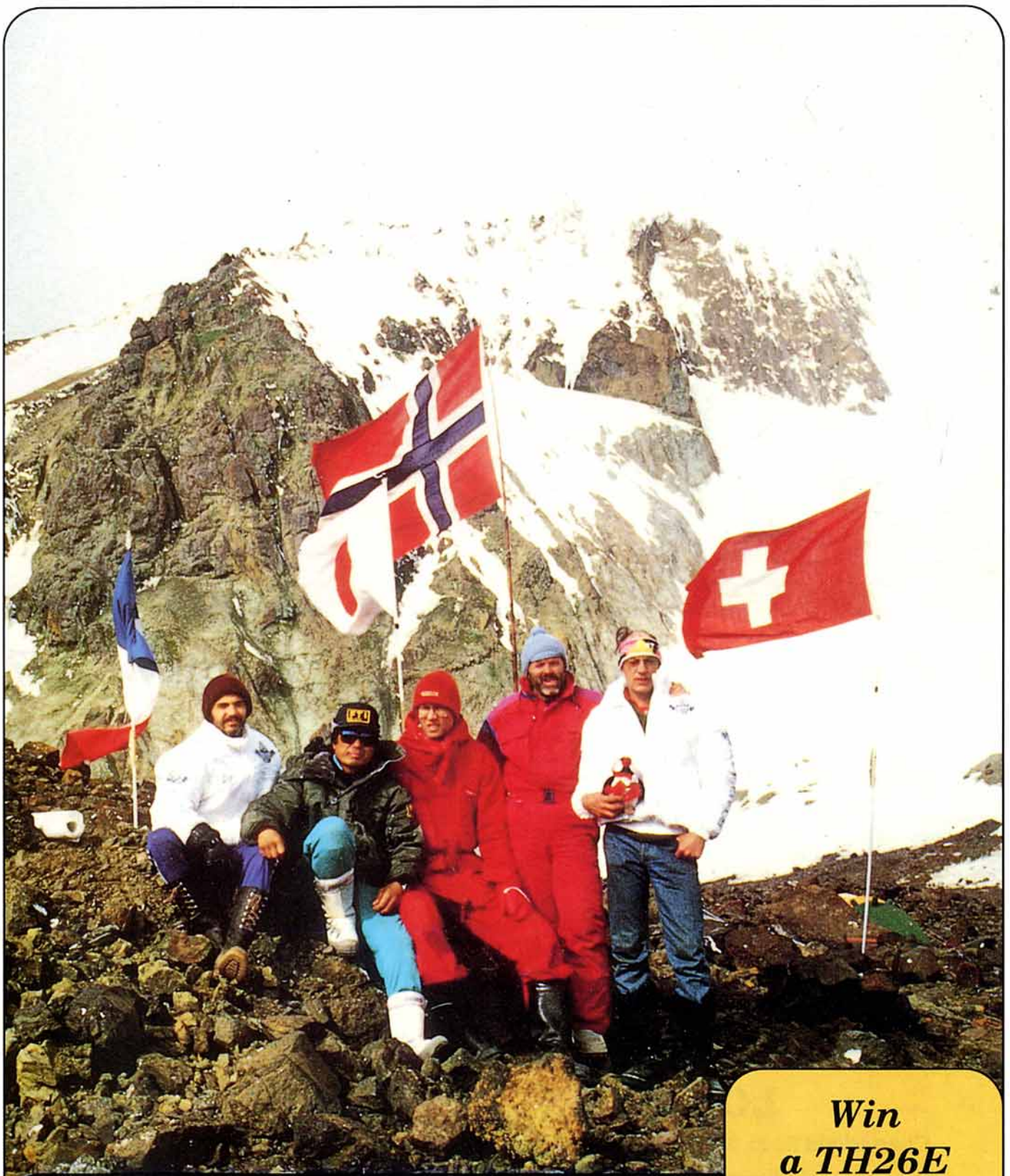
# Radio Communication

Volume 66 No 8

August 1990

The Journal of the Radio Society of Great Britain

## 3Y5X — Bouvet Is Expedition

***Win a TH26E handheld***

# KENWOOD

## Is this the best HF transceiver in the world?

When a reviewer of the stature of Peter Hart uses phrases such as: "The quality reports received on transmit with the DSP were superb." Or "The PA intermodulation performance was much better than the average rig." "The reciprocal mixing or oscillator sideband noise performance was also excellent, one of the best radios I have measured, and substantially better than the TS-930S or TS-940S even with the Lowe modification," you can begin to understand why we really do believe that Kenwood have set new standards for others to attempt to emulate.

Does the digital signal processing (DSP) really justify itself, or is it just a "gimmick." Peter Hart says: "The DSP performance was amazing In the widest setting, the -6dB audio bandwidth was 180Hz to 3.0kHz and yet the unwanted sideband and carrier rejection was in excess of 70dB!" The exclamation mark is fully justified.

See the TS-950SD at our Matlock head office if you can. We can't at the moment put one in every branch simply because of the demand for this definitive new transceiver, but a fully descriptive brochure is available on request.

If you happen to come across a TS-950SD being used on the air, just take a listen and you will soon answer the question . . .

**"Is this the best transceiver in the world?"**

## LOWE ELECTRONICS LTD.

Chesterfield Road, Matlock, Derbyshire DE4 5LE  Telephone 0629 580800 (4 lines)

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# Radio Communication

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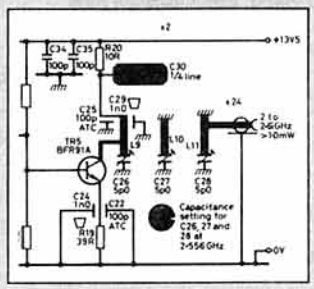
**Cover picture:**
**3Y5X, Bouvet Island (l to r: F2CW, JF1IST, LA1EE, HB9AHL, LA2GV) – page 12**

**News:**
**Ham hero, G0JEK – page 6**



**Construction:**
**G4DDK's 2GHz oscillator – page 35**

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

**The Editor**
**Radio Communication**
**Lambda House, Cranborne Road**
**Potters Bar, Herts EN6 3JE**

**Tel (Editorial only): 0707 59260**
**Fax (Editorial only): 0707 49503**
**E-mail (Telecom Gold):**
**76:MSX020**
**N.B. for all other RSGB telephone numbers see page four.**





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**RSGB membership**
**at 30 June 1990: 35,225**

# 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.

Headquarters and registered office:
**Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE**
Telex 9312 130923 (RSGB)
Electronic mail via Dialcom Telecom Gold: 87 CQO083
Fax: 0707 45105
Telephone: 0707 49855 — Members' Hotline, book orders
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*Correspondence to honorary officers should be addressed directly to them (QTHR), not to RSGB HQ*

**ANNUAL SUBSCRIPTION RATES**
**Once-off joining fee: £1.50**
**Corporate members: UK and overseas** (*Radio Communication* by accelerated surface post): **£25.00**
**UK associate member under 18: £8.50. Family member: £9.95**
**UK students over 18 and under 25: £12.75** (Applications should give applicant's age at last renewal date and include evidence of student status)
**Affiliated club or society/registered group (UK): £25.00** (including *Radio Communication*): **£14.95** (excluding *Radio Communication*) (Subscriptions include VAT where applicable)

Membership application forms available from RSGB HQ

# Geoloc

In February *Radcom*, the possibility was mentioned of a new spread spectrum radiolocation system called Geoloc operating in the 1.8MHz band was mentioned. We have expressed strong concerns to the DTI at the interference this might cause to amateur operation. There is still a possibility that it may come into service, and we felt that members should be aware of the details of the proposals, and the potential scale of the interference.

The 2 watt signal will occupy a 700kHz bandwidth centred on 2MHz, and will sound like broadband noise. It has been suggested that filtering could be installed at the transmitter to reduce the energy in the amateur band by 21dB. It is not clear whether this filtering will apply to 1810kHz-2000kHz, or just 1810-1850kHz.

While much of the 1810-2000kHz band is secondary, the 1810-1850 segment is due to become primary in the next few years. Noise in the primary segment will be especially unacceptable, but a great deal of weak signal DX working also goes on in the secondary parts of the band, eg 1907kHz-1912kHz to Japan. Most amateur operation occurs with signal levels that are not very far above the noise level, and signals from the Geoloc system are likely to degrade our receiver sensitivities significantly.

Spread spectrum systems may appear very attractive, insofar as the energy per Hz of bandwidth is low, which is fine when all the receivers are a large distance from the transmitter, so that the spread spectrum signal is below the background noise level. However, receivers much closer to the transmitter can suffer extreme interference. Amateurs already share bands with other stations using narrowband systems where sharing can achieved by choice of clear frequencies. However, in this case the interference will be broadband noise, and it will not be possible to avoid it. It is likely to be present 24 hours a day.

We have calculated the ranges over which the Geoloc signal would raise the ambient noise levels. These are based on a suburban median noise level of +3dBuV/m/kHz at 2MHz, and a daytime rural atmospheric noise level of -20dBuV/m/kHz. The proposed system will initially use transmitters in Norfolk and Scotland, with a power of 2 watts. The ERP from a Geoloc transmitter in a 1kHz bandwidth is 2/700 watts, ie 2.86mW or -55dBkW.

The table below gives the distances at which the atmospheric noise levels will be increased by 3dB and 20dB. Values are given for the filtered and unfiltered cases at the Geoloc transmitter, and as the Geoloc transmitters will probably be on the coast, for sea and land paths. The amateurs who will be affected may be either in rural or urban situations, so figures for both noise levels are given.

It is clear that Geoloc could have an impact over a very wide area. Even if filtered, it will affect a county, and if unfiltered, several counties. There is also potential for the interference to extend across to the continent or along the coast via the sea path.

We are unhappy with other aspects of this system. Other transmissions in the Geoloc band, such as nearby ships or coast stations, may still interfere with the Geoloc receiver if they exceed its level by more than the spreading gain, and so could prevent the Geoloc system from being used. It is also reasonable to question the need for it, as other systems offering much greater accuracy are available. It could also interfere with distress beacons on 2182kHz.

In conclusion, RSGB strongly opposes the introduction of this system in the 1.8MHz band; even the 21dB filtering would not provide enough protection to make it acceptable. We are particularly concerned that no degradation should be allowed in the primary and DX sections of the band. In the previous tests of this system a few years ago, the interference was considerably higher than we were led to expect.

We are also concerned that should the system prove technically inadequate in practice, the considerable investment in it will lead to future increases in power levels to improve the service, further worsening the interference problems.

Any members with views on this subject should write to the Chairman of the Licensing Advisory Committee, G3HCT.

**TABLE 1**

| | LAND PATH | | SEA PATH |
|---|---|---|---|
| | Urban noise level | Rural noise level | Rural noise level |
| **Unfiltered** | | | |
| 3dB | 40k | 120k | 600k |
| 20dB | 10k | 40k | 250k |
| **Filtered** | | | |
| -3dB | 10k | 40k | 25 k |
| 20dB | 3k | 10k | 40k |

# THE NOVICE LICENCE

Good progress is being made on just about every aspect of the Novice Licence, though much remains to be achieved both by the Radiocommunications Agency and the RSGB. The work involved in organising the Novice Licence has, as you would expect, been very detailed and a number of answers to questions at this stage remain in abeyance.

The basic format is, however, in place; this is essentially how it will work.

Someone wishing to obtain a Novice Licence will first of all have to locate and attend a course given by an RSGB registered Instructor. A list of senior Instructors in each County, Scottish region or main island, will be published by the Society. If a student contacts the senior Instructor, he/she will be given contact details for their nearest available course.

Only Instructors registered with the RSGB will be able to provide the course. If you are interested in becoming an Instructor, even if you only intend to give instruction on a one-to-one basic, then you should contact the RSGB Project YEAR Co-ordinator, Hilary Claytonsmith, G4JKS, (QTHR) without delay. Normally Instructors will deal with four students at a time, although special arrangements have been made to deal with disabled or geographically isolated students. Most holders of a full Class A or B UK Licence are eligible to become an Instructor.

The syllabus for the RSGB Novice Licence Training Course has now been agreed with the Radiocommunications Agency, so has the content of the RSGB Training Manual which will be on sale soon. Anyone can purchase the Training Manual, though it will cost less if you are already an RSGB registered Instructor. Details will be published in the September issue of RadCom.

The course itself will be approximately 30 hours long, during which all of the basics will be taught. Passing on the etiquette and good operating disciplines will be particularly important. Each student will be individually assessed by the registered Instructor. When each student has completed the training course, the Instructor will authorise RSGB HQ to issue a Course Completion Certificate. It is only after receipt of this certificate that the student can apply to take the Novice multiple choice examination which will be held every three months.

The Novice examination has been put out to tender, so at the time of writing we do not know which organisation will administer it. The test itself will last 90 minutes with a total of 10 questions on licensing conditions and an additional 35 questions spread over the remainder of the course.

Once an examination pass slip has been received, the student will be able to apply for the Novice B Licence which permits operation on frequencies above 30 MHz. Passing a 5 word per minute Morse Test will enable the student to obtain a Class A Novice Licence. We wonder who will be the first Novice on the air using the brand new "2" series of callsigns!

Of all of the unanswered questions remaining, one of the most serious concerns the mechanisms by which Class B licensees can gain the Novice HF privileges by passing the 5 wpm Morse Test. As yet, the Society has not discussed these questions with the RA; however, such facilities will exist, but at what cost, if any, and by what process has not yet jointly been addressed.

The RA give the likely timescale for the introduction of the UK Novice Licence as early 1991. We would very much like to see the Novice Licence earlier, such is the enthusiasm that has been met in the field. However, there is much work to be done and so the Society shall continue to work with the RA to the successful conclusion of this vast project.

In the meantime, the other aspects of the Project YEAR work continues, viz:-

a) The recruitment video has been written and YTV expect to have completed shooting by the end of July. We do not know the timescale for all of the post-production work, but the video programme is on schedule to coincide with the launch of the Novice Licence.

b) Now that the Novice Training Manual has been written we can turn our attention again to the books for the students and the launching of DiY-Radio as a bi-monthly for beginners of all ages. Again, the next few months should see these projects to completion.

c) One major aspect of the success of the Novice Licence will be the availability of low power transmitters and suitable receivers at modest cost. During August the RSGB will meet with kit manufacturers and other interested parties to stimulate further interest in this aspect of Project YEAR.

In summary then, we expect the Novice Licence, videos, books and kits to all reach fruition in about six months time. This is a very exciting and busy period for the Society for we know of the great demand that now exists for the Novice Licence. It will be the beginning of a new era for UK amateur radio in which, for the first time in a decade or two, we can begin to see many more people enjoy the fun and pleasure we experienced during our first steps in amateur radio.

**David Evans, G3OUF**

## HF Contests Committee

Council has appointed Dave Lawley, G4BUO, as the new Chairman of the HF Contests Committee. The outgoing Chairman, Ron Glaisher, G6LX, remains IARU Region 1 Contest Coordinator, and will continue as a full member of the committee.

Correspondence on matters relating to HF Contests should be addressed to: D J Lawley, G4BUO, "Carramore" Coldharbour Road, Penshurst, Tonbridge, Kent, TN11 8EX.

## QSL Bureau

In case anyone missed our previous items, members are reminded that the QSL Bureau has moved to: **PO Box 1773, POTTERS BAR, Herts, EN6 3EP, England.** Please do not send any cards to the old address as they are likely to go astray.

## NEW TELEPHONE NUMBERS FOR RSGB HEADQUARTERS

RSGB Headquarters has some new telephone numbers to help members to get through directly to the department they require without having to wait for the busy switchboard to become clear.

There is a new Members' Hotline which you can use to make credit card purchases, and for general enquiries (including non-delivery of *RadCom*) that cannot readily be handled by volunteers. The number is (0707) 49855.

All subscription enquiries, and any calls to the Accounts Department should now be made to (0707) 49805.

Members wishing to contact the Editorial Department regarding *Radio Communication* or GB2RS should telephone (0707) 59260.

An answering machine will be available on these numbers outside office hours.

The old number, (0707) 59015, will still be on line, but this number will be used mainly for non-members and other organisations to contact the RSGB.

Our fax numbers remain unchanged - (0707) 45105 for all RSGB business except *RadCom* and GB2RS news which use (0707) 49503.

## Important correction — Survey

**The deadline for returning Radcom Readers Survey forms is, of course, Friday 31 August, not as stated on page 42.**

## Make a note in your phone book!!

- **0707 49855**
  **Members Hotline, book orders**
- **0707 49805**
  **Subscriptions queries**
- **0707 59260**
  ***Radio Communication* and GB2RS News**

Remember - before ringing HQ, check whether your RLO can answer your query. Additionally, a list of Society volunteers able to offer assistance and advice by post appeared in July's *RadCom*.

# White Horse Hero


Inspector Christopher Kelland, G0JEK, Chairman of the Vale of the White Horse Radio Society, has been honoured by the Automobile Association after putting his own life at risk to rescue two people from a petrol-soaked car.

He was presented with a Patrol Service Cross by AA Chairman Sir Ralph Carr Ellison at a special ceremony in London. Sir Ralph spoke of his "selfless act" of gallantry.

In February last year, Inspector Kelland - then a patrol force sergeant - was driving on the M4 near Slough when he saw a car somersault across the carriage-way and land on its roof in a ditch alongside the hard shoulder.

He went to the overturned car and was able to free one young woman from the wreckage. He then saw that another woman lay unconscious in the front of the vehicle and was trapped in the car by her legs.

The wrecked car's electrical circuits were live, and it was impossible to disconnect the battery. The vehicle had filled with petrol vapour, and an explosion could have taken place at any moment.

Inspector Kelland knew that it would be too dangerous to leave the woman in the car until further help arrived. And by climbing into the roadside ditch, and crawling on his stomach under the car, he was finally able to release the trapped passenger and pull her to safety.

Both the Inspector and the woman whom he rescued were by this time soaked in petrol, and the Inspector was in some pain and virtually overcome by fumes . . . but the woman survived, and neither she nor Inspector Kelland had any serious after effects.

## Awards news

From Ian Cornes, G4OUT, comes the latest **VHF awards** news. G6FTB, and G4MKF, have each received the 50MHz 10 countries two-way certificate; GM8MBP, G0LCS, G1INK and G4VXE have added 20 countries two way stickers; G6NB has been awarded the 30 countries two-way sticker.

50MHz confirmed squares awards go to G1INK (50 squares), G4MKF (50), GM8MBP (75). The 25 countries DX Award has been achieved by three amateurs, GM8MBP, G0LCS and G4MKF.

G1NWO has 60 squares confirmed on 144MHz as well as 30 squares and 6 countries on 430MHz. Other 144Mhz award recipients are G4VXE (125 squares / 20 countries), G3NAQ (175/20), and D Hilton-Jones (200/30).

The Widnes and Runcorn ARC have announced the **Double Whiskey Award** in honour of Jim Davidson, G1AWW, founder member and President, who died in March. A contact with the club station, GOFWR, counts for ten points towards the award, and any club member of a special event station run by the club counts five. On HF, 25 points are necessary to qualify for the award. On VHF, no repeater contacts are allowed and UK stations need 25 points, whilst others need 15. Starting date is 1 July 1990. The cost is £2 or 8 IRCs which will go towards cancer research. Log extracts signed by one other amateur should go to G1VJP, 216 Alder Street, Newton-le-Willows, Merseyside, WA12 8HS

The **"Chinghis Khan"** award is issued by the Monglian Sports Federation (MRSF) and JTDX Club on the occasion of the 750th anniversary of "The Secret History of Mongols". The award is available to all amateurs and is obtained by submitting proof of contact with one Mongolian station and stations in each of 12 different DXCC countries. The callsign suffixes of these 12 must include letters which spell "Chingis Khan"; e.g. JA2WDC for a 'C', WB1HGV for an 'H' etc. A list showing full details, certified by two amateurs, together with $5US or 15 IRCs, should be sent in a registered letter to: MRSF, PO Box 639, Ulaanbaatar 13, Mongolia, Asia.

The **Lincoln Century Award** is run by the Lincoln Short Wave Club. The aim is to contact cities and counties called Lincoln throughout the world. Points are gained by a contact with the LSWC stations, G5FZ or G6COL, (30 points); any station in the City of Lincoln, England or any other town or city in the world with that name (20); or any station in the county of Lincolnshire, England, or in any Lincoln county in the USA (10). Classes of award range from 100 points to 500. Contacts must be made from the same location, not via satellite or repeater, and claims for 50MHz and above should be for single band. A list showing the contacts, certified by two licensed amateurs, should be sent, with £1 or 5 IRCs, to: The Awards Manager, Pichbeck Farmhouse, Mill Lane, Sturton by Stow, Lincoln, LN1 2AS.

To celebrate the **40th Anniversary of DARC**, the German national society, a special award is available. To obtain DARC 40, it is necessary to obtain 40 points by working club stations with the prefixes DF0, DK0, DL0, and DA0. Applicants must not include more than one DA0 station on each of HF, 2m and 70cm. The points are earned as follows:

| | HF | 2m | 70cm |
|---|---|---|---|
| Phone | 2 | 4 | 6 |
| CW | 4 | 6 | 8 |
| Other modes | 6 | 8 | 10 |
| DA0 station | 10 | 10 | 10 |

A log extract should be sent, with DM 15.00, 12 IRCs or US$ 8.00, to:- DARC Amateurfunkzentrum, DARC 40, PO Box 1155, 3507 Baunatal, Federal Republic of Germany. All income from this award will be donated to AMSAT-DL for the development of amateur satellites.

- The worst tornadoes since 1974 struck Indiana in early June. Thanks to the work of radio amateurs much possible death and destruction was averted. As in the UK, amateurs are incorporated into local emergency planning, and over 500 were involved in plotting the course of funnel clouds and passing damage reports. Assistance was also provided to the Red Cross and other relief agencies.
- JARL's Ham Fair '90, will be held at the New Hall of Tokyo International Trade Centre in Harumi, Tokyo, from 24 to 26 August. 8J1HAM will be operating during the event.

## Latest CEPT List

The Radiocommunications Agency recently issued a new list of countries that are signatories to the CEPT licensing agreement. This list includes Finland, for the first time, including the Aaland Islands, and Market Reef. The full list is as follows:

Austria
Belgium
Denmark
Federal Republic of Germany
Finland
France
Greece
Liechtenstein
Luxembourg
Monaco
Netherlands
Norway
Spain
Sweden
Switzerland

## Help the blind

Camden Cassette, the talking newspaper for the blind are looking for a volunteer Radio Engineer, prepared to take over the responsibility for the recording of the "Camden Cassette". This goes out each week to registered blind and partially sighted residents in the London Borough of Camden. It carries local news read on to a tape by a group of volunteers from the newspapers of the area, and a magazine containing general topics of interest as well as information of use to our blind listeners. The recordings take place every Friday evening and we have our own copying equipment.

We have the following equipment:-

1 6 Channel mixer
4 Unidirectional tie clip microphone
2 Omnidirectionals
2 Headphones.
2 Sony TCS430 "walkman" type recorders
2 Unidirectional dynamic microphones plus stands, windshields etc...
1 High speed (16X) tape duplicator (comprises 1 master & 5 Slaves).
A large number of tape recorders.
Contact Zera Hatton on 081-458 5238.

## Faster packet

The Radiocommunications Agency has enhanced the facility whereby the RSGB distributes packet mailbox Notices of Variation on their behalf. This facility already allows comparitively rapid approval for the operation of mailboxes designed for third party traffic, using GB7 callsigns on the 50, 144 and 1300MHz bands. The RA have now agreed that the Society can include 70.325, 70.4875 and 432.675MHz on NoVs. Permission to use these frequencies previously involved the Site and Frequency Clearance system which is time consuming and involves the RSGB and the RA in much work and expense. Mailbox SysOps wanting to have the new frequencies added to their NoVs should send an SAE for an application form to the Packet Working Group's Mailbox Coordinator, Neil Lasher, 40 Farm Road, Edgware, Middx, HA8 9LT. Note, though, that demand is expected to be high so clearance may take a little time. Please do not ask for an NoV for a frequency you are not able to use straight away.

## Silent Key

Mr GR Foster, G2BM, 5.7.89

**Ted Walker, G0KAQ, the 1989 Young Amateur of the Year, visited the Navico factory in Margate last December to collect one of his prizes, a Navico AMR1000 transceiver. Ted toured the factory with his father, John. As well as viewing the company's amateur radio and marine band transceivers Ted was also shown a range of navigational aids including the Tillerpilot TP5000 which recently won the 1989 Silk Cut Award for Marine Electronics. L to r: Dave Sheekey, Senior Design Engineer; Ted Walker; Tom Crosbie, G6PZZ, Communications Product Manager.**

## Radio as sport

The World Radiosport Team Championship took place on 20 July in cooperation with the 1990 Goodwill Games in Seattle. The competition was endorsed by the Radio Sport Federation in the USSR and the ARRL in the US. 23 teams of the world's best HF contesters competed from the same location, thus eliminating the geographical factors which usually affect contest results. The UK team comprised G3YDV and RSGB HF Contests Committee Chairman, G4BUO. A full report on their experiences will appear in *RadCom* shortly

- GB2RBC made over 1500 contacts from Balmoral Castle, 9/10 June 1990. In addition to attracting pile-ups from the USA, the station had a personal visit from KD6JG and his wife from Los Angeles.

## SMC helps lifeboats

South Midlands Communications is loaning comms equipment to Portsmouth Lifeboat Station when they embark on "Operation Compass" to raise £75,000 for a new lifeboat station. A crew of 4 will drive 2,000 miles around Britain visiting the furthest lifeboat stations north, south, east and west, on the mainland and the islands. SMC's Micro Mariner handportable will be used to contact the lifeboat stations. In addition, an amateur radio station (also from SMC) will be carried - callsign G8LVB.

- Yet again, the SAREX shuttle carrying W4SIR has been postponed. The latest date for the launch is in mid August. The RSGB's GB2RS news service will announce the launch when it happens.


**Shown behind the RSGB stand at this year's Friedrichshafen Hamfest are (l to r) President Frank Hall, GM8BZX; Angelika Roberts, G5CCI (who together with husband Nigel, G4IJF, has helped out at each year's Hamfest); and Rosemary Evans, G0NDB.**

## G4WIM 50/ 70MHz Dual-Bander

There has been a very good response to this article and details are given below of kits and PCBs. Potential suppliers should note that it is necessary to obtain the permission of the Editor before reproducing copyright material from *Radio Communication*, including circuit diagrams. Copyright is also held on the PCB layouts. Many requests have been received from members for these layouts and we are trying to process them quickly.

### Corrections and Comments

The author, Tim Forester, G4WIM, has advised us of the following corrections to the published text:-

- TR10 is shown as an NPN; a BD132 is a PNP.
- R40 should connect directly to R42, and C55 should connect to the left hand tap of T3.
- The positive end of RL1 should connect to the most positive end of R54.

None of these affects the PCB component placements.

Note that the coupling between L9 and L10 etc is mutual as they are in pairs within the same screening cans.

The SL6601 (IC4) should have a 100pF from pin 2 to earth and 1K5 across the crystal. The 100pF stops suprious oscillations which can otherwise occur; the 1K5 ensure the oscillator starts when cold with high ESR crystals.

### Printed Boards

A complete set of printed circuit boards for the G4WIM Dual-bander can be obtained from:

Badger Boards, 87 Blackberry Lane, Four Oaks, Sutton Coldfield, B74 4JF.

The price for the full set is £66.13 inc VAT, p&p.

### Components

Complete and part kits of components for the Dual-bander are available from a number of sources, including:

Badger Boards (see above).

F.J.P. Kits and Components, 63 Princess St, Chadsmoor, Cannock, Staffs, WS11 2JT.

J.A.B., 76 Wensleydale Rd, Greatbarr, Birmingham, B43 1PL.

# RAE Courses

**Belfast** - Belfast College of Technology, College Square East, Belfast, BT1 6DJ. RAE class Tuesdays 5.30pm to 8pm. Enrol week beginning Monday 3 September. Details from JE Wilson, GI3NEB on Belfast 327244 extension 297.

**Bradford** - Bradford and Ilkley Community College, Great Horton Road, Bradford, BD7 1AY. Three courses. RAE Theory leading to City and Guilds 765; Morse leading to 12wpm test proficiency; Radio and Electronics Construction. Enrolment is on the 11, 12 and 13 September. Further details from Brian Ackroyd on (0274) 753373.

**Brentford** - Brentford Community Education Centre, Brentford School, Clifden Road, Brentford, TW8 0PG. RAE classes on Wednesdays at 7pm, morse classes on Thursdays at 7pm. Enrolment is on Tuesday 11 September. More details on 081-847 4281 or 081-876 3183.

**Bristol** - Brunel College of Technology, Ashley Down, Bristol, BS7 9BU. Radio Amateur Theory leading to City and Guilds 765; Radio Amateur Morse; Radio Amateur Practical Expertise. More information from David Heald, G0KJI on (0272) 241241 extension 2190.

**Burnham** - Burnham Adult Education Centre, Opendale Road, Burnham, SL1 7LZ. RAE course and morse class. Further details from Roy Smith, G0IWU, 4 Dawes East Road, Burnham, Bucks, SL1 8BT.

**Chingford** - Friday Hill House, Simmons Lane, Chingford, London E4. RAE course starting Wednesday 19 September at 7.30. Enrol on first night. More details from Alan Foss, G8EAY on 081-529 3380.

**Clacton** - Green Lodge Adult Education Centre, Old Road, Clacton on Sea. REA course. Enrol during first week of September. Further information from Jeff Harris, G3LWM, 21 Waltham Way, Frinton on Sea, Essex, or from Reg Taylor, G0NIP on (0255) 430466.

**Croydon** - Heath Clark Centre, Cooper Road, Waddon. RAE and morse classes. Enrol during the week 10 to 15 September. Further details from Robert, G4GTO on 081-660 2532.

**Farnborough** - Wavell School, Lynchford Road, Farnborough, Hants. RAE class commencing Thursday 20 September; Morse class commencing Monday 17 September. Enquiries to Mrs Sally Rogers on (0252) 26096.

**Harrow** - Weald College, Brookshill, Harrow. RAE class starts 6.45pm on Wednesday 26 September. Enrolment on first evening. More details from John Brown, G4UBB on 081-954 9571.

**Heckmondwike** - Heckmondwike Grammar School. RAE class, Mondays 7pm to 9pm. More information from F Stork, G3TEE on Leeds 554190.

**Ifield** - Ifield Adult Education Centre, near Crawley, West Sussex. RAE course starting September. For more details contact Brian Davies, G3OYU on (0342) 832559.

**Leeds** - Joseph Priestley Institute, Morley, Leeds. RAE class each Wednesday, 7pm to 9pm. Morse class each Tuesday. Also Electronics course on Thursday evenings leading to GCSE. Enrolment on 3 September. Details from Rebecca Rowe on (0532) 533749.

**Lincoln** - North Lincolnshire College, Lincoln Centre, Cathedral Street, Lincoln, LN2 5HQ. RAE course, morse course, and Radio Amateurs' Advanced Course. The latter covers transmitter and receiver design and measurement, satellite systems and packet radio. Enrol on 17 or 18 September between 7pm and 8.30pm. Further details from Richard Merriman, G3SIP on (0522) 510530 extension 2080.

**London** - City of Westminster College, 25 Paddington Green, London, W2 1NB. RAE course and morse course. Prospective candidates should contact Ann James on 071-723 8826.

**Manchester** - North Trafford College, Talbot Road, Stretford, Manchester, M32 0XH. Four courses - RAE Theory on Monday evening or Wednesday morning; Morse Code on Tuesday evening or Wednesday afternoon; Amateur Television on Wednesday morning; Advanced Morse Code on Monday evening. Enrol on 5, 6 or 7 September. For more details contact JT Beaumont, G3NGD on 061-872 3731.

**Nottingham** - Arnold and Carlton College of Further Education, Digby Avenue, Mapperley, Nottingham, NG3 6DR. Two RAE classes - a full course leading to the May 1991 examination, and a short course for those with some background knowledge aiming for the December 1990 examination. A morse class, including live on air contacts for more advanced students. A construction class including a wide variety of projects. For further information contact Ron Wilson on (0602) 876503.

**Orpington** - Poverest School, Poverest Road, Orpington. RAE course Wednesday evenings, 7.30pm to 9.30pm starting 19 September. Enrolment by post to Bromley Adult Education, Aylesbury Road, Bromley, BR2 0QR, or in person on the first evening. More details from Alan Betts, G0HIQ on (0689) 31123.

**Romford** - Havering College of Further and Higher Education, Quarles Campus, Tring Gardens, Harold Hill, Romford, RM3 9ES. RAE class and morse test. Contact Stuart Woosnam, G0NKP or Chris Potarzycki, G0NJR on (04023) 81460 for more details.

**Stockport** - Avondale Adult Education Centre, Heathbank Road, Cheadle Heath, Stockport, SK3 0UP. RAE course on Tuesday evenings, morse class on Monday evenings. Both 7pm to 9pm. Enrolment in week commencing Monday 17 September. Further information from Rik Whittaker, G4WAU on 061-427 4730.

Reddish Vale Evening Centre, Reddish Vale Road, Stockport, SK5 7HD. Short RAE course on Monday evenings leading to December 1990 examination for students with some experience. Normal RAE course leading to May 1991 examination on Tuesday evenings. 7pm to 9pm. Morse course on Thursday evenings. More details from D Wood, G4UJD on 061-477 3544.

**Stourbridge** - Old Swinsford Hospital School Amateur Radio Society, Hagley Road, Stourbridge, DY8 1QX. RAE class each Tuesday evening from 7pm to 9pm. Potential students should contact Ian, G0LOZ on (0384) 373898 for more information.

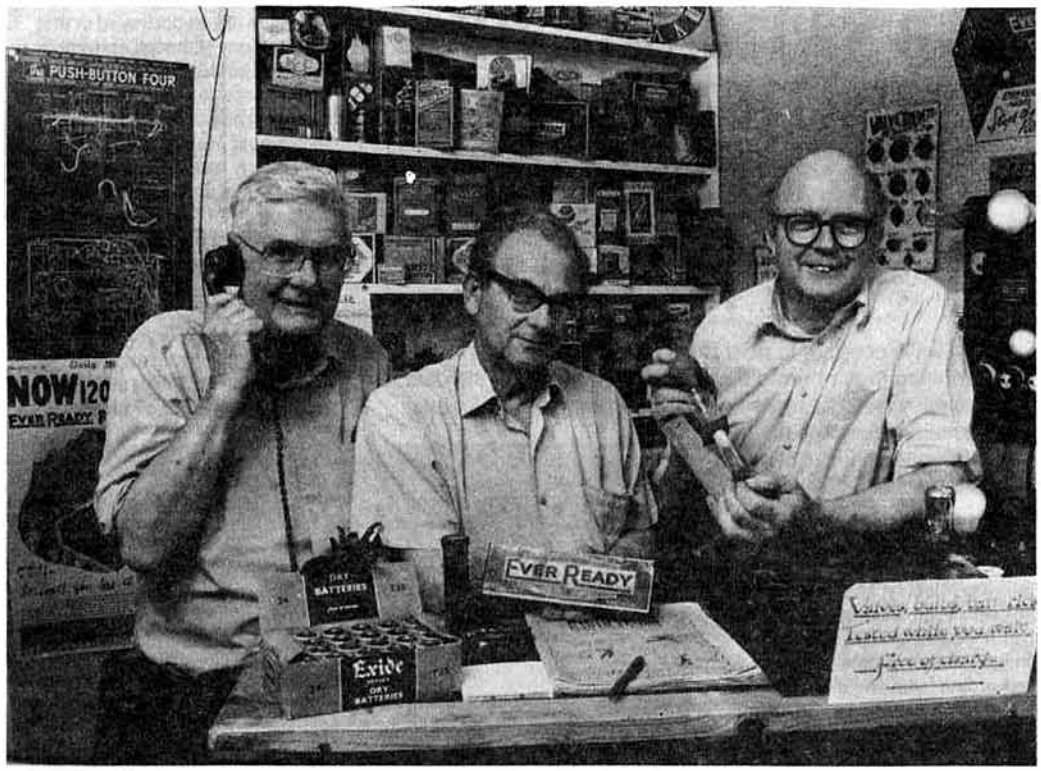
**Wilmslow** - North Cheshire Radio Club, Morley Green Club, Mobberley Road, Wilmslow. RAE class starting Sunday 23 September at 8pm. Further details from Peter Kirsop, G4WCE on Lymm 5959.


# Belfast Welcomes Guides

**Taken on HMS Belfast's Open Day, the photo shows (l to r) Bob Barton, G3PQH, Cmdr. of London Group RNARS, Angela Cook, Caroline Owen, and Nick Sifferlinger, OE8NIK, RNARS member. The two guides, from Chester, attended to collect RNARS SWL certificates won during JOTA. They are obviously future novice licensees as they have already learnt morse to 5WPM and some basic radio principles. PHOTO:G0LRS**

# Radio History

A private collection of radios at a house in Dulwich can be viewed by prior appointment. Gerald Wells's house contains his **Vintage Wireless Museum** which is crammed with over 1000 sets going back to the earliest models. He keeps the museum going by repairing old sets, and has a small team of craftsmen. In the cellar there are over 20,000 valves covering every set made. There is no charge to see the museum but prospective visitors should make arrangements in advance by telephoning 081 670 3667.




**Members of the Kingston and District ARS during their visit to the Vintage Wireless Museum in Dulwich. L to r: Gerald Fox, G3JRF; Robin Pellat, G4LJI; Gerald Wells, curator. *Photo:* G0LRS**

1990 is the 70th Anniversary year of the formation of the Royal Corps of Signals. To celebrate this, the RA permitted the special callsign GB70SIG to be used from 10 June to 7 July.

The **Royal Signals Museum of Army Communications** was established in 1967 and is located at the School of Signals at Blandford Camp. It is so successful that the collection is fast outstripping the storage and display space available.

A decision has been taken to build a new museum just outside the Blandford Camp boundary, which should greatly improve its availability to the general public. Three main exhibition galleries are planned.The largest will contain a chronological presentation of the history of army communications from the Crimean War to the present day, emphasising the work of the RCS. The presentation will include tableaux and full use of audio-visual effects, dioramas and voice commentaries. The second gallery will contain technical equipment used in army communications, presented in a straightforward way for the expert and enthusiast. The third will feature uniforms, paintings and medals.

Of special interest will be a section it is hoped to include in the Technical Gallery devoted to amateur radio. Special emphasis will be placed on educational aspects showing the development of the science of communications linking the past with the present day and future technology.

Although enjoying the support of the MoD, the capital and infrastructure costs of the new building and museum design must be met from private funds. The Museum Trust has set its appeal at £2,500,000. Much of this will come from the defence electronics industry and from serving and retired members of the Royal Corps of Signals. However, the museum is making a general appeal to anyone wishing to help make the project a success. Any contribution, no matter how small, will be gratefully received. Donations made by covenant would be especially welcome as this allows a taxation benefit to be claimed for the museum funds. Donations of £100 or more will entitle the donor to Associate Membership of the Museum for life, free entry for himself or herself and immediate family, and other benefits.

Further information can be obtained from the New Museum Project Office, School of Signals, Blandford Camp, Dorset, DT11 8RH. Tel 0258 452581 ext 2258.

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The **Amberley Chalk Pits Museum** is an industrial museum in the heart of rural Sussex featuring engines, buses, trains, steam locos, blacksmiths, pottery, printing and wood-working. In addition, it has a comprehensive wireless collection showing progressively the development of communications from the telegraph of the 1890s, through two world wars, to the techniques of television in the 1970s. One section of the Wireless Building is devoted to the history of amateur radio. The museum is open from Wednesday to Sunday, plus bank holidays from March to the end of October.

Visitors to the Isle of Wight may like to visit the Wireless exhibitions at Puckpool Park and Arreton Manor which are part of the **Communications and Electronics Museum** established in 1984. The museum initially concentrated the collections of Douglas Byrne, G3KPO, (an RLO and frequent contributor to these news pages), and Dr Graham Winbolt. Further information can be obtained from G3KPO at 52 West Hill Road, Ryde, IOW, PO33 1LN.

GB2IWM is the callsign used at the Imperial War Museum's site at **Duxford** Airfield (jctn M11/A505). The museum is housed in several hangars as well as having many outdoor exhibits, including a prototype Concorde. Although Duxford is open throughout the year, special events are held on certain Sundays. To coincide with these events Duxford Radio Society mounts exhibitions of communications equipment used by the RAF and the British Army, as well as Special Forces and clandestine radios. Information on the society can be obtained from John Brown, MIEE, G3EUR, 74 Humber Avenue, South Ockendon, Essex, RM15 5JN.

# RSGB NATIONAL VHF CONVENTION 1990

## VHF Columnist Norman Fitch reports on this popular annual event.

It is not always possible to hold the RSGB National VHF Convention on the preferred day. More often than not, the date is a compromise dictated by its not being too soon before or after another major event, the need to avoid public holidays and, not least, the availability of the venue.

The only suitable date for this year was the rather late one of Saturday, 12 May, and as football fans will recall, this was the day of the FA Cup Final. The established Drayton Manor Mobile Rally was held on the following day and it is thought that these were the main reasons why this year's attendance was a little down on that in 1989.

As usual, the queue of VHF pilgrims to the Sandown Park Racecourse at Esher in Surrey stretched almost to the gate by 10.00AM and the car park was already quite full. This year there were uniformed marshals managing the parking and making sure no illegal car boot sales were set up. When the turnstiles were unlocked at 10.30, access was swift and the main hall was quickly filled with eager bargain hunters.

The trade show was organized by Les Hawkyard, G5HD, and was well supported by many of the familiar *RadCom* advertisers who regularly attend the Convention and summer rallies. Most have got these one day stands to a fine art, setting out their wares in double quick time.

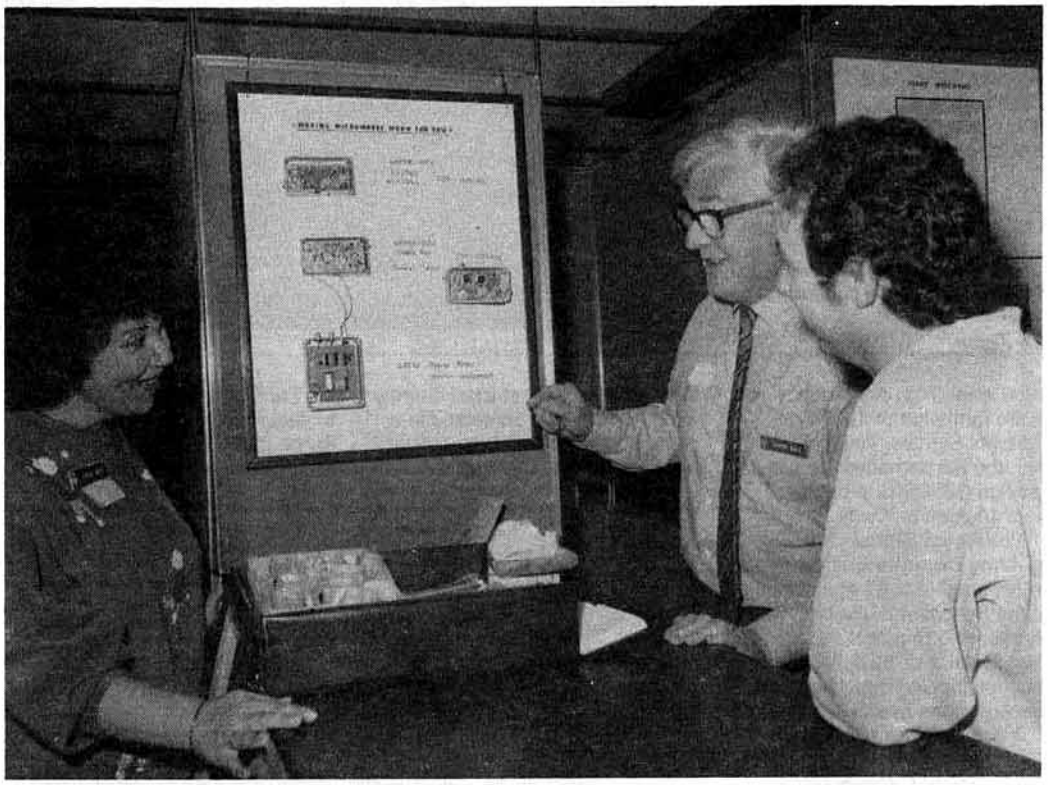
The main RSGB stand and bookstall was in its usual prominent position within sight of the main entrance on the ground floor. It was well staffed and did a steady business all day selling books and supplies and dealing with members' inquiries. The rest of the floor space was occupied by the traders and it is a very sensible idea to separate them from the special interest groups.

Some of the Society's numerous committees were on the first floor; these included the VHF, Microwave and Propagation Studies. Several other specialist groups, affiliated to the RSGB, had comprehensive displays, catering for such interests as satellites, RTTY, packet radio, ATV, remote imaging and contesting.

In a way, it is a pity that ordinary members of the public do not find their way into these amateur radio conventions. The majority still think that amateur radio and radio amateurs are as portrayed in that classic Tony Hancock episode in the days before colour TV. Were they to browse around the first floor of the grandstand, for example, they would probably be amazed at how highly technical and professional *amateur* radio has become.

The official opening of the Convention was at 1.30PM when VHF Committee Chairman Peter Burden, G3UBX, introduced the RSGB President, Frank Hall, GM8BZX. In a wide ranging address, the President mentioned the appointment of a Frequency Registrar, the new band plans for 50MHz and 70MHz and that Society VHF awards are now available to overseas applicants.

He outlined the developments in the novice licence negotiations and said he considered it vital to encourage young people to join the ranks of radio amateurs. One incentive would be to make these licences free to those under 21. The President warned that the DTI was taking a tough line against those who abused repeaters and packet radio networks. He urged members to report such cases to the RSGB's Amateur Radio Observation Service



***RadCom*** **columnist Mike Dixon, G3PFR, shows Meg, G7FRE, the display on the Microwave Committee stand.**


**Caroline, GI4XFS, talking EMC matters with Committee member Dave Lauder.**

Sam Jewell, G4DDK, was presented with the Wortley Talbot Trophy for developing high quality microwave designs such as the one on page 35.

Past President, Julian Gannaway, G3YGF, received the G3RPE Memorial Trophy for his microwave work.

The Courtney-Price Trophy, for the most outstanding technical development in amateur radio, was awarded to John Matthews, G3WZT.

The Founders Trophy went to Malcolm Harrington, RS 20249, for services to the Society on behalf of short wave listeners.

(AROS) to initiate suitable action.

Following the opening address, David Butler, G4ASR, the Society's VHF Manager, spoke about the IARU Region 1 Conference which was held in Torremolinos, Spain at the beginning of April. A full report has already been published in *RadCom*. He mentioned that delegates from several European countries thought there might be a possibility of their getting an allocation in the 70MHz region. Accordingly, this would be on a 'shopping list' for the WARC in 1992.

Before the assembled company departed for the lectures, there was the annual presentation of trophies by the President. The silverware was deftly handed to him by Council member and Trophies Manager Hilary Claytonsmith, G4JKS, and it was all recorded for posterity in the journal in true 'flash, bang, wallop' style! (*see this page and the Contest News pages - Ed*).

The popular lectures started at 2.15PM and Angus McKenzie, G3OSS, gave an interesting talk on the merits of VHF/UHF transverters versus 'Black Boxes.' He said that

Ken Ellis, G5KW, was awarded the Harold Rose Trophy for his 50MHz pioneering work.

the earlier transverters with HF transceivers gave an inferior performance to that of the best of the current VHF solid state rigs. However, he reckoned that the present generation of transverters, particularly those from Mutek Limited and SSB Products, when used with an HF transceiver of the Icom IC-735 or Kenwood TS-940 class, were capable of a very superior performance. Moreover, HF rigs usually incorporated more facilities than their VHF/UHF counterparts.

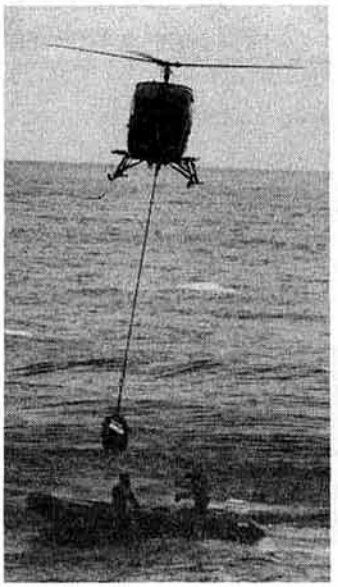
This year has already seen the launch of seven more amateur satellites, and Ron Broadbent, G3AAJ, the indefatigable Secretary of AMSAT-UK, gave a resume of their capabilities and operational states. His talk was illustrated with colour slides of the four Microsats and two UoSATs during preparation for their launch, and of the actual launch.

Another well attended session was 'DX and the Solar Cycle,' with contributions from Ray Cracknell, G2AHU, Martin Harrison, G3USF, and Ted Collins, G4UPS. This was also well illustrated, with diagrams of solar activity and recordings of QSOs between British Isles and Australian stations on 50MHz.

There were three forums - the Microwave Committee, the VHF Contests Committee and the Morse Test - a talk on the construction of simple microwave sources and the AGM of the Remote Imaging Group. Unfortunately Julian Gannaway's, G3YGF, lecture on communication by light was cancelled.

Once again Geoff Stone, G3FZL, was the overall organizer of this very popular annual event. He was still at it at 7.30PM, with a dozen or so volunteers, folding up and stacking the 280 heavy trestle tables hired for the traders. The VHF Committee has already discussed next year's VHF Convention, so make a note in your diaries to keep Sunday, 24 March free; that's the weekend before Easter. □

PHOTOGRAPHER: LA2GV



# The Club Bouvet 3Y5X Story

## Einar Enderud, LA1EE, and Kare Pedersen, LA2GV, describe one of the most sought after DXpeditions in recent years.

BOUVETOYA, a snow-capped and almost extinct volcano in the South Atlantic, has for many years been an attractive target for DXers and adventurers because of its remote and cold location, its wild and inaccessible nature and its position high up on the list of most wanted DXCC countries.

During the past 30 years radio amateurs had planned expeditions to Bouvetoya, and it was rather frustrating to see that nothing came of it.

Norwegian governmental expeditions in 1977 and 1978-79 had included radio amateurs, but only a small number of QSOs had been made. Bouvetoya was in great demand. There was a need for a major DXpedition, but none was in sight.

Would a private expedition be possible? It would obviously cost a lot of money - U$330,000 as it were. One would have to contribute personally and also depend on world-wide support, from hams and others. We made up our minds to give it a try.

## Club Bouvet is formed

To gain the necessary support we (LA1EE, LA2GV, and LA6VM) founded Club Bouvet in May 89. We also formed a project team to prepare for landing on Bouvetoya in December '89/January '90. By going in '89, the expedition would be able to celebrate the discovery of the island 250 years earlier. We would also be taking advantage of the sunspot cycle peak for good propagation conditions.

In early July we made our plans public by distributing News Release #1 where we solicited support from hams worldwide. Club Bouvet grew and correspondence with all supporting members - nearly 1000 in the end in more than 30 countries, took all our leisure time for months.

Transportation was the major issue. How would we get to Bouvetoya? Because the island has no natural harbour, and since the weather conditions are rough, it would be necessary to use a boat with helicopter for a safe and efficient landing and departure. That would lead to high costs, but the size of such a boat would allow for more participants and a wider funding base.

PHOTOGRAPHER: LA1EE

Jim, JF1IST.

We made contact with governments, embassies and private companies in our search for a suitable vessel. We also were approached by an American group, and corresponded with it about a possible cooperation which unfortunately did not materialize. It turned out in the end that we could make a very good deal by chartering the MV Aurora. We knew this boat from our expedition three years earlier to Peter 1 Is in the Antarctic.

Scientists (two), a film team (two), guest operators (three) and a camp assistant were invited to join our expedition. At the end of October, although much funding was still outstanding, and we knew we would be taking a personal economic risk, we were obliged to take a decision for the expedition to be on schedule. At this point we had only two weeks to prepare all kinds of equipment and for petrol to be taken on board. Nevertheless, on 14 November the contract had been signed and Aurora sailed from Sandefjord on its long trip to Montevideo where it would pick up the expedition crew 4 weeks later. The necessary landing permit, including authorization to use the helicopter, had been obtained from the Ministry of Environment who desired that our expedition update the 11 year old mapping of the bird and seal colonies in this wildlife refuge.

## The Journey

When Aurora left Montevideo on 14 December bound for Bouvetoya, we were 19 men on board, including the ship's crew of seven and the helicopter crew of two.

Through Raol, CX7BY, we had received a lot of valuable assistance from the CX DXers in the days before sailing. We also had enjoyed very much the hospitality and friendship of the local hams and the CX league.

**Because the island has no natural harbour, and since the weather conditions are rough there, a boat with helicopter was a must for a safe and efficient landing and departure.**

The guest operators were Jacky F2CW, Willy HB9AHL and Jin JF1IST. They had joined the expedition on condition that they bring substantial funding to the project from sponsors, primarily in their own countries. During the 11 day sea voyage we had time to get to know each other and to check out all the ICOM transceivers, amplifiers and tuners - six complete stations. Most of us were quite sick for several days in the heavy sea, but we managed to get on the air a lot and worked every day preparing field equipment, practising tent installation, and playing with the Inmarsat Std.C satellite communication system. The biologists got very excited seeing so many unfamiliar species of birds and whales. Every new one was duly noted in their logs, just like new countries among avid DXers.

The pine tree, which Jin had bought in Montevideo, appeared on a table in the mess. We knew that Christmas was drawing near. Not one minute was lost of band openings to Europe, while everyone on board had their chance to say "hello" to their families over Norwegian and other European coast stations. On Christmas Eve, the Captain turned the Aurora up against the wind to keep her steady in the heavy sea during the traditional Norwegian Christmas supper. Later, Father Christmas came to see us bringing presents for everyone on board.

While operating LA5X/MM we really felt how DXers world-wide were sharing our expectations and excitement as we were approaching the island.

PHOTOGRAPHER: JF1IST

Willy, HB9AHL.

The WX did not look very promising. Winds were increasing, waves were long and heavy and at least 7-8 metres high. The pressure fell about 100mb in 24 hours and we were in the middle of a 949mb low. We sailed through fog and reached the west side of the island on schedule in the afternoon of 25 December, head on by means of satellite navigation and radar. Landing by dinghy through the heavy waves breaking on the shore was completely out of the question. Nor could we launch the lifeboat or mount the helicopter, because Aurora was rolling too much. We found a suitable anchor place for the night just south of the Christensen glacier. On 26 December, the wind turned more southerly and we moved east and then north of the island where we spent the second night on board waiting for the wind and sea to subside.

## Landing on the Island

In the afternoon of 27 December, after an exciting tour of reconnaissance with the lifeboat, Aurora continued its circumnavigation of the island and moved in towards Nyroysa to find shelter behind a stranded iceberg less than 1000 metres flying distance from the planned camp site. The helicopter, which had been brought all the way from Norway, was prepared for flight and the landing team got ready to disembark. We were determined to accomplish as much as possible before dark. At 1850 that evening, Einar set foot on Nyroysa, the only location on the entire island where a camp is possible. Kare remained on board to organize the loading operations, while Einar coordinated the work onshore. Two hours later nine men and most of the field equipment was ashore, but Kare, the generator fuel and some equipment remained on board until the day after.

**During the 11 day sea voyage we had time to get to know each other and to check out all the ICOM transceivers, amplifiers and tuners - six complete stations.**

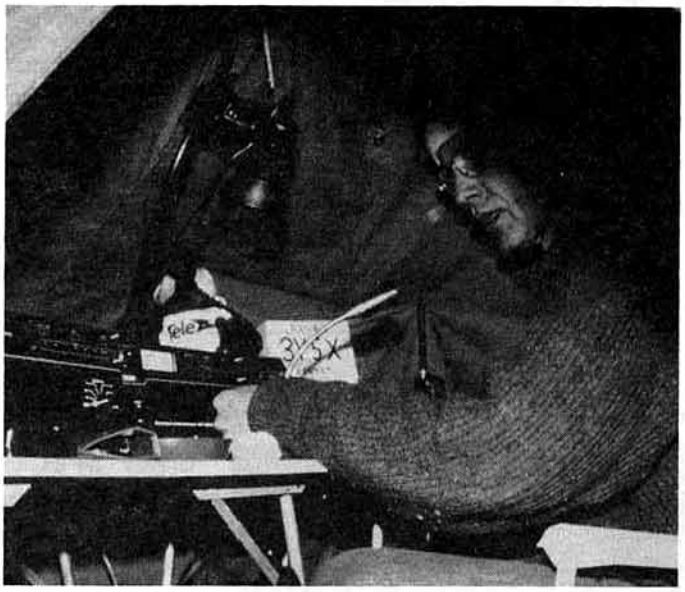
It was overcast and just below the freezing point. Together with the biologist from the Norwegian Polar Research Institute, we located the very limited area where we could put up our tents without disturbing the birds' hatching areas while getting the best possible radio take-off in the direction of Europe, Japan and USA. Before dark we were provisionally installed in our tents amidst the rough boulders, not the ideal site for a bed and a good night's sleep, to put it mildly.

We were lucky to be able to fly again the next morning. Ten barrels of petrol were brought in, along with the generators and the rest of the equipment. Then Kare made a reconnaissance tour around the island with Aurora to make a closer inspection of possible escape routes for the planned eastern glacier camp. We had agreed that a second camp on the eastern side of the island would be highly desirable because of the steep mountain effectively screening towards Japan, Australia and New Zealand short path from the base camp. Unfortunately, after the site survey we found it too dangerous, and had to conclude that there would be only one camp.

We were now faced with a new challenge: to try to work a reasonable number of QSOs with Japan, Australia and New Zealand when the long path was open a few hours a day to these areas at times when the bands were also wide open to North America. We knew this would be putting the understanding, cooperation and patience of the stations in North America to a hard test.

In the evening of 28 December, the entire landing team of 10 and all the equipment was ashore and installed. Four stations were ready for operation; the fifth one became operational the next day.

PHOTOGRAPHER: JF1IST



**Kare, LA2GV, operating one of the six stations.**

## 3Y5X goes QRV

After more than 25 hours of hard labour, interrupted only by a few hours sleep, we were quite exhausted, but happy and ready for the DX operation. We moved up to 14.145 and Einar worked LA6VM as the first station. Some minutes later we had four stations on the air. We were in business at last!

**Landing by dinghy through the heavy waves breaking on the shore was completely out of the question.**

The five stations were arranged in separated igloo tents which became our "private homes" for the 17 days on the island. The tents were designed to resist strong winds and to avoid condensation. Each tent contained two small camping tables with a radio station, a camping chair, a field bed with sleeping bag and a 220V AC heater and lamp with clip. One typical station consisted of IC-751A transceiver, IC2KL, IC-AT500 plus keyer, microphone, headset and a heavy 12V battery. Some of the equipment, including the Tono RTTY terminal, was re-used from the Peter 1 Is expedition. Einar used a Victor PC and LA9UX software for logging thousands of QSOs and as a memory keyer. Our antennas were four triband Yagis for HF plus three HF6V Butternut verticals. Kare also used the W0CD Battlecreek Special for 40, 80 and 160, partly acting as a Minooka and inverted L. On 6m we tried a five element Yagi and 100W , but no QSOs were made and no beacon reports received.

Our two Honda 3kVA generators worked very well, but two other 2.6 and 3.6 kVA ones created more work. We used about 1800 litres of 100-octane petrol to power all stations, heating, lighting and some electric tools.

Since the five stations were quite close together, there was some interference between them, which limited the freedom and sometimes hampered the daily operating. But often the mutual interference could be eliminated or reduced by playing with antenna polarization and beam headings.

We generally felt that when we tried to work Asia and the Pacific over the long path across North America, the great majority of North American hams cooperated and stood the test. We suppose they realized that they had good openings 24 hours a day on one band or another. Some apparently did not see clearly, or did not care, what was happening and did not cooperate. Or perhaps they panicked in fear of missing this opportunity. After all, there might not be another chance in their lifetime.

New Year's Eve was celebrated with meatballs and Bouvet wine (the French wine-maker had granted funding and wine). We also celebrated the 250 years anniversary and the first Norwegian landing by the Norvegia expedition in 1927. The Club Bouvet bronze plaque commemorating Consul Lars Christensen from Sandefjord, who equipped that expedition, was unveiled and bolted to a rock.

**In the afternoon of December 27, after an exciting tour of reconnaissance with the lifeboat, Aurora continued its circumvention of the island and moved in towards Nyroysa to find shelter behind a stranded iceberg.**

The new Inmarsat Std.C system was very impressive, providing two-way public telex service from our Victor laptop computer via a tiny, omnidirectional antenna, for weather reports, press releases and other project correspondence. We also had a HF voice link to Norway on frequencies outside the ham bands.

PHOTOGRAPHER: JF1IST

**Einar, LA1EE.**

On certain days, when the low pressures were passing north of the island strong gusts of wind from the east hit us with tremendous force, tearing the tent guy ropes and creating loud noises and a lot of extra work and discomfort in the camp.

More pleasant were the hot meals served each evening. Our camp assistant Espen, a young biology student, also provided self-service meals around the clock in the kitchen tent.

*continued on page 61*

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# 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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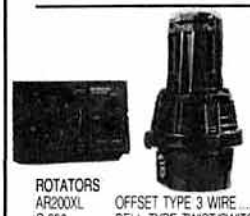
# SMC South Midlands Communications ltd.

## 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 |
| RCS-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 l/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

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## *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 | 144/14T | 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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## NEW MK II HP100E

**1000 Channel Superscanner 8-1300 Mhz**

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(subject unsold)

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ICOM R100 MOBILE SCANNER 50KHz to 1.8GHz — now in — **£499**

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**£379.00** with batt case.

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'The *effective* aerial'

**NON RADIAL: Mobile antennas independent of vehicle ground plane**

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CHL24J 144/432 Mhz 2.15dB/5 dB 100W 0.8 metres long ..... £25.30
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2x4WX 144/432 Mhz 6.5/9.0dB 200W 3.18 metres Glassfibre ..... £79.95
2x4SUPER II 144/432 Mhz 6.0/8.4dB 200W 2.43 metres Glassfibre. .. £77.35
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**DUPLEX & TRIPLEXERS Zinc alloy diecast**

CFX5140 50/144/432 Mhz 800/800/500 Watt PEP 55dB isolation £38.10
CF413N 432/1296 Mhz 500/200W PEP 55dB Isolation "N" ..... £36.65
CF416 144/432 Mhz 800/500 W PEP 60dB isolation ..... £26.80

**SR Series to order only. MONO BANDER MOBILE ANTENNAS**

CA285 5/8 wave 3.5dB 300Watt 1.32 Metres Base loaded ..... £15.00
CA287C 7/8 wave 5.2dB 200W 1.89 metres double co-phase ..... £22.50
CA430TM 3 x 5/8 wave 432 Mhz 6.8dB 150W 1.47 metres ..... £29.95

**MONOBAND BASE ANTENNAS**

ABC21 5/8wave Ground Plane 144 Mhz 3.4dB 200W 1.4 metres ... £24.50
ABC22A 2 x 5/8 wave 144 Mhz 6.5dB 2.87 metres ..... £36.00
ABC23 3 x 5/8 wave 144 Mhz 7.8dB 200 W 4.5 metres ..... £50.50
ABC71 5/8 wave ground plane 432 Mhz 3.4dB .54 mtrs ..... £21.56
ABC72 2 x 5/8 wave GP.432 Mhz 200W 5.8dB 1.07 metres ..... £34.85
CA712EF 432 Mhz Twelve x Half wave! 9.5dB 3.10 metres ..... £55.00

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CHA-5 Vertical with Loaded Radials for 80/40/20/15/10 M 200W SSB 5.29 Metres. Features trifilier wound toriodal core ..... £219.95
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CBL30 HF 1.7 — 30 Mhz Balun 1:1 1kw ..... £20.85

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CRZ12DB A Unique wide band Active antenna 500Hz to 1500 Mhz 1.24 Metres with controller ..... £96.30
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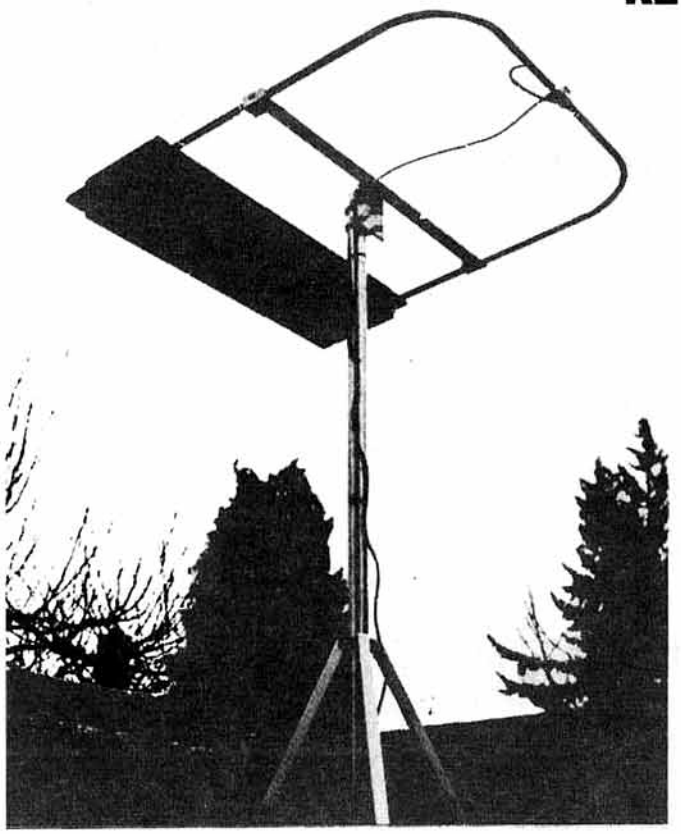
WIGAN: Greensway Arcade, Gerrard Street, Ashton-in-Makerfield, Wigan, Lancs. Tel: 0942 713405

LEICESTER: DAVE FOSTER (Agent). Tel: 0533 608189. Latest calls 8.30pm please!

# AEA's IsoLoop™ HF ANTENNA

## REVOLUTIONARY COMPACT DESIGN

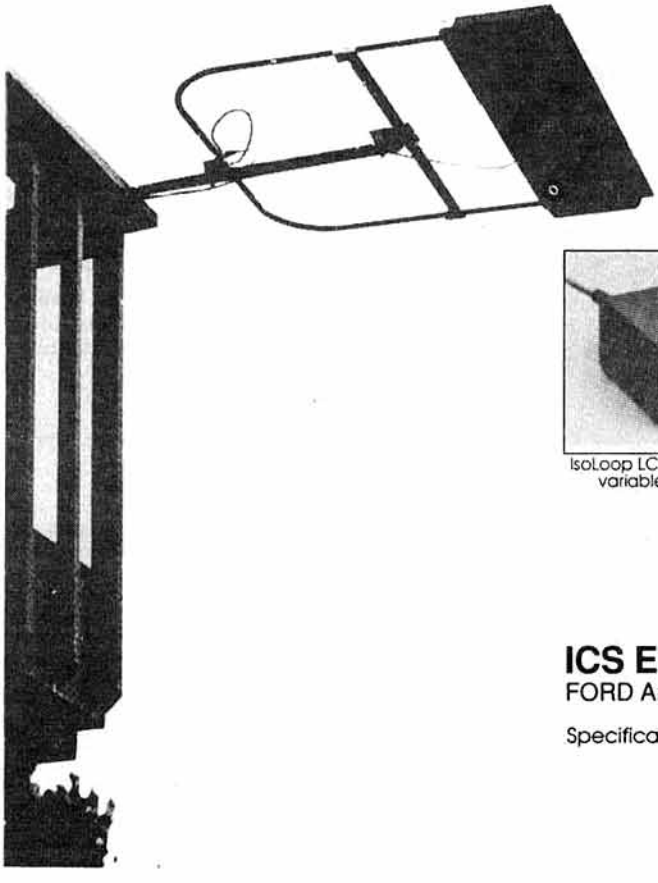


Once again AEA has achieved a significant engineering breakthrough with its high-performance, low profile HF IsoLoop antenna. Performance isn't compromised by its small size. Operate your favourite HF band (14 to 30 MHz frequency coverage) from areas with planning consent problems or flats and apartments. Or take it with you on holiday. . . it's the ideal go-anywhere portable antenna. And it's the only antenna you need to cover 14 to 30 MHz. ONE antenna instead of numerous dipoles and without any traps!

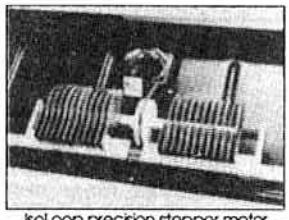
**150 Watts.** Rated up to 150 watts, the IsoLoop transmits and receives on any frequency between 14 to 30 MHz. When mounted with the loop in the horizontal plane, the radiation pattern is omni-directional and horizontally polarized, with the gain of a dipole. Maximum radiation is at low angles which is ideal for DX operation. The IsoLoop may also be mounted with the loop in the vertical plane to provide a null in a desired direction. Tuning is provided by a precision stepper-motor and a small remote control box, the LC-1.

The IsoLoop does not need ground radials and its balanced, shielded feed-loop isolates the feedline from the antenna. The IsoLoop is well-isolated from the feedline. Like AEA's Isopole antennas, your signal is radiated by the antenna and not the feedline. With end-fed antennas, the outside of the coax becomes part of the antenna, resulting in noise and computer hash pickup and increased TVI problems.

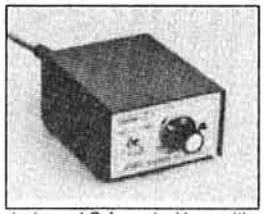
**High-Q Design.** One of the unique features of the IsoLoop is its inherent High-Q. The IsoLoop can be considered a very sharp tunable filter that radiates. The narrow bandwidth suppresses harmonics from your transmitter reducing TVI problems. It also attenuates out-of-band signals from nearby transmitters that could overload your receiver.



**Compact.** The IsoLoop is square, with rounded corners, and measures 32 inches on a side and weighs only 12 pounds. It packs down to only half this size for transportation. Because of the IsoLoop's small size, it makes a perfect attic or balcony antenna. It's also excellent for portable operation, recreational vehicles or camp-site use. A rotator is not necessary when used in the omni-directional, horizontally polarized mode.



IsoLoop precision stepper motor provides accurate tuning.



IsoLoop LC-1 control box with variable speed tuning.

**Revolutionary.** The AEA IsoLoop antenna represents years of research and development. Others may try to imitate the IsoLoop, but none can match the patent-pending design.

The Isoloop is imported exclusively for Europe by ICS Electronics Ltd., who offer a full 12 months warranty. Contact ICS or your local dealer for more information.

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# SPECTRUM ANALYSIS

## HF

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

GW4BKG, the Society's awards manager, asks if G4PLC, G5LP, G4OUT, GM4BQA, and G4OTW would please send him a large sase (10 by 12in) to collect their PZK awards?

An offer to act as QSL manager has been received from Marius Dancila, YO3CD. His QTH is P.O.Box 57-11, R-76500 Bucharest, and anyone needing his services should please contact him direct.

I have just received the translation of the April issue of *"Radio"* the monthly magazine of RSF. It contains the draft rules of the "QSD-CW-LID-Club". The club would accept genuine boors in its ranks with the greatest of pleasure - it is sufficient not to know the radio codes or operating procedures! Pity it was in the April issue... The same number says that collective and personal stations of the first category were allowed to use Packet and SSTV from 1 March 1990 in the agreed IARU Region 1 band segments.

### REG CHERRILL, W3HQO

I am sorry to have to report the death on 6 June of Reg Cherrill, W3HQO, founder of the Ex-G Radio Club. Reg founded the club in 1959 and it has been the means of keeping literally hundreds of expatriates throughout the world in touch with Great Britain and each other via the many club nets. Reg was born in Kidderminster in 1907 and emigrated to the USA in 1928 - but he still kept his Worcestershire accent to the last! A visit to the "old country" in 1957 gave him the idea for the club and his perseverance resulted in a rapid growth to its present membership of over 250. He devoted a great deal of time to its cause until he became ill following his wife's death in 1988. He was a gentleman in every way and it is hoped that a special memorial W3HQO award will be announced soon.

**The Polar Expedition group (see text). L to r: UV3DEZ, RA3DAP, G0KPH, UA3DRP, and G0GWA.**

### POLAR EXPEDITION

Simon Browne, G0GWA, and Paul Keighley, G0KPH, were invited to take part in the Polar vehicular expedition which was expected to use the callsigns EK0AA and EK0AB. However, this did not happen, and later they required permission to join another group and needed permits to visit Sredniy Is. Whilst waiting in Moscow they visited RA3DAP, UA3DLT, UA3AGS, UA3PIP as well as Box 88 and they operated club stations UZ3AXX, UZ3DZU, and RZ3DWQ. Everybody was extremely hospitable during their stay. On 31 March the group arrived in Sredniy and joined UA3DAP and UV3AAC operating as EK0DA/4K4 and EK0AAC/4K4. It was here that they met Morag Laurence. Sergey, etc of "North Pole 90". They operated using the callsigns UA0/GB4MSS and UA0/GB41CE and made about 1,400 QSOs before leaving on 17 April. This total included about 130 UK stations. Simon is now planning a visit to Sierra Leone for about two months from mid-August. He will do some VHF propagation work and may operate from all 9L call areas as G0GWA/9L1 — G0GWA/9L4 mostly 15kHz up from band edges and on the QRP frequencies.

### DX NEWS

According to *DX-NL* FT5XA and FT5XH on **Amsterdam Is**,use the same station (two days for each) and are very active near 28.440 around 0700, 21.153MHz around 1400, and 14.114MHz at 1600. FT4WB on **Crozet Is** often joins in on the 28.440MHz frequency. 3V8PA, in **Tunisia** is reported to be near 14.018MHz quite regularly around 1930. G4RUL is in **Botswana** and at the time of writing was expecting to be on 21 or 28MHz between 1100 and 1300 daily . His callsign may be A25/G4RUL or A25OR. According to *DX-NL* the new operator at ZS8MI is very active - try looking for him on Saturday at 1130 on 14.256MHz. Other preferred frequencies are 14.262, 21.260, and 28.495MHz.

There are rumours which seem to be coming from VU2NTA that A51JX will be on the air during September when a group of Indian amateurs visits **Bhutan**.

VP8BXK, on Signy Is in **S.Orkney** is reported by the *Long Island DX Bulletin* to be near 21.285MHz quite often from about 2000.

KB5LRO is on a one year tour of duty in **Greenland** and will probably be found using his OX3EW callsign mostly on SSB near 14.230MHz. DF2UU, DL2GCA, and DL2GCH are due to visit **Iceland** this month and they will be on all bands until 24 August using the TF/ prefix followed by their own callsigns. A large group of Greek amateurs will be visiting **Crete** between 1 and 15 of this month. They will be on all bands on CW, SSB, and RTTY, and the callsign may be J49G. The actual operation will be from Gavdos Is and according to *DX-NL* it should count as a separate DXCC country under DXCC Rule 3 (its situation is similar to that of Market Reef).

AA6LF is touring in the Pacific and has said that he has permission to visit **Palmyra Is** during August.

### DX MISCELLANY

I have received a registered letter from the Head of the International Telecommunications Sector, Egyptian National Telecommunications Organisation, which states quite clearly that Charles Signer, SU1EE, and John Reika, SU1EX, "are not registered in licences issued by the Arab Republic of Egypt."

According to the *JARL News* the Kokusai Denshin Denwa Co recently developed equipment which almost completely eliminates "woodpecker" type interference and is alleged to be much more effective than a noise-blanker. At present it is being used by maritime radio telephones but may become available to the amateur market later. This would happen at a time when the original "Woodpecker" seems to have disappeared...

Krishna Khatry, 9N1MC, has retired from the Nepalese Ministry of Communications and in future will not answer cards sent to him at that address. He will in due course be answering all QSLs already received together with return postage. The letter says "from now on cards intended for 9N1MC or 9N1RN for fresh contacts should not be addressed in my name". It seems that "green stamps" enclosed with cards are generally removed in transit and even if they arrive it is considered to be illegal to receive them.

Please note that G3CWI has now taken over *all* QSLing for his previous callsigns - VP8ANT, JY8NT, VK9LW, and G3CWI/CE (various call-areas). Even though VP8ANT ceased operating a long time ago Richard is still receiving cards for QSOs made up to nine years ago. He expresses sincere thanks to Martin, G3ZAY, who has dealt with all his direct QSLs since 1981 - sending out over 8,000 for VP8ANT alone.

John Vajo, W2ZWW/HS0AC, has sent me a copy of a letter which he wrote to Ellen White at ARRL. In this he gave the news that a new station, HS0AC, located in the Bangkok Science Museum, came

### QTH CORNER

| | |
|---|---|
| **EK0AAC/4K4** | (see EK0DAP/4K4) |
| **EK0DAP/4K4** | Box 73, Moscow 103051, U.S.S.R. |
| **FR5ZU/T** | J.Quillet, 1 Cite de Meteorologique, F-97490 St.Clotilde, Reunion Is. |
| **G0GWA/9L** | S.Browne, 8 Lincoln Av, Heald Green, Cheadle, Cheshire, SK8 3LJ. |
| **HS0AC** | via NY2E, 819 Old Medford Av, Medford, NY 11763, USA. |
| **VP8ANT** | (see text) G3CWI, 27 Gleave Avenue, Bollington, Nr. Macclesfield, Cheshire, SK10 5LX. |
| **ZD8LII** | Steve Hodgson, PO Box 2, Ascension Is, |
| **ZS8MI** | PO Box 13077, Jacobs 4026, Rep. of South Africa. |
| **7O1AA** | 9K2CS, Yousuf Saad Alsabah, Box 476, Kuwait. |

Radio Society of Great Britain

# HF Convention

## 29 and 30 September 1990

## Penguin Hotel, Daventry


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

### 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 10.30am to 17.30pm.

***Stream A***

Pacific DXpedition . . . . . Mats Pereson, 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

***Stream B***

Amateur radio software . . . . . Don Field, G3XTT
QRP Forum . . . . . G-QRP Club
High Power HF antennas . . . David Yates, G3PGQ
UK DX Packet Alert . . . . . Ian Shepherd, G4LJF
Direction Finding

*Question and Answer session on HF and DX matters.*

***Including all the usual attractions . . .***

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

**1990 28MHZ COUNTRIES TABLE**

| | | | |
|---|---|---|---|
| G0JZA | 180 | G0MXU | 80 |
| G4MUW | 178 (ssb) | G0CKP | 79 |
| G4VVP | 172 (ssb) | G4NXG/M | 78 |
| G4DXW | 148 | G2AKK | 76 (cw) |
| GM4OBK | 122 | GM4ZIL | 63 |
| G4ZYQ | 109 | G4SJG | 60 |

on the air in March and has made several thousand QSOs. Its prime function is to act as a demonstration station and hopefully it will ultimately have two complete HF and one VHF positions. No foreigners are issued with licences in Thailand but they may operate a club station under the supervision of a RAST member and there is talk of temporary permission being given to those living in Thailand. Visitors should take their home licence with them and arrangements may be made for them to operate. HS0B is seldom used these days and HS0E and HS0F are Thai nationals.

## EXPEDITIONS

In the letter, mentioned earlier, sent to me from YO3CD (via G3NOH), Marius says that a group of Romanian amateurs (including himself) is planning an expedition during the next year to **Mount Athos** and **Albania**. It will be sponsored by Yaesu together with the EUDX Foundation.

*"Radio"* reports that members of a scientific expedition may be active from **Ghana** until the end of 1990. 9G0R will operate ssb on 1.825, 3.695 and 7.095MHz and 9G0R/MM will use CW on 1.805, 3.505, and 7.005MHz. I have yet to hear of either of these being logged.

Vince Lear, G3TKN, together with VO1MP, will visit **St.Pierre et Miquelon** between 3 and 6 August. Callsigns will be FP/G3TKN and FP/VO1MP and operation on all bands with special attention to 3.5, 7MHz, and the WARC bands. CW will be 20kHz up from the lower ends of bands and ssb on 3.790 and 7.090MHz. They will have a TS930S and TS680S with multiband dipoles and maybe an hf beam on the hotel roof. Vince will be VO1/G3TKN for the rest of August and is looking particularly for Europe on 3.5 and 7MHz.

Liga Colombiana de Radioaficionados is mounting a four day expedition to **Malpelo Is**, probably in October (but later messages suggest it may be postponed until early in 1991). More details later.

## CHILTERN DX CLUB PACKET CLUSTER

This *should* have been the UK's first DX packet cluster to be licensed but due to administrative delays it has only just become fully operational from G4LJF's QTH in Wokingham. It has the callsign GB7DXI, and may be accessed from the node network on 144.675MHz or 70.325MHz.

## SEANET CONVENTION 1990

This will take place in Kuching, Sarawak, from 10 to 12 November and looks like being quite an event. As the brochure says "To use the amateur radio parlance, it will give members of the fraternity the opportunity for an eyeball QSO and, at the same time, go on frequency in this enchanting 9M8 land known as Sarawak". This is "Visit Malaysia Year" and hopefully this will attract even more to the convention. More information from MARTS, PO Box 10777, Kuala Lumpur, Malaysia.

## CONTESTS

In the **1990 Bermuda Contest** Ron Stone, **GW3YDX**, once again excelled and won the UK section with a total of 626,620 points - more than three times the score of GU0ELF (205,020) who was second UK entrant. Other scores were: G0CCH - 117,000; GJ0KKB - 110,295; G3XTT - 68,460; G0EIX - 23,850; GM0AAX - 15,755; G4CNY - 14,190; G4SIA - 9,200; G4SSN - 5,340; G3AAE - 2,420; and G4GFH - 300. The USA winner is N3AD, the Canadian VE1JL, and the FR Germany winner is DL1YAF. The top Bermudian was VP9LR. In 1991 the contest will be on 16 and 17 March. The winners have a free trip to Bermuda to collect their certificates at the banquet of 19 October - during the BARS Radio Week.

***All-Asian DX Contest***

0000 25 August - 2400 26 August (CW section)

I can supply full rules (SASE please). In the 1989 All Asian DX Contest (Phone) UK scores were (Multi-band) GM3BCL (7,303), G0LFX (3,760), and G3XWK/P (25). On 21MHz G4IJW scored 9,576 points, GW3HGJ 6,890, and G3OLU 210.

In the **1989 Colombian Independence Contest G3ESF** came world fifth with 45,936 points.

Apologies to **G4BWP.** In the results of the **1989 IARU HF World Championship** shown in the April column his score had been misplaced. In fact **GB4DX**(operated

## HF F-LAYER PROPAGATION PREDICTIONS FOR AUGUST 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 | .....1.. | ....1111131. | ...333334641 | 1.2555556873 | 645655556898 | 875333234689 | 7521....1367 | 42.....35 |
| MALTA | .....1.. | ...11121131. | 1..344444642 | 312666667875 | 866766667899 | 998533334689 | 8862111111478 | ++3.....4+ |
| GIBRALTAR | ..... | .....1.. | ....2222142. | 1..244444652 | 633776666897 | 987754434689 | 8874211111478 | ++4.....4+ |
| ICELAND | ..... | ..... | .....11. | .....1111441 | 2..245444775 | 754644444578 | 776421112346 | 443.....3 |
| ** ASIA | | | | | | | | |
| OSAKA | ..... | ....11..1... | ...121112111 | ....31113342 | ....1...1573 | .....361 | .....13. | ..... |
| HONGKONG | ....1...11.. | ...11111331. | ...122224641 | 1...11114774 | 1.....2687 | .....365 | .....142 | ..... |
| BANGKOK | ...11111221. | ...12222352. | 1..113235762 | 2....1114885 | 4.....2688 | 3.....377 | .....145 | .....2 |
| SINGAPORE | ...11111231. | ...22322453. | 1..112235763 | 3....1114886 | 5.....2688 | 3.....378 | .....145 | .....2 |
| NEW DELHI | ...1111121.. | ..122333421. | 1.1112235542 | 31...1114775 | 72.....2688 | 5.....378 | 3.....146 | .....3 |
| TEHERAN | ...22222331. | ..2333435531 | 214322336874 | 5351..124887 | 863.....2689 | 85.....378 | 62.....146 | 3.....23 |
| COLOMBO | ...22222331. | ..1334335631 | 211113236874 | 52...1124887 | 82.....2689 | 6.....378 | 4.....146 | .....23 |
| BAHRAIN | ..1333334421 | 1.2433445642 | 424322336876 | 7551..114898 | 973.....2689 | 85.....378 | 62.....146 | 3.....24 |
| CYPRUS | ...333333421 | 1.1555556642 | 4247666778886 | 757755567898 | 9875222357799 | 9852....2588 | 762.....257 | 53.....24 |
| ADEN | 1.1334555532 | 313434556755 | 645312246888 | 8761...14899 | 985.....1689 | 862.....378 | 73.....156 | 4.....24 |
| ** OCEANIA | | | | | | | | |
| SUVA/S | ..... | .....1.. | ...111.1242. | ...321.1263. | ..151...152. | ...3.....3.. | ..... | ..... |
| SUVA/L | 32.2.....53 | 33241.....74 | 12473....173 | ..473....261 | ..261....53. | ...3.....3.. | ..... | ..... |
| WELLINGTON/S | ..... | .....1. | ...22111..3. | ..1421.1..51 | ..251....1251 | ...2.....33. | .....1.. | ..... |
| WELLINGTON/L | 21.1.....23 | 43131.....45 | 44462.....76 | 34573....174 | .1461....462 | ..13.....33. | ...1.....1. | ..... |
| SYDNEY/S | ...1111..... | ...22211.... | ..1432221..1 | ..1531112113 | ...31....1444 | .....361 | .....13. | ..... |
| SYDNEY/L | 1...1.....11 | 21.12.....23 | 311441....56 | 211541....76 | ...52....284 | ...2.....251 | .....3. | ..... |
| PERTH | ...23221.... | ..134343.... | 211253332... | 41..3111321. | 5.....155. | 2.....374 | .....144 | .....22 |
| HONOLULU | ..... | .....1.. | .....1..121. | ...111.1231. | ..241....12.. | ..23..... | ..... | ..... |
| ** AFRICA | | | | | | | | |
| SEYCHELLES | 1.1334555432 | 312434556755 | 645312346888 | 8751..114899 | 983.....1689 | 86.....378 | 73.....156 | 4.....24 |
| MAURITIUS | 1.1434556633 | 3.2535557865 | 725313336888 | 9561.1114899 | 984.....1689 | 861.....378 | 73.....156 | 4.....24 |
| NAIROBI | 211444666644 | 533544567876 | 866512236899 | 9873...14899 | 996.....1689 | 884.....378 | 761.....146 | 43.....24 |
| HARARE | 311444667754 | 633644667877 | 976622336999 | 9985...14899 | 9982....1689 | 886.....378 | 773.....146 | 44.....24 |
| CAPETOWN | ...354677854 | 1..565567986 | 3..853336999 | 62.731.14899 | 97261...1689 | 8863.....378 | 774.....146 | 44.....4 |
| LAGOS | 42.354667864 | 642564457987 | 985752116999 | 99873...3899 | 9986....1689 | 8873.....378 | 674.....146 | 34.....24 |
| ASCENSION Is | 31..54456652 | 541.65446875 | 874263214898 | 997441..2799 | 99851....589 | 8873.....268 | 7741.....46 | 44.....3 |
| DAKAR | 21.143455752 | 531364445875 | 874663112798 | 997741...699 | 99861....389 | 9873.....68 | 7741.....36 | 442.....3 |
| LAS PALMAS | ....22332421 | 21.244554652 | 532576676886 | 864776666898 | 998764333699 | 998531..1379 | 8862.....157 | +53.....25 |
| ** S. AMERICA | | | | | | | | |
| Sth SHETLAND | .....566751 | .....1566872 | .....2235896 | 3....1.13888 | 73211....678 | 8862.....356 | 6741.....24 | 342..... |
| FALKLAND Is | 21...2465652 | 431..3456774 | 764213235787 | 986421.13689 | 99861....368 | 9973.....36 | 7741.....14 | 442..... |
| R DE JANEIRO | 11...3454642 | 4211.4454674 | 763323222587 | 986531...389 | 99862....69 | 8873.....38 | 7641.....16 | 432.....3 |
| BUENOS AIRES | 11.1.3454542 | 3212.4454664 | 763513332477 | 98672111.278 | 99861....48 | 8873.....16 | 7741.....3 | 442..... |
| LIMA | .....221221 | 21..21332343 | 5313422311136 | 76354111..17 | 99762.....5 | 7873.....2 | 5741..... | 242..... |
| BOGOTA | .....1121221 | 1...12232233 | 42.233221135 | 75244211..16 | 89762.....5 | 7873.....2 | 4741..... | 242..... |
| ** N. AMERICA | | | | | | | | |
| BARBADOS | .....2121231 | 21..23222343 | 531343211156 | 8635411...37 | 99762.....6 | 8873.....4 | 6741.....1 | 342..... |
| JAMAICA | .....1.121 | 1....1121222 | 42.12221.125 | 6413311....5 | 78652.....3 | 6863..... | 3741..... | .4..... |
| BERMUDA | .....1.1.121 | 1....2111232 | 31.11221.145 | 6412211...27 | 88552.....6 | 7863.....3 | 4741..... | .4..... |
| NEW YORK | .....1. | .....1.122 | 2....1111134 | 52.11111..26 | 77441.....4 | 5863.....1 | 2641..... | .3..... |
| MEXICO | .....1. | .....1.111 | 2.....111112 | 42.11.11...1 | 56442..... | 2763..... | .441..... | .2..... |
| MONTREAL | .....1. | .....122 | 2....1111134 | 52.1.1.1..26 | 76431.....5 | 5863.....2 | 2541..... | .2..... |
| DENVER | ..... | .....1 | 1.....2 | 31.....2 | 3433..... | 1563..... | .241..... | ..... |
| LOS ANGELES | ..... | ..... | 1.....1..1 | 11.....1... | 1333..... | .363..... | .141..... | ..... |
| VANCOUVER | ..... | ..... | ..... | 1..1....1... | 1223..... | .253..... | ..31..... | ..... |
| FAIRBANKS | ..... | ..... | ....1..... | ...12...11.1 | ..241...11.. | ..23..... | ..... | ..... |

The provisional mean sunspot number for June 1990, issued by the Sunspot Index Data Centre, Brussels, was 105.2. The maximum daily sunspot number was 224 on 30 June and the minimum was 57 on 21 June. The predicted smoothed sunspot numbers for August, September and October were respectively: (classical method) 137, 135 and 133; (SIDC adjusted values) 127, 127 and 126.

by G4BWP and G5LP) scored 1,506,750 points in the Multi-Operator section and was placed world eighth. Fred seems unlucky - he was also incorrectly classified by IARU HQ last year !

***LZ DX Contest***

0000 to 2400 2 September

3.5 to 28MHz. CW only, following IARU Region 1 bandplans and observing contest-preferred segments on 3.5 and 14MHz. Exchange RST and ITU zones (UK is Zone 28). Six points for LZ contacts, one for other stations in same continent, and three for others. Listeners may enter and score two for both callsigns and numbers, one for two callsigns and one number. Multipliers are the ITU zones on each band. Send logs within 30 days to LZ Contest, BFRA, P.O.Box 830, Sofia, Bulgaria. Copies of full rules available. Applications for the NRB, W-100-LZ, 5-Band LZ, W-28-Z, Black Sea, and Sofia awards may be made when sending in logs. In the 1989 contest **G3ESF** scored 46,124 points, GM3CFS 20,683, and G4OKN 17,784 in the multi-band section and G0IDE 2,844 on 7MHz.

***Maryland DC QSO Party***

1600 18 August - 2359 19 August.

I can provide copies of the rules.

Results of the **1989 ARRL 10 Metre Contest** were in July *QST*. **GB4DX** was world fifth in the Multi-operator class with 1,646,224 points. **GW4BLE** was world fourth and **top European on ssb** with 786,880, and **G3SXW** and **G3TXF** were fourth and sixth respectively in the CW section with 694,144 and 631,296. G0JFX scored 473,440 in the mixed-modes class. On phone other scores were GW0ARK (513,454), GM4GXR (470,850), GM0ECO (308,858), G4OJH (306,640), GM3BCL (232,776), G4MET(191,750), and GM4ELV (83,148). On CW G4ARI (206,056), GM3CFS (173,656), G4WVX (140,492), G4ZME (61,320), GM8SQ (25,960) and G3WRR (24,128). Other multi-op scores were GW8GT (1,168,584). G0MFO (282,020), G4DRS (238,670), and G6OI (66,990)

**AWARDS**

***Diploma ZHK*** For confirmed QSOs with at least eight out of the ten Colombian call-areas.

***Diploma CHK*** For confirmed QSOs with 25 different Colombian stations (HK, HJ, 5K, 5J). Send list of QSLs - certified by two other amateurs (or the RSGB HF Awards Manager, GW4BKG) plus four IRCs to Awards manager, LCRA, Box 584, Bogota, Colombia. There are other awards for working specified numbers of stations in the various HK regions. (I can supply copies of rules).

## PROPAGATION

Complaints from all directions that we do not seem to be getting our expected bonanza at the peak of the cycle... A typical letter (from G4NJH) says that the predictions and the speculation have all come to nothing in a sense - HF conditions seeming to be poorer than they were two years ago for example. This is puzzling and it would be interesting to have an explanation of the several elements that contribute towards HF propagation - much confusion exists, even amongst experienced HF operators. He says that one band which should be hopping is 28MHz but it doesn't seem to be very good (but isn't it? - see 1990 28MHz table). I have asked G8KG to explain - but meanwhile his report says "By the second half of June, solar activity had continued to show the markedly one-sided profile which has persisted for seven successive rotations of the sun - i.e. for more than six months. The signs of an up-turn in average indices reported last month proved to be very short lived and this time round the daily solar flux barely topped the 200 sfu mark while the 27-day running average dropped steeply from 196 to only 165 sfu - a value not seen since the last quarter of 1988. Clearly the probability that the plateau in the smoothed indices in the second half of 1989 represented the peak of the cycle, albeit an exceptionally early one, is increasing as the months pass although a late peak towards the end of this year can still not be ruled out."

**5B4TI's QTH in Cyprus. L to r: Mike's daughter, Mike (5B4TI), Miriam (5B4WW) and Sheridon (A922BE).**

### BAND REPORTS

This time thanks go to G2s AKK, HKU, GM3CSM, G3s GVV, KSH, YRM, G4s DXW, FRV, GW4KGR, G4s MUW, NXG/M, and ZYQ.

Stations listed in italics were on cw.

**14MHz**

| | |
|---|---|
| 0000 | EP2HZ, J39CO. |
| 0600 | P29PL. |
| 0800 | *FO8AA*, ZK3EKY, *3D2AM*, 4K2/UV3CC. |
| 0900 | *HS0AC, KP2BL*, V85GA, YI2LVB. |
| 1000 | YJ0AKY. |
| 1400 | YK1AA, 9M8FH. |
| 1700 | FR5ZU/T, JT1BY, TJ1/N3CJH, XT2AT. |
| 1800 | JA, V63AY, ZS8MI, ZS9S, 7O1AA. |
| 2000 | RB3MR/JT, KL7N, 3W8CZ, 7O1AA. |
| 2300 | VP2E/G4JVG, VP8CDK, ZY0TK. |

**21MHz**

| | |
|---|---|
| 0700 | FO5AK, YI1BGD. |
| 0800 | FO0KW, KH0/N6BUV, KL7XD. |
| 0900 | FO0IGS, 3D2XV, 4K3/RA3YG. |
| 1000 | A41KR, H44RW. |
| 1100 | JE4LWQ/JD1(Ogasawara), *VU2BK*, YJ0AKY, 3D2AM. |
| 1200 | AT0T, HL0Y, *4K4AFM*, 7O1AA. |
| 1300 | BZ4RBC. |
| 1500 | 9N1MM. |
| 1600 | BV2AB, W6-W7. |
| 1700 | BZ1AJ/9, OH0AP/OJ0. |
| 1800 | V31BB. |
| 1900 | *FY5FO, TA5KA*. |
| 2000 | *BV2AB, ZD7KM*, 7Q7JM. |
| 2100 | *KL7PJ*. |
| 2200 | A41KV, HK0OEP, JA, W6-W7. |

**28MHz**

| | |
|---|---|
| 0900 | FR7ZU/T, 7O1AA. |
| 1100 | V51P, YK1AO, XU8DX. |
| 1200 | T5RR, 3X1SG. |
| 1400 | A41KM/0 (Kuria Muria Is). |
| 1500 | YI1BGD. |
| 1600 | PY0FF, WZ6C/ST4, *ZD8LII*,7Q7RM. |
| 1700 | TY1DX, 3W9CZ. |
| 1800 | 3W6PY. |

Thanks go again to the *Lynx DX Group Bulletin* (EA2JGO), *DX'press* (PA3CXC), *DXNL* (DL3RK), the *Long Island DX Bulletin* (W2IYX), *DX News Sheet* (G4DYO), the *Ex-G Radio Club magazine* (WA8GTA), and *DX Report* (VK9NS). Please send material for **October** issue to reach me by **26 August.**

# VHF/UHF

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

The main talking point this month was of the lack of any major Sporadic E opening on 144MHz from the British Isles up to the end of June. The only events seem to have been on 29 May and 4 and 16 June. I have kept detailed records of Es propagation since 1976 and see that 1979, the peak year of Cycle 21, only produced one opening, on the 28th. 1982 was poor with just two in the first week, and in 1986 there was only one event on the 6th.

By contrast 50MHz has brought many excellent Es openings and 70MHz has often been very lively, too. There have been a few auroras, when the active side of the Sun was facing Earth, and the occasional tropo lift. This month's postbag was quite full, so let's get the show on the road.

## DXPEDITIONS

First a reminder about imminent operation from Iceland by members of the Five Bells Group; the Derbyshire Hills Contest Group's trip to the Irish Republic and GW4VVX's operation from IO78 square. See the July *VHF/UHF* for details.

John Hotchkin, G4ATA (YSW), plans to operate from IN79JX during the *Perseids* meteor stream, 10-17 August. He will be QRV on 50MHz using an Icom IC-202S, R N Electronics transverter 25W to a 3-el. Yagi; on 144MHz with a Kenwood TS-780, single 4CX250B amplifier and a pair of 14-el. MET Yagis, and on 430MHz with the TS-780, 100W to two 21-el. Tonna Yagis. All VHF/UHF antennas will be on an 18m tower at a site 50m ASL.

Operation will be mainly on SSB, using CW where necessary, but he is not taking an MS keyer. His preferred QRGs will be decimal 190 on each band and he will also be on the HF bands. This will be John's first attempt at such an operation and he is seeking sponsorship to raise money for the BBC's Children in Need appeal.

Adrian Sharman, G7GPU (SFD),

has sent details of the round Britain trip planned by the University of Birmingham Radio Society. This annual event is scheduled for 8-19 September with activity from G, GW, GM and G again. Operation will be mainly on 144.360 and 432.200MHz SSB, but with some FM in the appropriate parts of the bands. The call will be G8IUB/P with the appropriate country prefix.

The team will include G1GUH, G1ZTX, G7DVW, G7DWV, G7GPU, G7GOY and G7GMU. For further details contact The Contest and Events Manager, The Radio Society, Guild of Students, Birmingham University, Edgbaston, BIRMINGHAM, or via packet to GB7BIR.

## NORTH SEA ACTVITY

Stewart Howarth, GM0GTU, whose home location is near Inverness, wrote from the drill rig *Ocean Victory* on 27 May, when it was in JO09SO. He is a mini-submarine (ROV) pilot and began operating on 144MHz on 21 May. His station comprises a TR-751E, MML 144/100-LS amplifier and an iambic keyer made for him by John Mullen, GM0CNP. His Yagi antenna was lost in transit so he made do with a 5.5 wavelength centre-fed wire dipole.

Local noise from the rig and interference from a troposcatter link on the nearby *Beryl Platform* was unbelievable, but he did hear OY9JD calling CQ and ES2XM (KO28VV) on the 25th. Stewart was due to leave the rig on 6 June and by now he should be back on it from a new location in the southern North Sea. He warns that those who call him on CW at twice the speed he is sending are unlikely to be answered. 70MHz operation with full legal power was also promised.

## BEN NEVIS CONQUERED

During the 144MHz Trophy Contest on 19/20 May, GM3WGV/P (IO76LS) was always audible at G3FPK. John Linton, G3WGV (BRK), has sent a detailed account of the operation, complete with the contest log. The station was located on the summit of Ben Nevis, Britain's highest mountain, and was established by members of the Reading and District ARC. The operators were P Swinford-Lain, G6ZYT, Tony Gledhill, G6MCI, and John.

The equipment consisted of a TR-751E transceiver with preamplifier, RF Concepts 170W amplifier and two stacked 9-el. Tonna Yagis on a 20ft aluminium mast. Power was from five 12V 24AH sealed lead acid batteries, one of which was used solely for the TR-751E, while the others were cycled through to power the amplifier. The batteries *just* lasted for the 19 hours of operation.

All the gear was back packed from the base of the mountain some five miles distant, each member carrying about 60lbs. One stalwart made several trips in the 24 hour period. The weather was very calm and the summit was covered by about eight feet of snow. Conditions seemed marginally up with GB3VHF (KNT) audible most of the time. They made 271 contacts worth 4,322 points, and with county multipliers, their claimed score was 358,726 points. Best DX was FC1BHB (JN09XP) at 918km.

**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 | 53 | 27 | - | - | 61 | 14 | 21 | 6 | 14 | 5 | 201 |
| G1WYC | 16 | 18 | - | - | 53 | 14 | 25 | 8 | - | - | 134 |
| G0CUZ | - | - | - | - | 81 | 22 | 27 | 4 | - | - | 134 |
| G0IMG | 24 | 18 | 20 | 2 | 34 | 7 | 20 | 2 | - | - | 127 |
| 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 |
| G8PYP | 21 | 20 | 1 | 1 | 39 | 10 | 13 | 3 | - | - | 108 |
| GW6VZW | 72 | 32 | - | - | - | - | - | - | - | - | 104 |
| G3FPK | - | - | - | - | 73 | 16 | - | - | - | - | 89 |
| G8XTJ | 6 | 19 | - | - | 50 | 9 | - | - | - | - | 84 |
| GI4OWA | 20 | 4 | - | - | 30 | 12 | - | - | - | - | 66 |
| G6MXL | 3 | 12 | 1 | 1 | 25 | 5 | 7 | 2 | 2 | 2 | 60 |
| G6ODT | - | - | - | - | 35 | 6 | 15 | 4 | - | - | 60 |
| G7CLY | - | - | - | - | 53 | 6 | - | - | - | - | 59 |
| GM0GEI | 29 | 22 | - | - | - | - | - | - | - | - | 51 |
| GM0JOL | - | - | - | - | 33 | 13 | - | - | - | - | 46 |
| G4OUT | - | - | 7 | 1 | 28 | 5 | - | - | - | - | 41 |
| GW7EVG | - | - | - | - | 23 | 6 | - | - | - | - | 29 |
| 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.

## BEACON AWARD

To encourage propagation studies on 144MHz the German group, VHF-DX-Group DL-West, has announced the VHF-Beacon-Diploma. During any calendar year, starting in 1989, applicants need to monitor the beacon band from one location. Propagation anomalies have to be logged and reports must include the date, time, callsign, transmitted text and text repeat time. Other relevant details such as inversions, Es, auroras, and any interference from other transmissions, should be noted.

To quote: "The elementary diploma is a skilful craftsmanship of a multicoloured painting work of the size 21 x 30cm and produced by *verre églomisé* technique. Each diploma is unique and will be individually labelled with the operator's name and the callsign". There are three classes; level 3, 10 different beacons; level 2, 15 beacons from 10 countries; level 1, 20 beacons/15 countries. The cost is DM28.50 inclusive and applications should be sent to Hans-Dieter Traxel, DK5PZ, Mainzer Str 5, D-5568 Daun, German Federal Republic.

## METÉOR SCATTER

Earth passes through one of the best meteor streams of the year this month, the *Perseids*, whose parent body is comet Swift-Tuttle 1862 III. The period is 116.18 years, in a retrograde orbit inclined at 113.4° to the ecliptic, with the high eccentricity of 0.961. At maximum on 12 August, its solar longitude is 139.3°, the radiant Right Ascension 45° and Declination +59°. The stream velocity at atmospheric encounter is 58.4km/s and over 43% of the meteors have trains.

This stream never sets for anywhere in the British Isles and the best times for the various directions for reflection efficiencies over 50% are: NE/SW 0800-1800, E/W 1000-0130, NW/SE 1800-0400, N/S 0800-1330 and 2200-0400; all times are UTC. Based on the 1989 observed peak time, this year's could be 1200-1400. A couple of American programs give 0630, but that would be for the visual peak. For some of the longer streams the visual and radio peaks are hours apart. From about a week before peak activity, reflections are usually quite good if you pick the right time for a particular direction, but they soon diminish after the peak.

## AURORA NEWS

Graham Daubney, G8MBI (HFD), drew my attention to an article in the Science and Technology section of the 21 June edition of *The Times* newspaper. Entitled "Why scientists are painting the sky red", science writer Nina Morgan referred to the forthcoming launch of the CRRES satellite from Cape Canaveral by the NASA.

CRRES stands for Combined Release and Radiation Effects Satellite which will carry an experiment; "...to 'paint' huge, but temporary, celestial murals by turning a large section of the magnetic envelope surrounding Earth into vast clouds of green, red, blue and yellow particles."

She referred to the Geomagnetism Information and Forecasting Service (GIFS) which offers a daily forecast of the level of geomagnetic activity in Europe. GIFS is available free to users of the Joint Academic Network (JANET) computer system via British Telecom's computer link. Non-JANET mortals can telephone the Geomagnetism Research Group on 031-667 1000 during office hours.

There was a lot of interesting information in this feature, such as satellite data links between the world's observatories under the Intermagnet program, for example. Some of the rest of Nina Morgan's article in *The Times* was similar to one she had published in *The New Scientist* for 23 September 1989 under the title "The Earth's magnetic field."

For amateur radio purposes, the Sunday morning GB2RS News Broadcasts always include solar factual data and a forecast for the coming week. These data are compiled from several sources by Charlie Newton, G2FKZ. Propagation and solar information is regularly broadcast from WWV, so we already have a comprehensive, free service. The GIF service was established for commercial and professional users who need to know when solar activity might upset their communications.

## SOFTWARE

As regular readers will know, the G3FPK office computer is an Amstrad PCW8512, which runs on the CP/M operating system, rather than MSDOS as used by IBM and clone PCs. It was originally bought for word processor work in the office, but compares very favourably with other 8-bit machines in conventional computing mode.

Users have accumulated a comprehensive range of software including many useful amateur radio programs. I am quite happy to copy programs for readers but please don't send disks 'out of the blue' with requests such as: "Please send me all your software." Send an SASE first and I will mail you the latest PROGLIST from which you can choose what you want.

Apart from updating the Keplerian elements in the various

**PROPOSED 70MHz BAND PLAN**

| | | |
|---|---|---|
| **70.000** | | |
| **Beacons only** | *70.030* | Personal beacons |
| **70.030** | | |
| **SSB and CW only [1]** | *70.100* | MS reference frequency |
| | *70.200* | Calling frequency |
| **70.210** | | |
| **All modes non-channelized** | *70.260* | Calling frequency |
| **70.290** | | |
| **Channelized 12.5kHz spacing** | *70.300+/-* | RTTY and FAX calling |
| | *70.325* | Packet radio |
| | *70.350* | Used |
| | *70.375* | by |
| | *70.400* | Raynet |
| **70.400** | | |
| **FM simplex only** | *70.450* | Calling frequency |
| | *70.4875* | Packet radio |
| **70.500** | | |

NOTE [1] Overseas beacons operate in this section: 70.112, 5B4CY; 70.120, ZB2VHF; 70.130, EI4RF.

**LOCATOR SQUARES TABLE**
**Starting date: 1-1-1979**

| Callsign | 50MHz | 144MHz | 430MHz | 1.3GHz | Total |
|---|---|---|---|---|---|
| G6DER | 43 | 183 | 114 | 82 | 422 |
| GJ4ICD | 407 | 263 | 119 | 59 | 848 |
| G4RGK | 69 | 302 | 140 | 52 | 563 |
| G8ATK | 74 | 144 | 94 | 52 | 364 |
| G3IMV | 228 | 428 | 125 | 51 | 832 |
| G6HKM | 232 | 219 | 109 | 46 | 606 |
| G0DAZ | 137 | 316 | 122 | 39 | 614 |
| G1KDF | 266 | 183 | 104 | 37 | 590 |
| G4MUT | 122 | 153 | 94 | 34 | 403 |
| G6STI | - | 152 | 69 | 24 | 245 |
| G1GEY | - | 170 | 92 | 22 | 284 |
| G6MXL | 52 | 97 | 48 | 20 | 217 |
| G6UWO | - | 41 | 44 | 18 | 103 |
| G8LHT | 113 | 185 | 93 | 14 | 405 |
| G0NFH | 55 | 76 | 16 | 8 | 155 |
| G4XEN | 66 | 295 | 114 | 5 | 480 |
| G4VXE | 147 | 162 | 42 | 4 | 355 |
| G6MEN | 67 | 54 | 27 | 3 | 151 |
| G4IJE | 355 | 338 | 5 | 2 | 700 |
| G4KUX | - | 384 | 120 | - | 504 |
| G4TIF | 172 | 204 | 111 | - | 487 |
| G6HCV | 243 | 231 | - | - | 474 |
| G0CUZ | - | 336 | 73 | - | 409 |
| G1SWH | 185 | 156 | 59 | - | 400 |
| G1DWQ | 239 | 144 | - | - | 383 |
| G4RRA | - | 280 | 80 | - | 360 |
| G1LSB | 44 | 172 | 143 | - | 359 |
| G4SSO | - | 257 | 98 | - | 355 |
| G0EVT | 88 | 209 | 57 | - | 354 |
| G0JHC | 303 | 48 | - | - | 351 |
| GW6VZW | 201 | 125 | 6 | - | 350 |
| G4PIQ | - | 261 | 87 | - | 348 |
| G4SWX | - | 347 | - | - | 347 |
| GM4YXI | - | 340 | - | - | 340 |
| G4DHF | - | 325 | - | - | 325 |
| GJ6TMM | 109 | 151 | 52 | - | 312 |
| G8PYP | 166 | 108 | 32 | - | 306 |
| G0GMB | - | 187 | 99 | - | 286 |
| G4YTL | - | 249 | - | - | 249 |
| G3FPK | - | 242 | - | - | 242 |
| G0LFF | 83 | 153 | - | - | 236 |
| GM4CXP | - | 198 | 31 | - | 229 |
| GW4FRX | - | 228 | - | - | 228 |
| G1SMD | 115 | 106 | - | - | 221 |
| G4DOL | - | 216 | - | - | 216 |
| G0HVQ | 142 | 71 | - | - | 213 |
| G1TCH | 99 | 95 | 6 | - | 200 |
| G8XTJ | 77 | 120 | - | - | 197 |
| GM0GEI | 193 | - | - | - | 193 |
| G4XBF | - | 172 | - | - | 172 |
| GM1XOG | 145 | - | - | - | 145 |
| G4TGK | - | 137 | - | - | 137 |
| GW4VVX | - | 115 | - | - | 115 |
| GM1BVT | 88 | 23 | - | - | 111 |
| G1CEI | 11 | 77 | 18 | - | 106 |
| GM0GDL | - | 83 | 22 | - | 105 |
| G7CLY | - | 100 | 2 | - | 102 |
| G1WPF | - | 101 | - | - | 101 |
| G6ODT | - | 29 | 47 | - | 76 |
| G0HDZ | - | 64 | - | - | 64 |
| GM1ZVJ | 6 | 48 | - | - | 54 |
| GW7EVG | - | 16 | - | - | 16 |

**No satellite, repeater or packet radio QSOs. "Band of the month" 1.3GHz**

satellite programs, I have not added anything to my collection of immediate interest to VHF/UHF operators. Several readers have inquired about RTTY software which I didn't have, but Lee Rogers, G7EHA (KNT), kindly sent me a copy of COM12 which runs on the PCWs. He included some documentation but it was incomplete. As I have no suitable hardware I cannot try it out, so I am not offering to copy this program. If you are really keen, you could contact him direct; he is QTHR.

For Commodore Amiga users, Karl Lamford, G6ODT, has written a comprehensive contest scorer program. He offers either to send printouts to anyone interested on receipt of a 9 x 6in SASE, or provide an automatic loading/executing program on receipt of a 3.5in double-sided, double-density disk and stamps to cover return postage. He is QTHR.

## 70MHz BAND PLAN

In the March *VHF/UHF* I included the proposed amended 70MHz Band Plan. At the VHF Committee meeting on 9 June we carefully considered all your suggestions and criticisms and agreed on a revised draft as shown in the table.

We felt that the few beacons could be accommodated in the bottom 30kHz, initially using 5kHz spacing; any future, overseas beacons could slot in between the British ones. The 70.030-70.210MHz section effectively allocates one-third of the band to CW and SSB modes. We thought it useful to introduce 70.100MHz as an MS reference frequency to encourage experiments with this mode.

Those using ex-PMR equipment with crystals for 70.260MHz can be accommodated in the all-modes non-channelized section, 70.210-70.290MHz. From 70.290-70.500MHz we have opted for 12.5kHz channel spacing. We considered the complaints from some that their wide filters would not be able to cope, but in a band only one-quarter the width of 144MHz, we concluded it unrealistic to perpetuate the 25kHz spacing concept. In any case, those with narrow filters will use the 'half channels' anyway. All the existing specific frequencies are unaffected, obviating the need to buy any new crystals.

The EI, ZB2 and 5B4 beacons are not specified since this is a UK band plan; nevertheless, their frequencies have been noted for the benefit of newcomers to 70MHz. If other countries eventually allocate 70MHz to the Amateur Service in ITU Region 1, then band planning would become the concern of the IARU.

If users have any constructive comments to make please send them to the Chairman of the VHF Committee, who is *not* QTHR. He is Peter Burden, G3UBX, 2 Links Road, Penn, WOLVERHAMPTON, WV4 5RF. The next meeting of the VHF Committee is scheduled for 15 September when we aim to make a final decision on a new band plan to be implemented on 1 March 1991.

## 50MHz

In his May report summary Ray Cracknell, G2AHU (HWR), wrote: "Apart from Africa, where the tail-end of their TEP season overlaps the early summer Sporadic-E season, giving some good TEP plus Es propagation, results were, in the main, confined to Europe. For many, several new countries were on offer and heavy pile-ups were heard on I, LX, OE, OH, OY, OZ and even older licensed calls such as CT and SV; and then the first Germans were heard on the band."

There was Es propagation to somewhere in Europe on every day except the 10th, 12th and 27th. Auroral and auroral-E propagation was reported on 18, 22 and 27 May from G; 11, 18, 22 and 27 from GI, and 18, 20-22 and 26 from GM. QSOs with African stations in V5, Z2, ZS6, ZS9 and 9Q5 were reported at intervals throughout the month and the ZD8VHF and 9L1US beacons were received on two days each.

Next, the Ted Collins, G4UPS (DVN), *6m Information Pages* for June covering all the news from near and far. He reports that IK2GSO/IM0 operated from the small island of La Maddalena (JN41) just off the North coast of Sardinia, between 1 and 14 June; it counts as IS0 for DXCC purposes. ZB0W is now QRV from Gibraltar and will be there for several more months; QSL via G6YZC who is QTHR. The QSL manager for ZB2T is DL1SDN at Schlesierstr 97, D-7440 Nuertingen, Federal Republic of Germany.

CU1EZ (HM76KW) is active from Santa Maria in the Azores and runs 10W to a 4-el. Yagi. ZC4AB is a new station on from Cyprus; QSL via Mr A Bramley, J.S.B. Episkopi, BFPO 53, LONDON. There are four LX stations on the band, LX1s DB, DK, JX and SI. CT1DRP says to QSL either to his G3RBR address or direct to Mr B Rogerson, Rua Felizardo de Lima 149, P-4100 Porto, Portugal. The QSL manager of YV5ZZ is Mr M Anderson, K8EFS, Box 54 R4, S Cochran, Charlotte, MI 48813, USA.

OZ1DJJ will be in Greenland till October. He will be in GP60 until 1 August; 3-23 August, HP15; 1-28

September, GQ12WS and perhaps GP80 from 1 October. QSL to his home QTH as per the *International Call Book*. The SMIRK organization has donated an antenna to VP8s BFH and BOQ who have 50MHz gear. Equipment is reported to be on its way to 7Q7RM in Malawi and 9J2BO in Zambia. The UK Six Metre Group has built a beacon for 9J2 - callsign awaited.

According to a letter from YU3ES, although no permits have been issued to any Yugoslavian amateurs, there is a "strong possibility" that this will happen sometime this year. The 5B4CY beacon was still QRT on 16 June; ZC4MK was trying to ascertain the reason for this. QSLs for SM7s AED, BAE, CMV, FJE, FMX, LXV and SCJ can all be sent via SM7AED.

HB9QQ's expedition to Liechtenstein on 2-3 June was curtailed by bad weather. In-band MS QSOs were completed with GJ4ICD, G4XVS, G3WOS, G4ZSS, G4AHN, G3CCT and G4MKF on SSB. On CW, Pierre completed with SM7AED, G2ADR and GW4LXO. *(Unfortunately, space does not permit the inclusion of members' reports on 50MHz this month — Ed.)*

## 70MHz

Issue 9 of Roger Banks's, G4WND (SFD), *QSB The Newsletter for Four Metres* arrived on 23 June. The editorial, "Change for changes' sake?" dealt with the first draft of the amended band plan. Other items were news of the re-commissioning of the ZB2VHF beacon from a new site by ZB0W/G6YZC; *Perseids* MS operation from western Ireland by E19FK/P; a contribution on FM by Jack Hum, G5UM; the usual 'Who's on Where?' feature; part 3 of Geoff Grayer's, G3NAQ, series on 70MHz propagation and a review of the RN Electronics 70MHz preamplifier.

Once again there was little activity to report apart from G1SWH who worked ZB0W on 4 June, and G8ESB who reports a QSO with EI9FK on 12 June which started aurorally and finished on tropo. Perhaps there will be some reports next month covering VHF NFD?

## 144MHz

The August *VHF/UHF* usually carries reports of several major Es events in June, but not this year. The tone was set by G0COL who wrote: "I booked two weeks off work from 2 June to catch and work all the 144MHz Es. What a waste of two weeks..." Mind you, on several days Es propagation almost reached the band. A good indication is when the skip becomes very short on 50MHz, indicating very high ionization of the E-layer; that's the time to explore likely paths on 144MHz.

Colin Morris, G0CUZ (WMD), worked EA7ZM (IM76) at 1642 on 29 May, however. On 4 June in the period 1748-1800, he found EB7BQI, EA7AH and EA7GAA all in IM67 and EA7TL (IM76). ZB0T, who is ex-GM6TKS, was QRV too. A five minutes opening from 1256 on the 16th brought QSOs with EA7AJ (IM89) and EA7GTF (IM87).

As usual, MS reflections in June were very good, the 10th, at the peak of the *Arietids* being particularly rewarding. He completed with OK1DDO on random CW on the 3rd; OH0BT for a new country and square on the 5th; Y2/DJ2QV (JO74) on the 8th, and EA2LU/1 (IN71) on the 9th. This last produced 90 reflections in 20 minutes, enabling Colin to send "73 Adios" and receive "73 Ciao hi hi" in return. He made a successful 15W QRP test with SM5MIX on the 9th which went through in 35 minutes.

G1DWQ made many auroral QSOs at the end of May; on the 21st with G, GM, LA and SM, 2050-2240; on the 22nd with D, G, GM, GW, LA, PA and SM, 1200-1750 and 2242-2310; on the 25th with D, GM, LA, OH, OZ and SM, 1240-1640; 26/27th with D, G, LA, OZ, PA, SM and Y, 2206-0010. The three afore-mentioned Es events did not reach Dorset, though.

G1SWH lists EA7GAA via Es on 4 June and LA1T (JO37) on tropo on the 16th. G1WYC had tropo QSOs with SK6HD (JO68) and LA8AK (JO38) on 12 June and with LA6HL (JO28) on the 14th. Ian Richardson, G3KXT, (DOR) is a refugee from London who wrote about software. He finds 144MHz activity totally different in Dorset where; "...repeaters can be used as originally intended."

G6HKM's first Es QSO this year was with EA7ZM on 29 May. The strong aurora of 12 June gave Ela her first Orkney contact, GM1SMI/P (IO89). In the late evening LA3BO (JO59), LA8AK and SK6HD were worked, followed by discussion about the propagation mode; Ar-E or tropo? She worked GM and OZ in another aurora on the 14th.

Karl Lamford, G6ODT (NHM), was hobbling around on crutches following a motorbike accident, so spent lots of time in the shack. Even so, he had no luck with any Es but did manage a QSO with SK6HD at 2300 on the 12th. He heard good MS reflections from IV3BMO and HB9, OK and EA3 on 144.300MHz; worked some ONs in the 2 June contest and found five new 1990 counties on the 17th. John Hill, G7CLY (HBS), took part in the QRP contest on 17 June working GI4SJB/P (DWN), GM4CJW/P and EI6ARB/P (DBN), using 2.5W and a 13-el. Yagi.

G8PYP worked lots of Fs on 2 June and GM8VBX (IO85) via aurora on the 14th. Steve heard EA7s at 1307 working Midlands stations, but they were very weak in Wimborne. G8XTJ found little of interest in June, just working some more WAB areas. John operated in the *Practical Wireless* contest on 17 June which saw moderate activity but nothing new for the tables.

GJ4ICD reports an Es opening from France to Italy on 2 June. On the 4th, there were paths from GJ to EA8, F to CT3 and ZB to GM. GM1BVT worked GM0JKF, over 100 miles away, on 30 May using 0.5W. Rotator problems kept GM1ZVJ off the band for six months but John is QRV again from West Lothian.

## 430MHz

G6HKM had contest exchanges with ON4ARC/P (JO20) and FC1CDX/P (JN19) on 3 June. G6ODT contacted G1RPA (SXE) on 13 June and FC1LJA (JO10) on the 15th; Karl runs 1W to a 23-el. Cue-Dee Yagi at 25ft AGL. John Percival, G7DDU (NHM), also worked FC1JLA on SSB on 14 May for his first continental QSO. He monitors 432.200 SSB and has had some early morning success; e.g. G3KBS (BRK) on 1 June.

## DEADLINES

The Editor has set new copy deadlines so you have a few extra days from now on. For the October issue it is now 30 August and for November, 27 September. These are the very latest dates, but don't leave it to the last minute.

# SWL

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

## HF BANDS

The bands had apparently been in a rather poor state during the second half of May and early June. 28MHz had been devoid of signals for long periods, but the occasional burst of strong European signals via Sporadic-E gave some interest. The main event of the period was the appearance of 7O1AA, courtesy of several 9K2's. It seems that the political situation is not clear cut, and will remain so for some time. The operators were not clear whether they were operating from the People's Democratic Republic of Yemen or the Republic of Yemen. Press reports suggest that there is likely to be a 2.5 year transitional period prior to full unification. One extremely welcome aspect of the expedition was that the operators stopped working Europeans for a long period in protest at the poor operating. If others followed suit, the bad manners would soon disappear!

Another "goody" during the period was the appearance of the group who activated Conway Reef. This was David Whitaker's 347 All Time new country, which must rank among the highest country tally among British listeners. Can anyone better 347 All Time?

Other notable scalps which were mentioned by reporters included EP2HZ, FJ5BL, FR5ZU/T, HC8GR, PY0FF, PZ1EL, V47KTG, 7Q7JM and SY4NED on 14MHz, while A22MH, C53FW, CE0MTY, TJ1BJ, TZ6PS, ZS8MI and 9M2LM were about the best on offer on 21MHz. 18MHz had produced some stations of interest, including A92DQ, C6AFR, CO2BB, VK6AJ, VP2V/N4VHD, VR6JR and YB0USJ. The LF bands had provided some interest before the bands become rather dormant for DX during the height of the summer. Stations noted included, on 7MHz, CE0ZAM, FR5CN, HR1RMG, VU2WAP, XT2BX, ZS4WB and 6Y5IC. 3.5MHz had given the faithful CP8IH, EL2WK, HH2PK, JA3EZD/J3, VQ9AN and ZP5FGS.

Luciano Marquardt G1VDW mentioned the pleasure at receiving cards from EL7X, HL9HH, J37AE, TL8WD, 8P6QM and 3DA0BK. *(The HF Table has been moved to the SWL Column — page 54 — this month, due to pressure on space — Ed)*

## VHF BANDS

**50MHz:** With the release of the band to much more of Europe, this has been, perhaps as you would expect, the band where things have been happening during the period in question. David Whitaker and I have caught some very good conditions and have added a number of new countries and many new squares. Now that the Italians have the band, that is where most of the activity has occurred. When the band is open in that direction, the 12kHz allocated to the Italians has been wall-to-wall QRM, with many stations in different parts of Italy QRMing each other. However, it is good to have the extra activity. Most parts of Italy have been heard, but we have still to hear an I7. Some very strong signals — in view of the low power allowed — shows what can be done on the band when there is Sporadic-E propagation. Some of the strongest signals have come from I1ANP, I2CSB, I2FHW, IV3BGO, I4RSH, IK5EHR, IK6FWJ, I0NLK and I0SSW. Away from the mainland of Italy, there had been the occasional IS0 and IT9, but the prize catch was IK2GSO/IM0, an expedition to Magdallena Is (off the coast of Corsica). A number of Austrians had also been heard, including OE5PAM (JN78), OE6LOG (JN76), OE6MGG (JN76) and OE8TPK (JN76). Some Germans in the south of the country had been heard occasionally, including DK2WV (JN58), DJ3TF (JN59) and DL9RM (JN69). There had been some quite spectacular conditions with the band open to many different countries. A few examples are 2 June (when between 1520 and 1945 stations in DL, F, GM, I, OE, OY were audible), on 8 June (when

*(continued on page 64)*

# EASTERN COMMUNICATIONS

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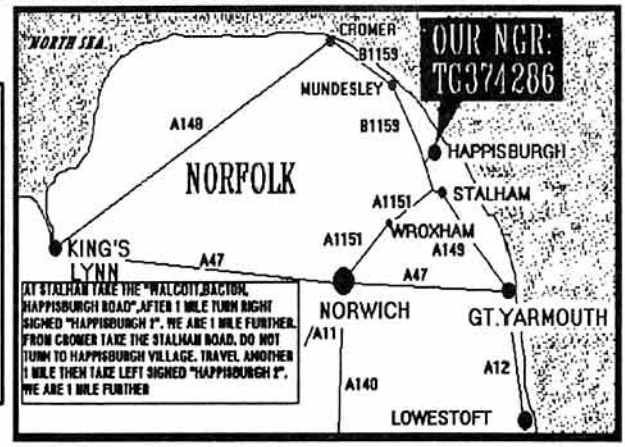


FRED

TIM

DENISE

# TECHNICAL TOPICS

PAT HAWKER G3VA

## APPLICATION SPECIFIC INTEGRATED CIRCUITS (ASICs)

Integrated circuits began to revolutionise communications and electronics equipment some thirty years ago. It was in *TT* (January 1967) that I included my first detailed note on these devices under the heading 'The potential of microelectronics', with the comment: "A major upheaval in equipment practice is building up more rapidly than most of us suspected, and is unquestionably going to affect our gear in the very near future. Those with their ears to the electronics ground will probably have already surmised that the opening sentence refers to the approaching era of low-cost integrated circuits (ICs). Over the past few years, we have referred from time to time to the progress of micro-electronics devices ... but this had usually been accompanied by the proviso that such devices, though interesting, were still some way from entering the day-to-day practice of Amateur Radio."

What changed my mind in 1967 was the receipt from Mike Barlow, ex-G3CVO (who had long departed our shores for Canadian television engineering) of a Fairchild 'Micrologic' plastic encapsulated $\mu$L914, a simple dual-gate device incorporating just four small-signal silicon transistors and six resistors, and selling in North America for about one dollar. Mike Barlow had commented: "This is fantastic — just last year ICs were $4 and up, and in 1960 they were $100 per device."

The years since 1967 have seen further fantastic progress, particularly in the number of active devices squeezed on to a single chip — from the IC to LSI (large scale integration) to VSLI (very large scale integration) with hundreds and thousands of active devices on a single chip. There has been the introduction of low-cost integrated op-amps suitable for analogue as well as digital applications; the introduction of power-saving ICs based on CMOS rather than bipolar technology; ICs for consumer electronics providing virtually complete receivers, requiring just a few external discrete components; most recently the growing use of tiny surface-mounted components; etc, etc. One form of IC which has been assuming increasing importance in the professional field over about the last five years or so, but which has not previously been discussed in *TT* or *RadCom* is the ASIC — the Application Specific Integrated Circuit.

ASICs already amount to around 20% or so of the total IC market and have come to represent a reassertion of the importance of the equipment design engineer vis-à-vis the component manufacturer. Instead of standard 'chips' designed by a few IC experts and then produced in enormous volume, we are now seeing the growing influence of LSI and VSLI chips intended for just one specific application, designed in part by systems engineers with the help of CAD (computer aided design) even though their knowledge of semiconductor fabrication technology may be rudimentary; the devices are then manufactured for their own use in relatively small numbers. What has made this metamorphosis possible is primarily the increased availability to professional design engineers of CAD techniques applied to LSI chip design and layout.

Admittedly, the VSLI chips increasingly in use in modern consumer electronics such as television receivers are designed for specific applications — for example as teletext, MAC (multiplex analogue component), NICAM 728 digital stereo (Near Instantaneous Companding and Audio Multiplexing at a bit rate of 728 kilobits per second) decoders and the decryption chips for subscription television channels — but these complex ICs have been developed by semiconductor manufacturers for volume production and are not generally regarded as ASICs. Custom or semi-custom ASICs are thus chips specifically designed: (a) to perform reliably a complex function that cannot conveniently and/or effectively be implemented with just one or two standard IC devices; (b) to help reduce the volume, weight and/or power consumption of equipment by integrating a large number of logic functions on a single chip.

Readers may feel with some justification that ASIC technology is not one that can be applied to home-construction or even small batch production for the Amateur Radio market. However the fully 'customized' cell-based device is not the only form of ASIC: also important are the large 'gate arrays' which are personalised only in the final processing steps. It is with some forms of gate arrays that useful opportunities are already arising for their use in home-constructed equipment.

What were termed 'uncommitted logic arrays' were introduced by Ferranti almost twenty years ago. These ULA devices consist of a regular array of unconnected logic elements with pads for external connections **(Fig 1)**; the internal connections are made by later diffusion processes usually by the semiconductor firm. Applicable to the do-it-yourself ASIC approach are various families of programmable logic arrays (PLAs) using PROM or EPROM technology. 'Standard' user-programmable devices such as conventional ROMs and microprocessors are not usually regarded as 'customized' ASIC devices. PLA devices suitable for digital circuitry comprise a regular array of transistors/gates and a fixed number of bonding pads, each with an I/O buffer. They are relatively inefficient in terms of the number of gates in a given chip area, but even so may include more than enough functions for complex units. In such arrays, the internal 'elements' each comprise a number of transistors, with the interconnection defining the final function of each element: see, for example, **Fig 2**. CMOS technology is generally used and there is an expanding number of families of programmable devices becoming available from a number of semiconductor firms, including the 'erasable programmable logic device' (EPLD) which, as Colin Horrabin, G3SBI shows this month, offers most interesting possibilities for amateur radio equipment. He stresses: "In my opinion these EPLD chips are the most important hardware development since the microprocessor;

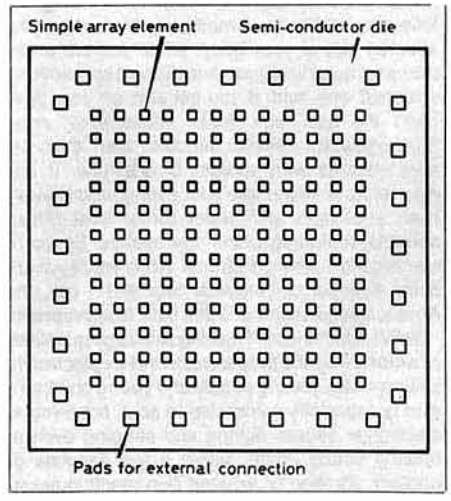


**Fig 1. Basic array structure of an uncommitted logic array. The principle remains the same in the programmable arrays (source *Electronics Engineer's Reference Book*).**

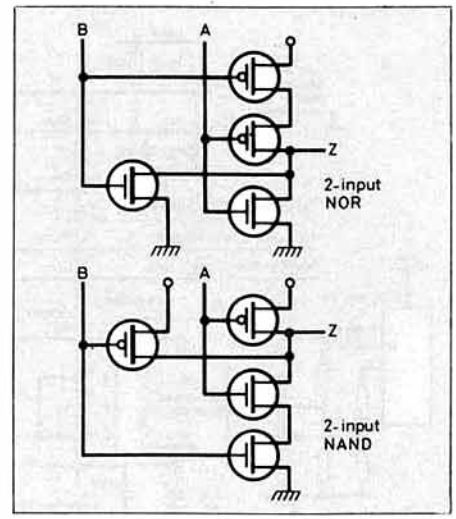


**Fig 2. Example of how a basic cell element can be interconnected as a 2-input NOR gate or as a 2-input NAND gate (Source as Fig 1).**

they can replace a large number of conventional logic chips, and are extremely versatile."

While CAD facilities to assist in designing the logic arrangements may not be available to 'non-professional' amateurs it is clear, from G3SBI's pioneering work in this field, that EPLDs for specific applications can be developed by those knowledgeable in this approach and then devices programmed in the small numbers that would never justify the introduction of a mass-produced conventional IC device. It also seems likely that the ASIC approach will appeal to firms making amateur radio equipment, as we have seen with surface-mounted devices.

## AN EPLD IAMBIC KEYER

Colin Horrabin, G3SBI (71 Duckworth Grove, Padgate, Warrington, WA2 0QU, Tel 0925 825383) writes: "This note describes an iambic keyer integrated circuit that is similar to the Curtis keyer chip, but uses a programmable device and is capable of being used in a 'coherent CW' (CCW) system or as an ordinary iambic keyer. Eight speeds may be selected by a BCD-coded switch using a master clock of 750Hz or 1kHz. The master clock can be crystal-derived for CCW or use a simple CMOS oscillator for normal keyer use. In this latter case, a gate output pin from the chip automatically starts the oscillator when the paddles are in operation. An iambic-mode pin determines if an extra dot after dash, or dash after dot occurs when the paddles are released: 0V for normal iambic operation; +5V for the extra dot or dash.

"The IC in which the design is programmed is an EPLD from Altera, type EP610, although direct equivalents are now available from a number of manufacturers. This device contains sixteen logic cells, each of which has a register that may be programmed to be D, T, JK or RS flip-flop, while the input to each cell is a programmable AND OR array. Another feature is 'non-turbo mode' which gives lower power consumption at low clock speeds; about 15$\mu$A at 5V and 750Hz clock, making it ideal for battery powered applications, although care must be taken not to exceed 5V.

"The easiest way of designing circuits with the device is to run a program called APLUS on an IBM PC. With this software, logic diagrams can be drawn on screen with the aid of a mouse. The software minimises the logic and, with the addition of a programing card, programs the completed design into the chip. If the design does not work correctly the chip can be UV erased and used again with the modified design. In my opinion these chips are the most important hardware development since the microprocessor; they can

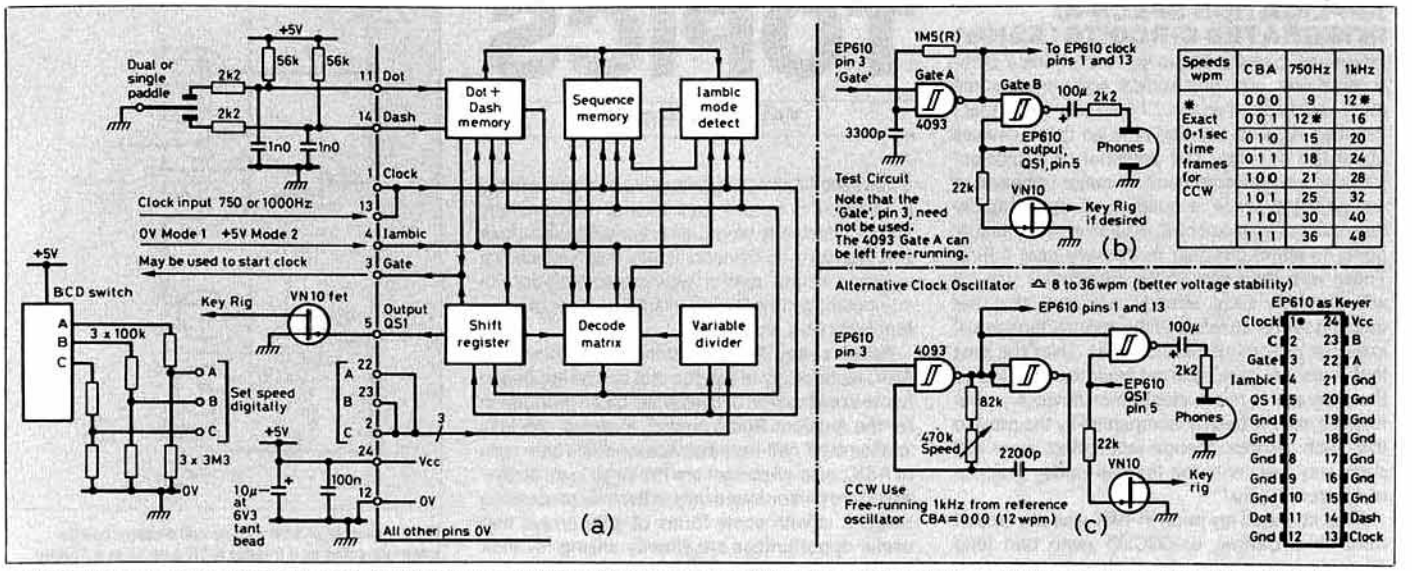


**Fig 3. Block diagram of G3SBI's iambic keyer using the Altera, type EP610 erasable programmable logic device (EPLD) together with test circuit, variable clock oscillator etc.**

replace large numbers of conventional logic chips and are extremely versatile.

"A block diagram of the keyer chip is shown in **Fig 3**. An external clock source is required which may be 1kHz derived from a crystal for CCW operation or the simple arrangement shown using a CMOS 4093 device. Basic operation is as follows: the output morse code from the EP510 chip is from a shift register which is only updated when the variable divider that sets the speed in relation to the master clock counts down to one. Information from the dot and dash paddles, together with the shift register contents, determines the next state of the shift register output. In other words, if dot plus space, or dash plus space, or alternate dot dash sequences are generated. The important difference between this chip and the Curtis chip is the use of a digital divider to control morse code speed, an essential feature for CCW operation where long-term mark/space transitions must be accurate to better than one part in a million.

"To test the device, a simple test circuit using a 4093 may be used: **Fig 3 (b).** Operation is as follows: Gate A is used as a simple clock source with the keyer output gate starting the oscillator, the frequency of which is set to 750Hz by adjusting the value of R, the output of this gate going to the keyer clock pins. The keyer-chip's morse code output QS1 is connected to gate B input 1, and the clock oscillator to input 2. The output from this gate can be connected to a resistor and capacitor in series with a pair of headphones to monitor the generated code. A connection to the BCD-coded speed control pins of CBA = 001 gives 12wpm morse with a 750Hz clock and 36wpm with CBA = 111. If it is desired to key the rig a VN10 FET can be driven from QS1 for normal polarity or, alternatively, a reed relay for universal use. It is not necessary to use digital speed control: the R in the clock oscillator can be made variable, **(Fig 3 (c),** in which case CBA is set to 000 (all 0V). When used in a normal CCW scheme with a 1kHz clock, CBA = 000.

"It is also possible to develop the basic circuit to provide the heart of a memory keyer. A prototype has been made using a 24-cell EPLD with three additional chips; this performs as a 16-memory keyer with 1kbits per message; latent power is 20µA and about 0.5mA when operating. With the next larger EPLD array, just the EPLD and memory would have been required."

G3SBI mentions that should anyone wish to purchase the basic EPLD keyer programmed into an Altera EP610 he could supply this for a cost of £8.50.

## BATTERY ACID AND SAFETY

In my late teens, I was once unwise enough to store an unused 2V (lead-acid) accumulator on top of a wardrobe. For reasons unknown, it tipped over, some of the acid electrolyte leaked out and dripped on to an elder brother's jacket; the results were disastrous. I escaped the consequences (the brother concerned was away spending four years as a prisoner-of-war) but the incident taught me that battery acid is pretty nasty stuff.

I was reminded of that event by notes on 'safety' in the third of the three-part articles by George L Thurston, W4MLE 'Practical Battery-Back-Up Power for Amateur Radio Stations' (*QST*, May 1990 with Parts 1 and 2 in March and April issues). The safety notes include the warning: 'Heavy-duty lead-acid cells are potentially very dangerous. Each cell contains fairly strong sulphuric acid, which can cause injury when in contact with the skin and blindness when in contact with the eyes. Handle the cells with great caution and respect.'

W4MLE recommends: "Whenever you handle these (large) cells, installing or moving them, wear liquid-proof safety goggles and acid.resistant rubber (or plastic) gloves. Keep a garden hose handy, with water turned on. Keep a supply of sodium bicarbonate (also known as bicarbonate of soda, or baking soda) at hand to neutralize acid that may get on your skin. Have another person standing by to help if something goes wrong. If any electrolyte makes contact with your skin or clothing, safety experts recommend taking the following measures *immediately*. Hose down the affected part of your body. While you are under the hose, quickly remove and discard any clothing splashed with acid. If you get acid on your skin, flood the spill with water *immediately*, rinse thoroughly for several minutes, then dust the affected area with sodium bicarbonate. If any electrolyte splashes into your eye(s), *immediately* flush your eyes with water for at least fifteen minutes, including under the eyelids. Speed in starting the flushing is *critical*. While your eyes are being flushed, *call medical help*. A 911 call (the American equivalent of a 999 call) is appropriate.

W4MLE continues: "Flushing with large quantities of water is also the proper treatment for electrolyte spills on skin. Elderly people and young children's skin is especially vulnerable to acid, but 6-molar electrolyte causes itching and stinging even in healthy young adults within a few seconds of contact. (Broken or irritated skin reacts quicker, and more strongly.) If the electrolyte is flushed away with water and neutralized with baking soda, chances of serious injury are minor.

"The polycarbonate-plastic cases of back-up batteries and cells are extremely strong and acid-resistant, but they must be treated with respect. A 300Ah float cell weighs about 85 pounds. If you drop it and its case cracks, you have a very dangerous mess on your hands (or feet)! Dust and gunk of various kinds tend to accumulate on the cases and must be cleaned off periodically. The best cleaner is a damp cloth or paper towel. But if acid is spilled on the outside of the case, it should be neutralized so it won't damage other materials or injure skin that comes into contact with it. Battery manufacturers recommend a dilute solution of baking soda. This extremely mild alkali neutralizes the acid *without damaging the plastic*. (Baking soda fizzes because it reacts with the acid to produce sodium sulphate and carbon dioxide gas.) Do not use stronger alkalis, such as lye (sodium hydroxide) or ammonia (ammonium hydroxide) on back-up batteries. These chemicals damage the cases, causing cracking that may lead to leaks. Also, do not use organic solvents such as alcohol or carbon tetrachloride."

W4MLE also lists a number of steps to be taken when disposing of unusable cells, considered by environmental agencies to be hazardous materials. He lists the procedures recommended by safety experts including the neutralization of the electrolyte by carefully adding small quantities of slaked lime (hardware and garden-supply stores) to emptied out acid in a plastic bucket, but warns that the chemical reaction results in a great deal of heat and lime should not just be dumped into the liquid. Like the electrolyte, slaked lime is highly caustic and should not be touched or its dust breathed in.

He concludes his three-part article by stressing that "Back-up power for Amateur Radio stations is useful, and need not be expensive. Heavy-duty batteries *intended for float service* are available to do this job well."

## MORE VOLTAGE-DOUBLER CIRCUITS

Practical applications of voltage-doubling and voltage-multiplication diode rectifiers have been featured in a number of *TT* items over the past year: July, October, November 1989; May 1990. This topic is of considerable interest these days when high-voltage mains transformers, unless recycled from old equipment, are increasingly rare (ie expensive) and now that improved linearity or higher efficiency can be achieved with FET or bipolar solidstate power amplifiers by using 24-28V or higher voltage supplies.

John Brown, G3EUR who has already made notable contributions on this topic has been prompted by the appearance in the May *TT* of the

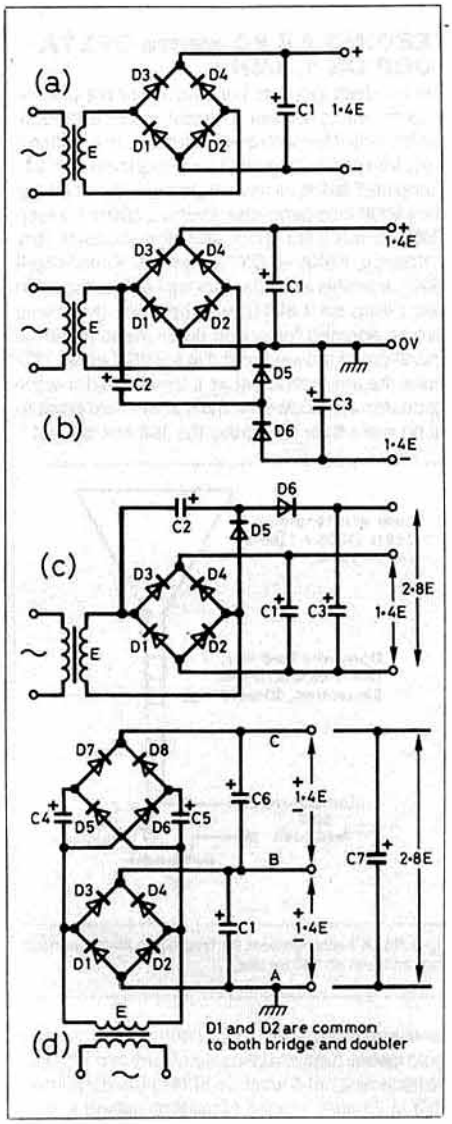


Fig 4. Voltage doubler configurations based on full-wave bridge rectifiers. (a) Conventional bridge rectifier. (b) Arrangement producing positive and negative outputs of ±1.4Edc from Eac input. (c) Arrangement producing 2.8Edc and 1.4Edc outputs. (c) Practical arrangement with eight diodes used by G3EUR to provide power for a B-2 transmitter-receiver without the requirement for a centre-tapped mains transformer secondary and with no requirement for 600V or so electrolytic capacitors.

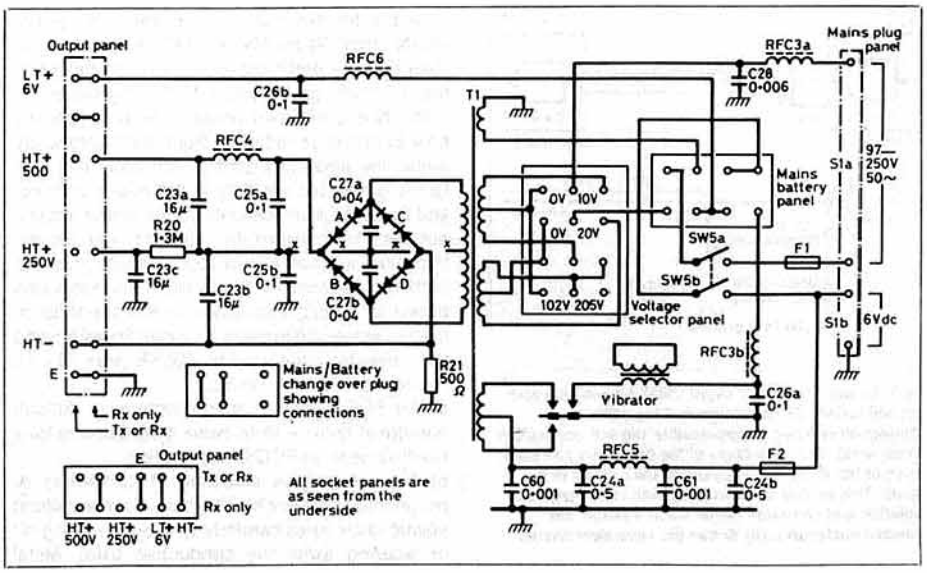


Fig 5. The original 1943 B-2 power supply unit designed by G3EUR and suitable for AC mains from 97 to 250V or 6V DC vehicle batteries. This used centre-tapped windings on the mains transformer.

full-wave voltage-doubler ('Extra diodes provide improved voltage-doubler' page 32) to delve back into one of his laboratory notebooks which provides further consideration of this approach which he used to power a Type 3 Mk 2 (B-2) suitcase transmitter/receiver. He writes: "Starting with **Fig 4 (a)**, and the need to get a negative supply for a small CRT, I hung a half-wave rectifier D5 and D6 on to a standard bridge rectifier (D1-D4) as shown in **Fig 4 (b)**. The small DC current in the transformer core did not bias the core unduly and all was well. Later I used the same trick to get a positive supply (**Fig 4 (c)** also for a CRT).

"Doing this again but in a full-wave configuration as in **Fig 4 (d)** gave me a supply to feed a B-2 transmitter, using much larger capacitors. Note that, since the transformer secondary is symmetrically loaded, no DC bias current results and a toroid transformer can be used without the risk of saturation. Since it is possible to earth any of the points A, B or C one can get positive or negative supply lines as required. This is essentially the same as the circuit shown in the May *TT*, but with two extra diodes (D3, D4). This gives a centre tap to the supply which is most convenient when using both a transmitter and receiver and avoids the need for 500V or 600V-working electrolytics, which are increasingly rare these days.

"One assumes that the arrangement shown in the May *TT* and in PA0SE's column in the March 1990 *Electron* was intended for use with a mains transformer but, of course, the bridge can be connected directly to an AC supply, although in this case the output is then *very* live to earth and must be treated with great respect. "In **Fig 4**, since these circuits work at all voltages, I have shown the outputs in terms of E, the RMS voltage of the supply; the capacitors all work at 1.4E, except C7 which, if used, must be 2.8E plus some margin for safety in each case. Naturally, at 12V RMS and an output of an order of 1A or so, the capacitors need to be of the order of 470-2200μF and the voltage drops of the silicon or germanium diodes must be taken into account. With E equal to 200-300V RMS, the voltage drops in the silicon diodes can be ignored and capacitor values of 10-47μF apply.

"I do not favour use of very large capacitors to get low ripple in the output, since this means large current-spikes in the AC supply. I consider it better to design for a ripple of 2 to 5% and use a choke/capacitor filter in the DC line(s) unless an electronic voltage regulator is used with enough 'head-room' to accommodate the ripple as well as the variation of DC voltage due to regulation and variation of the mains supply."

As a matter of interest, I have added the circuit diagram **(Fig 5)** of the flexible PSU originally developed by G3EUR for the B-2 in 1943, providing 500V and 250V HT from a conventional bridge rectifier and centre-tapped transformer, intended for use on AC mains from 97-250V RMS or, by means of the vibrator unit, from 6V DC car batteries.

In those days, one depended on the less-efficient copper-oxide or selenium rectifiers. Even selenium units, developed originally in Germany, were in short supply, although STC through its ITT connections was able to begin manufacturing selenium rectifier disks in the UK in 1939. The story is told in *Power of Speech — A History of Standard Telephones and Cables, 1883-1983* by Peter Young (George Allen & Unwin, 1983). He tells how, in the early 1930s, the associated STC company Kolster-Brandes (Brimar) began to import selenium rectifiers from an ITT associate company in Nuremberg, mainly for use in battery chargers. In the summer of 1939, probably in view of the possibility of war, STC engineers began to acquire production equipment and know-how from Germany to establish their own production: "One thing the Germans did not supply was the formula for the mysterious ingredient 319. When supplies of this were cut off after 3 September, 1939, its content was ascertained from a French associate company." Production of disks was expanded from half a million in 1939 to twenty-three million in 1944 mainly for use in Service equipment. Selenium rectifiers could work in appreciably higher ambient temperatures than copper-oxide rectifiers which needed much larger cooling fins when rectifying more than a few milliamps.

Incidentally, there are still quite a few B-2 equipments in use on the amateur bands. In connection with the Duxford Radio Society of the Imperial War Museum, John Brown, G3EUR has formed a users' group of amateurs interested in the B-2 suitcase set with its own newsletter. If interested, write to "B2-UG" at the Duxford Radio Society, Duxford Airfield, Cambridge, CB2 4QR.

## THOSE NOISY RFI-GENERATING COMPUTERS

The May *TT* item 'Taming the station computer' discussed a number of steps that can be taken that help to allow microcomputers to form an integral part of amateur stations without reception being disrupted by RFI stemming from the computer and its peripherals. Equally or perhaps more common are problems arising from digital equipment, including computers, operated anywhere near the receiver, often belonging to a neighbour or nearby commercial establishment. Computer-generated RFI is increasingly a problem even for relatively strong-signal broadcast reception, let alone for weak-signal reception of distant amateur stations.

In the UK, there are still no legally-enforcable limits on spurious radiation from Information Technology (IT) equipment — and even when, under the EC EMC Directive, legislation is implemented, this is most unlikely to be retrospective, applying only to new equipment and installations. The Radio Investigation Service (RIS), when notified by (preferably a group of) broadcast listeners/viewers, will often do its best to 'persuade' owners of clearly offending equipment to do their best voluntarily to reduce RFI. In this connection remember that you and your neighbours can notify the RIS of sources of interference to broadcasting without incurring the £21 charge for a personal visit.

Even in the USA where, since January 1981, there have been FCC regulations imposing radiation limits on microcomputers, the more powerful 'business' Class A machines are permitted to generate significantly more RFI than the cheaper

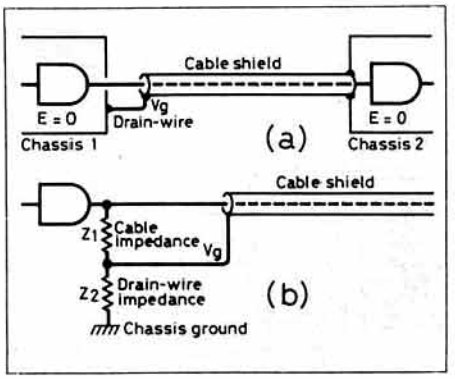


**Fig 6. As explained in *TT* (April 1988) a screened cable can still radiate RF noise/signals if the cable-boot connection includes an appreciable 'pig-tail' connection (drain-wire). The inductance of the drain-wire can cause much of the RF noise to appear on the outside of the shield. This applies to minimizing both unwanted noise radiation and unwanted signal/noise leakage into shielded enclosures. (b) Shows the equivalent circuit.**

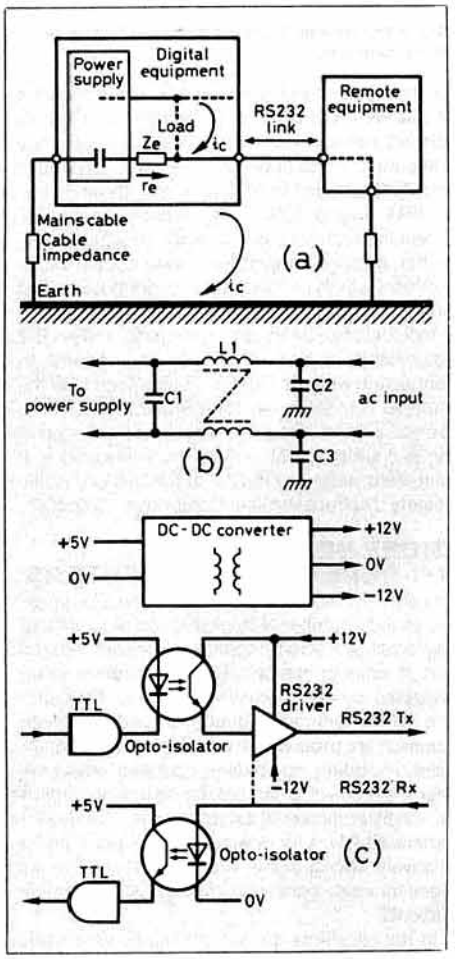


**Fig 7. Tips on reducing RFI from computers as described in *TT* (August and April 1988). (a) Circulating common-mode currents in mains cables and interfacing links between digital equipment results in RF signals being injected into the mains supply or radiating directly. (b) Typical mains filter to reduce noise from power rectifiers and switch-mode PSUs etc being injected into AC power leads. An alternative form of filter is to wind the power cable around a suitable ferrite bead. NU1N considers the best method of isolating signals coupled through the power lines is to use a combination of RF line filters and transient suppressors. (c) Method of isolating an RS232 interface by means of an opto-isolator and 1W DC-DC converter chip.**

domestic Class B machines. Class A includes many of the PC-compatible machines based on the Intel 80386 devices; quite a few such machines are now commonly used in the domestic or amateur-radio environment. A four-page article 'Understanding computer-generated RFI — some remedies for this malady' by Bryan P Bergeron, NU1N (*Ham Radio*, March 1990) makes it all too clear that the problems of RFI will not end when the UK finally gets round to IT-RFI legislation.

NU1N is concerned primarily with suggesting how to minimise radiation from microcomputers under the amateur's control. He describes how RFI is generated not only in the microcomputer and its associated switched-mode power supply, but also by peripherals including: the mouse; trackballs; light pen; tablets; touch screens; joysticks; modems; printers; RF modulators; and local area networks (LANs). His advice on RFI suppression follows well-trodden paths but extends well beyond the measures suggested by ZS6KE (May *TT*). To summarize his main points:

a) An FCC Class B rated machine is difficult enough to tame — think twice before opting for a machine with an FCC Class A rating.

b) Do not remove shielding in computers or peripherals to prevent heat build up. Open metallized plastic enclosures carefully to avoid chipping off or wearing away the conductive paint. Metal shielding is now increasingly restricted to the power supply.

c) Use shielded cables wherever possible and add snap-on ferrite inductors to peripheral cables, especially if they are not shielded. Do not forget to add a snap-on inductor to the telephone cable where it exits your modem. See also **Fig 6.**

d) Judicious use of RF bypass capacitors with resistive touch pads, mechanical mice and joysticks is often worthwhile.

e) If possible isolate your receiver from the computer by using separate power sockets (preferably not directly connected on a ring mains circuit — G3VA): "If all the power sources in your shack are controlled by a single circuit breaker, try adding two good surge protectors — one for your communications gear and one for the computer equipment. A simple protector with MOVs won't do. The best method of isolating signals coupled through the power line uses a combination of RF line filters and transient suppressors." See also **Fig 7.**

f) A good earth is essential: "It's surprising how many hams who have six foot ground rods connected by heavy coaxial braid to their gear fail to ground their computer equipment" (Note that special precautions should be taken in using 'real earths' in houses with electricity supplies using protective multiple earthing, PME — see for example the article by Peter Chadwick, G3RZP in the June 1987 issue of *RadCom*. In any case there should be no direct connection between mains earth and real earth — G3VA).

g) Minimize cable lengths; where possible use an internal modem, move your micro and peripherals as far from your receiver as possible. Running an external disk drive cable parallel and adjacent to the antenna is asking for trouble.

h) Minimize the entry points of RFI into your receiver. If you have an external loudspeaker cable with more than a few inches of cable, use a low-pass filter and shielding to prevent the cable acting as an antenna.

i) If you develop your own software, try and minimize the reading and writing of data to disk. Try to avoid using software that requires frequent operation of the disk drive: "The stepper motors and associated drive circuitry are extremely noisy in the RF spectrum."

NU1N urges that amateurs should think of their computer system in the same way as communications gear with peripheral cables, telephone connections and power cables acting as the antenna system.

## HERE AND THERE

A famous name in both amateur and professional antenna engineering, Dr John D Kraus, W8XK has been awarded the 1990 IEEE Heinrich Hertz Medal (gold medal, bronze replica, certificate and $10,000). He became a radio amateur at 14, gained a physics PhD at 23 and "trained himself to design experimental apparatus which is elegant in its simplicity". He was responsible for the helical antenna, corner reflector, and the original close-spaced bi-directional W8XK family of antennas. He was also one of the pioneers of radio-astronomy and designed and built the giant 'Big Ears' radio telescope for Ohio State University, of which he is Emeritus Professor of Electrical Engineering & Astronomy and Director of the Radio Observatory.

Another 14 year old amateur, Todd Kramer, N4WOR seems set to follow in the footsteps of W8XK. He recently made the first known amateur radio contact (31 December 1989) using an antenna made from one of the new 'high-temperature' (liquid nitrogen coolant) superconductors: a 1-2-3- yttrium-barium-copper dipole made by ICI Inc with a handheld Repco SYN2100 transceiver. He made a 12 minute contact with KN4BC via a 70cm repeater.

G E Cripps, G3DWW has found an excellent source of VFO components. He writes: "If you can acquire an ex-WD passive preselector unit known as an Acceptor Unit ZA54916, this contains a number of suitable ceramic formers plus a beautiful four-gang variable capacitor with slow-motion drive, and all housed in a very well screened cabinet. These seem to appear at rallies etc. Mine was a bargain at around £20. I guess the coils alone cost more than that."

A problem with long-wire and voltage-fed antennas, unless one end is brought into the shack (increasing the risk of TVI/RFI) is that the ATU is remote from the operator. Dick Rollema, in his 'Reflecties door PA0SE'. *Electron* June 1990 summaries an article by DL2NI (*cq-DL* April 1990)

## FEEDING AN 80-metre DELTA LOOP ON 1.8MHz

The 1-λ delta loop has become a very popular HF antenna and provides a useful multiband loop, particularly if fed with open-wire line. In practice it is seldom possible to erect such a system with a 1-λ loop on 1.8MHz as this would require something like a 500ft loop perimeter. Even a 3.5MHz 1-λ loop (268ft) needs a fair space and high supports. Roy C Koeppe, K6XK in *QST*'s 'Hinks & Kinks' (April 1990) indicates a satisfactory way of feeding an 80 metre loop on 1.8MHz, an approach that could also be adopted for scaled down loops to permit operation on a lower band: **Fig 8.** K6XK writes: "C1 tunes the antenna to act as a three-quarter-wave resonator and allows the SWR at the feed point to be no more than 1.1 across the 160 metre band."

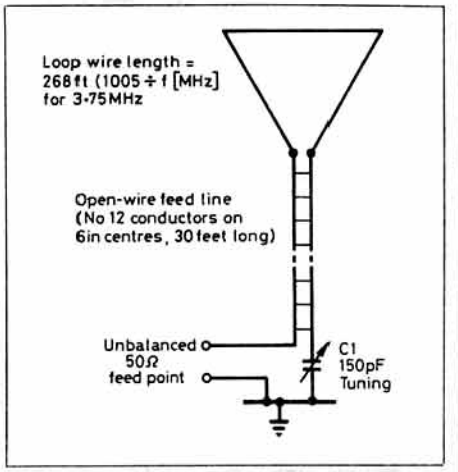


**Fig 8. K6XK's arrangement for feeding an 80 metre delta loop antenna on 160 metres.**

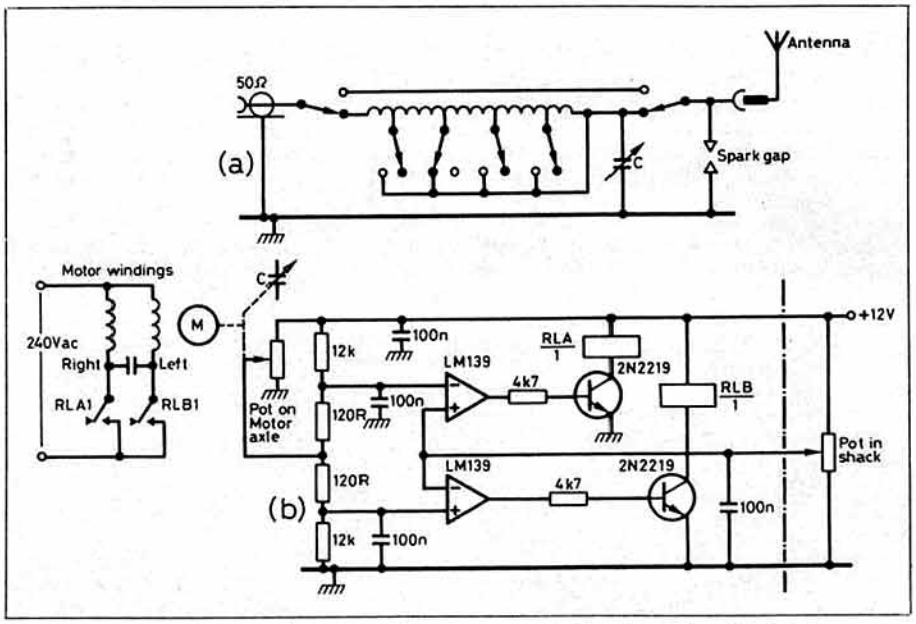


**Fig 9. (a) L-network ATU for voltage fed multiband long-wire antennas etc. Remote switching of the inductance can be implemented with relays. (b) DL2NI's electronic remote-tuning system with operator potentiometer tuning control. Full component/motor details not available from PA0SE's digest of a *cq-DL* article by DL2NI.**

on a 1.8MHz to 10MHz long-wire antenna that uses a relay switched L-network ATU with remote tuning of the capacitor as shown in **Fig 9 (a).** PA0SE does not provide any details of the reversible motor, relays etc but the principle seems to be that the electronic controller causes the tuning shaft potentiometer to move to the same relative setting as the potentiometer tuning control in the shack: **Fig 9 (b).**

## MEASURING ANTENNA GAIN

The considerable difficulty of obtaining realistic and reasonably accurate measurements of the far-field forward gain of HF/VHF antennas without (and sometimes with) the use of a good professional standard model antenna range is well known. This is one reason for the current interest in the increasing use of the NEC 'Method of Moments' computer approach. But neither model ranges nor computer simulations provide the actual gain of a full-size, installed antenna, and whether it really gives your signals the boost promised by the manufacturer's sales department. A major problem with trying to measure gain by comparing signals received on the array with those on a reference dipole is the rapid fading of HF and 50MHz signals.

Dr TH Wilmshurst, G3IBY has developed a useful method of measuring the forward gain of various types of 50MHz beam antennas. He feels that not only should the results be of interest, but so also the method of measurement, which is not beyond the means of any technically minded amateur or SWL. He writes: "**Fig 10** shows the results of a series of forward-gain measurements made on some of the more popular 50MHz beam antennas. The method of measurement was, for the most part, as in **Fig 11**, although there was a small degree of evolution during the series. The antenna gain measurement figure (GA) is in dBd. This means that the figure represents the increase in received signal strength when the station is received first on the dipole and then the dipole is replaced by the test antenna. In practice, useful measurements cannot be made in this way, because by the time the change of antennas has been made the station being received may have closed down or, even if he is still there, fading will have changed the signal strength. These problems can be avoided by using two antennas with rapid switching between them. Fading can be surprisingly rapid and requires very rapid switching of the order of a 100 milliseconds switching period.

"There is a range and bearing-dependent difference between the two antenna locations which, if not corrected for, gives a further spread of about 3dB for each histogram, making the comparisons less accurate. The difference is measured and compensated for by including a simple dipole in the series of antennas put in the 'test' position. It is clear that many measurements have to be taken to obtain a good enough distribution to be able to

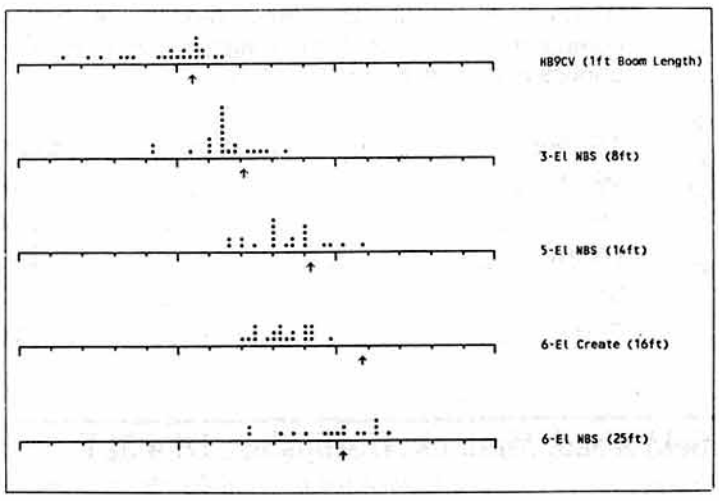


**Fig 10. Some of G3IBY's 50MHz antenna gain measurement histograms. X-scale: range 0 to 15dBd. Histogram resolution 0.2dB. Arrows indicate gains as published in *RSGB VHF/UHF Manual* (HB9CV array), *ARRL Handbook* (NBS arrays), manufacturer's literature (Create).**

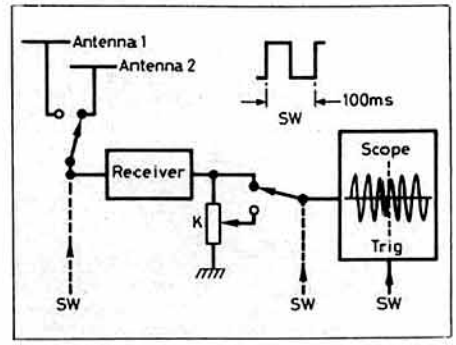


**Fig 11. G3IBY's normal method of measurement. ANT 1 reference antenna. ANT 2 Antenna under test or second dipole. Antenna height 40ft, spacing 30ft, horizontal polarization. Receiver SSB mode linearised by backing off RF gain to disable AGC. Adjust K until signal levels on the two sides of the screen of the 'scope are, on average, equal (signals normally SSB speech). Then with $K_1$ value of K with antenna under test and $K_2$ value of K with second dipole in place of test antenna with location correction factor. The measured test antenna gain, $G_1 = 20 \log (K_2/K_1)$.**

make a meaningful comparison. Thanks are due to many local and semi-local stations in the Southampton area who gave me carrier bursts, whistles, 'aahs' etc in attempts to improve accuracy. It ultimately became clear that the only realistic way of obtaining an adequate number of measurements was to have a system that would operate on a station transmitting normal speech, not necessarily in contact with me. The arrangement of **Fig 11** fulfils this requirement well. The method is to tune in to the station, point-up the two antennas and adjust K till the mean signal amplitudes seen on the two sides of the 'scope face are the same. This usually takes at least one 'over'.

"The received stations were mostly within a range of 100 miles and all were via tropo. There were no sporadic E or other propagation-mode signals. The location is a fairly good one but by no means giving antenna test-range conditions. The results shown in **Fig 10** indicate that, for the most part, the published gain values recorded on antenna ranges do give quite a good indication of the performance that can be expected in normal use.

"It would be interesting to have some results from sporadic-E, auroral, TEP (trans-equatorial propagation) and other propagation modes, also for some of the larger antenna types now in use, and for other bands. It should be noticed that this is a 'receive-only' test and could be carried out by a technically-minded SWL. The reciprocal performance of antennas means that forward gain will be similar on transmit as on receive."

## ELIMINATING WOODPECKER INTERFERENCE?

Despite the virtual ending of the 'Cold War', there seems little immediate prospect of any sudden disappearance of the interference from Russian 'over-the-horizon' (OTH) radars, although in recent years this has been rather less intrusive than when it started back in the 1970s. An interesting but non-technical item has, however, appeared in the May 1990 issue of *The JARL News* which provides notes on 'Highlights of Amateur Radio activity in Japan'. This is as follows: "Kokusai Denshin Denwa Co Ltd (international telephone and telegram corporation) recently developed an equipment which almost completely eliminates 'woodpecker' interfering with short wave radio communication.

"The noise is thus called because it resembles the rhythmic tapping sound the woodpecker makes when it taps the tree trunks. Previously only a noiseblanking method was used but now this equipment enables clearer conversation. For the time-being, however, it is being used for short wave radios of ship telephones but utilization for amateur radio is also under consideration." □

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**Random ramblings**

Geoff Arnold has once again produced a superb issue of his magazine *"Radio Bygones,"* and if you haven't seen it yet, get one right now, because they sell like hot cakes and are in limited supply. This magazine is unique in its approach, and is so interesting that I for one can't put it down. The articles are very much orientated towards the kind of radio bygone equipment of particular interest to the amateur radio enthusiast, and I am now beginning to look at BC-348s and WS-38s with a new outlook (anyone got any to sell?). Coupled with the best colour photography I have ever seen in any magazine, *"Radio Bygones"* is a classic in the making. We have a very few copies of the earlier issues, and if you haven't yet made up the complete set, do it straight away whilst you can. Keep it up Geoff.

Those of you who live in the great metropolis will know that we have had our fair share of difficulty in getting a manager for our Eastcote branch. They have all been good chaps, but for one reason or another (what have you lot done to them?) they have all gone on to other things. Now is the time for all good men to come to the aid of our new manager, Fred Butchard, who re-opened the doors on the 26th of June. Why not call in and make Fred's acquaintance? You will be made most welcome, and I'm sure that you will find Fred a most knowledgeable and likeable man.

Finally, for all the followers of Packet Radio, we have had our first shipments of the new Kantronics "Data Engine." What a machine... talk to Richard Hillier here at Matlock, and he will give you blow by blow details of the latest from the best — Kantronics.

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

**Sam Jewell, G4DDK, describes an easy-to-construct and versatile design.**

## INTRODUCTION

The unit described in this article was first presented in booklet form at the 1989 Sandown VHF Convention. It is basically an extension of my 1152MHz oscillator design published in *RadCom* [1], but incorporating an additional multiplier stage to 2GHz and dimensioned to fit into a readily available tin-plate box.

Comments received from a number of constructors of the original 'Sandown' unit have been incorporated into the version published here to produce what I hope will be an easy-to-construct, reproducible and versatile oscillator source for the 2GHz frequency range. Printed circuit boards are available from the RSGB microwave components service under the designation 'DDK004'.

The original board was designed for 2556MHz, its output being multiplied by four to 10,224MHz for the local oscillator of a 10GHz transverter. However, the range of adjustment of the various multiplier stage filters is such that it could be used anywhere between 2GHz and 2.6GHz, making it suitable for the local oscillator of a 2.3GHz converter or transverter. It could also be used as the local oscillator of a 2.4GHz receive converter for Oscar 13 mode S. The source could also be used as a low-power 2.3GHz personal beacon or control transmitter under the terms of the revised amateur radio licence.

To use the board as a transmitter, it must be capable of being modulated. The optional modulator circuit allows the source to be frequency modulated with either speech or frequency-shift keyed (FSK) data [2].

One unexpected use for the board has emerged. The tuning range of the final multiplier filter is such that it has been found possible to resonate it as low as 1.2GHz, allowing the final multiplier to operate as an amplifier producing 50 to 70mW output. In this form the board may be used as a low-power transmitter in the 1.2GHz band.

The output filter uses SKY trimmer capacitors, and I am indebted to J Dahms, DC0DA, and R Wesolowski, DJ6EP, for the original idea to use these low-cost trimmers to resonate microstrip lines at frequencies as high as 2.6GHz [3]. Measurements with a network analyser have shown the self-resonant frequency of these trimmers to be just high enough to make them usable at this frequency.

## CIRCUIT DESCRIPTION

The circuit for the frequency source is shown in **Fig 1.** The crystal oscillator uses the Butler circuit made popular in the RSGB Microwave Committee UHF source design [2]. The advantage of this circuit is its extremely low phase noise compared with that of the more common bipolar transistor Colpitts circuit so often used in 'seventies equipment designs. Phase noise performance is at least as good as that of the popular FET Colpitts oscillator with the additional advantage of being easy to set accurately on frequency.

Using the specified coil, the oscillator can be used at any frequency between 80 and 125MHz, just by changing the resonating capacitor C3. Operation outside this range usually requires that L1 be changed.

A fifth-overtone crystal determines the oscillator frequency, with the heavily damped tuned circuit comprising C3, R4 and L1 ensuring that only the correct crystal overtone is selected. Adjustment of L1 core allows the frequency to be pulled slightly either side of the marked crystal frequency. In the unlikely event that the frequency is low even after adjustment, it may be necessary to connect a capacitor of between 10 and 33pF in the position marked Cx on the component overlay. If Cx is not required then replace it with either a 1000pF ceramic plate capacitor or a short wire link.

The circuit associated with TR2 is the limiter section of the crystal oscillator. Because of the hard limiting produced by this stage, the output spectrum is rich in harmonics. By incorporating a tuned circuit at the required harmonic frequency, a relatively high-level output is obtained up to about the fifth harmonic. In this design the output is tuned to three times the crystal frequency: 319.5MHz in the case of a 2556MHz local oscillator. A double bandpass tuned circuit consisting of C7/L2 and C8/L3 ensures adequate rejection of the unwanted harmonics.

An integrated circuit regulator IC1 provides a stabilised 9V supply for both the oscillator and the base bias for the first multiplier stage. Because of the need to maintain a 3V drop across the regulator, the minimum supply voltage to the board should be 12V. If the unit is to be powered from a car battery it may be better to use a 78L82 regulator which will provide a regulated 8.2V even with the car battery well down on charge. The effect on oscillator output power will be a loss of 1 to 2dB.

The first multiplier stage uses a BFR91A as a very efficient frequency doubler. Its output circuit consists of a double-tuned stripline filter at 639MHz (for the 2556MHz version). Trapezoidal capacitors are used to provide very effective decoupling at the emitter of TR3 and at the supply end of L4.

The second multiplier is similar to the previous stage, but doubling from 639MHz to 1278MHz. The transistor selected for this stage is the BFR96. Alternatively a BFR91A could be used but the output level is usually less than the BFR96 provides.

The final stage doubles from 1278 to 2556MHz using a second BFR91A. This device replaces the BFG91A originally specified for this stage, but which was found to be only conditionally stable.

Later development work showed the need to use decoupling capacitors with low equivalent series resistance in the 2.6GHz stage to overcome tuning difficulties. The normal trapezoidal capacitors of the type used in the previous stages have proved to be inadequate in this stage. This has been overcome by extra decoupling using ATC porcelain chip capacitors soldered across C24 and C29, on the groundplane side of the PCB.

A three-stage stripline filter is used at the output of TR5 to ensure adequate rejection of the half-frequency drive signal. SKY trimmers are used to resonate this filter. Other types of capacitor have been tried without success.

At the very highest end of the range, the trimmers will be *very* close to their minimum value, so the filter becomes very sensitive to stray capacitance. For this reason it is essential to use a

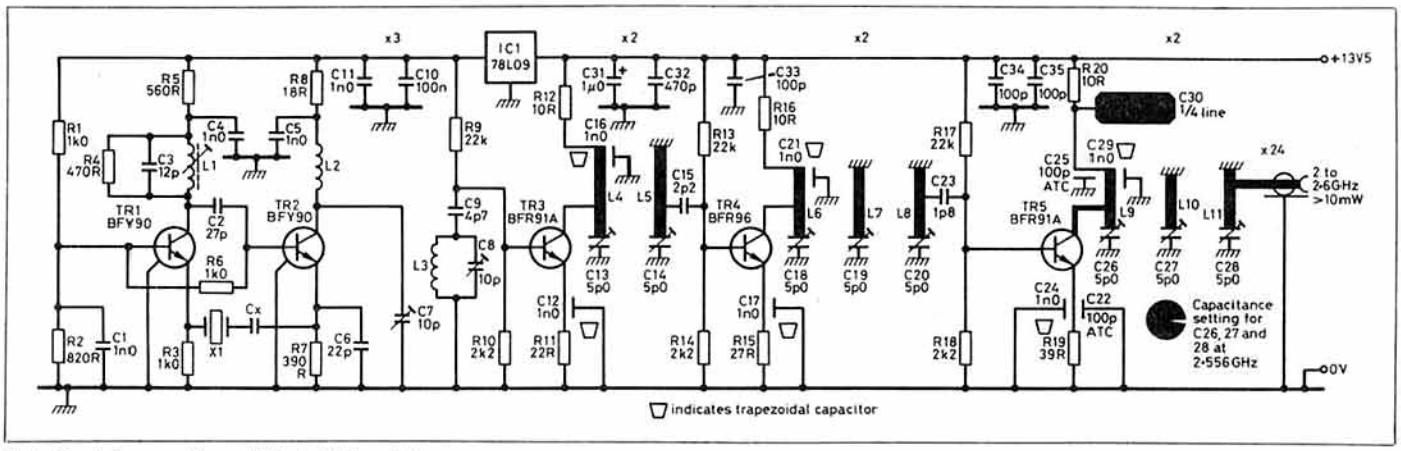



**Fig 1. Circuit diagram of the oscillator/multiplier chain.**

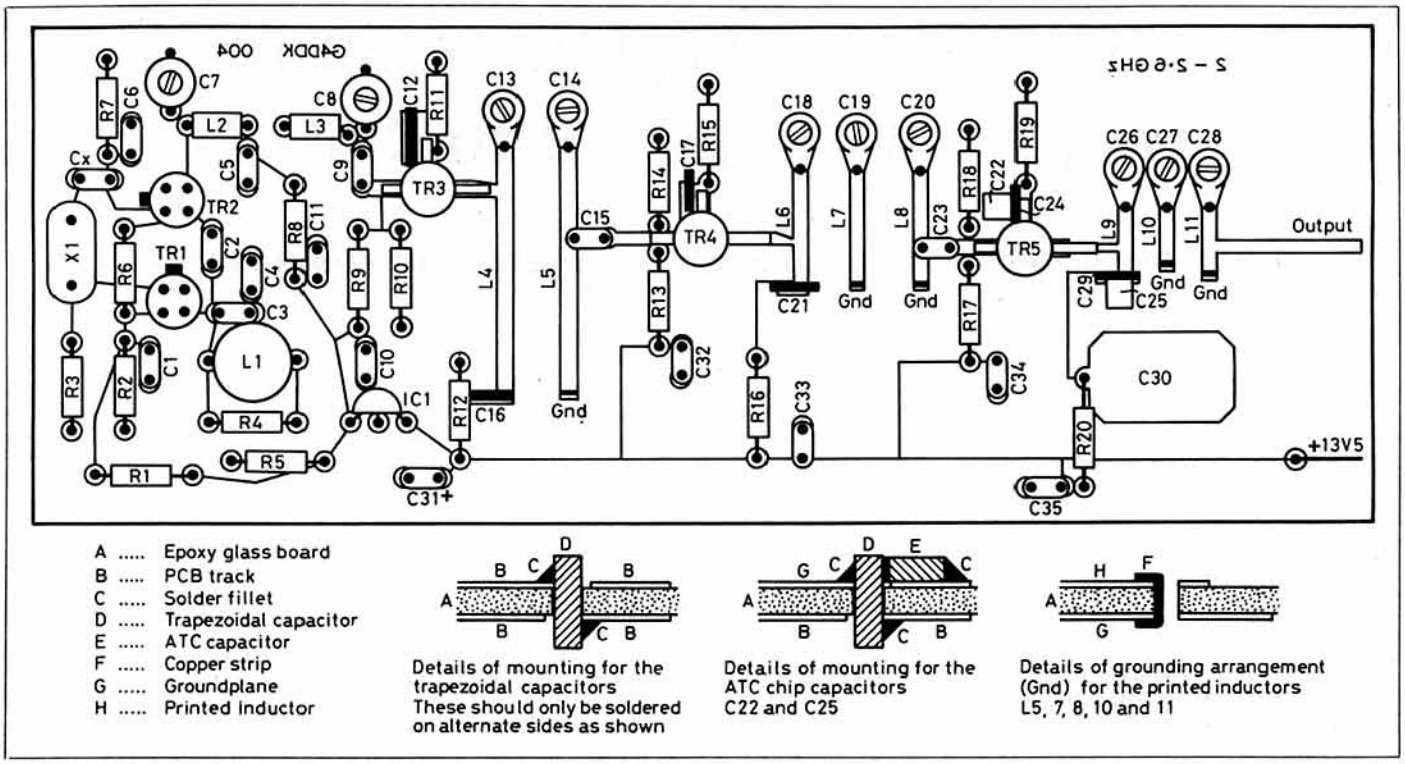



**Fig 2. Component overlay.**

non-metallic trimming tool when adjusting the trimmers. Ceramic blade tools are ideal but may be considered too expensive unless a number of these units is to be built, in which case the investment in time saved will more than outweigh the cost.

The output is taken from the filter via a 50-ohm miniature connector such as SMA, SMB or SMC (Conhex), although BNC is just acceptable at 2.3GHz.

## CONSTRUCTION

In order to ensure reproducibility the unit is built on a purpose-designed PCB, which may be obtained from the RSGB microwave component service. The PCB is seam-soldered into a 148 by 55 by 30mm tin-plate box for screening and protection.

The output at 2.5GHz is via a miniature coaxial connector soldered to the end wall of the box. DC power is taken through a solder-in feedthrough capacitor, also in the end wall of the box. Additional feedthrough capacitors are used to connect the optional crystal heater and sensor to the temperature controller circuit [4].

1. Begin construction by marking the inside of the tin-plate box where the PCB is to be mounted. The groundplane side of the board should be 15mm from the rim of the box. Do not solder the two halves of the box together at this stage.

2. Mark the end wall of the box where the output connector is to be mounted. Also mark the location of the feedthrough capacitors. Drill holes to accept the spill of the connector and all the feedthrough capacitors, even though you may not presently intend to use them all.

3. Carefully file a small area from two corners of the PCB to clear the overlapping edges of the box.

4. Spot-solder the PCB into one half of the box. Placing the soldered half of the box down on its rim, jig the other half of the box into place, checking for good alignment of the edges. If necessary, file the edges of the PCB for a good fit. Check that the two lids fit correctly.

5. Solder the overlapping edges of the box together before finally seam-soldering the PCB into place.

6. Solder the output socket into place, taking care to ensure that the spill of the output socket lays flat onto the output stripline from L11.

7. Solder the feedthrough capacitor(s) into place in the end wall of the box.

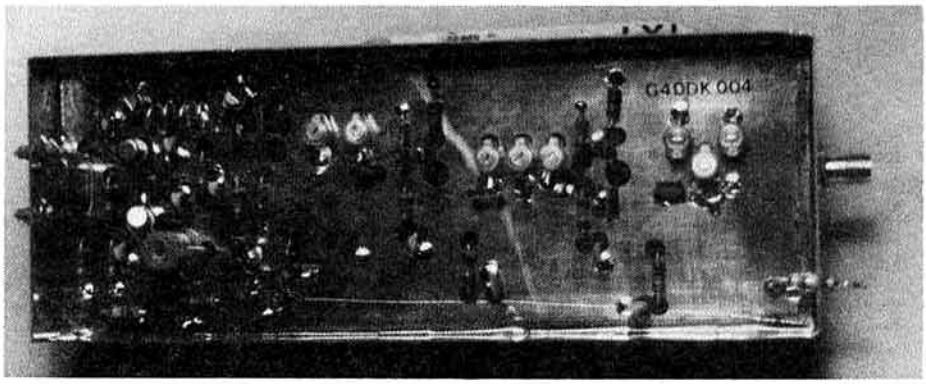
8. Populating the PCB with components (**Fig 2**) should be done in the following order.

(i) Grounding strips for L5, 7, 8, 10 and 11
(ii) Trapezoidal capacitors
(iii) L2 and 3
(iv) Resistors
(v) Capacitors
(vi) L1
(vii) Trimmer capacitors
(viii) Transistors
(ix) IC1
(x) Crystal

9. Connect the power feedthrough to the main power pad (near C30) with a short length of insulated wire.

10. Now that construction is complete, carefully inspect the assembled board for correct component placement, damaged components or poor solder joints.

The board may be cleaned of flux residue using a solvent such as acetone. This *must* be applied carefully with a cotton bud, as most solvents of this type will dissolve the plastic SKY trimmers!




**The completed unit.**

## ALIGNMENT

The following items of test equipment are regarded as essential for alignment:

*Moving coil* multimeter (20,000 ohms/volt)
Absorption wavemeter(s) covering 90MHz to at least 2.6GHz
Power meter with full-scale sensitivity of <100mW at 2.6GHz
Frequency counter (preferably to 2.6GHz, but 110MHz will do)

Before starting alignment, set all trimmer capacitors to minimum capacitance and set the core of L1 level with the top of the coil former. Connect a 13.5V supply to the unit and check that the total current drawn is less than about 200mA. If the current is significantly higher than this, switch off and check for short-circuits or incorrectly placed components. When you are satisfied that the current is within limits, check that the voltage at the regulator end of R5 is 9V. If significantly different, check for faults and correct before proceeding.

The frequencies quoted in the following instructions assume that the unit is to be aligned to 2556MHz.

1. Tune the wavemeter to 106.5MHz and place its pick-up coil close to L1. Turn the core of L1 until the wavemeter registers the presence of a strong oscillation. Confirm that the oscillation is

at 106.5MHz and not on some other adjacent frequency. Switch the supply off and then on, and check that the oscillator restarts. If not, then slightly turn the core of L1 and try again. Exact frequency setting is not too important at this stage, as it is to some extent influenced by the settings of the following stage.

2. Switch the multimeter to its 2.5V range (or nearest equivalent) and place the probes across R11, positive end to the emitter of TR3. Depending on the initial settings of the previous tuned circuits, a reading of a few hundred millivolts will be noted. Adjust C7 and look carefully for a small increase in the voltage reading. When the increase is seen, adjust for the peak reading. This should be obvious on a moving-coil meter but is almost impossible to see on a digital voltmeter. Now adjust C8 for a further, significant increase in the reading to around 0.7V. Confirm with the wavemeter, by placing its pick-up coil close to L3, that you have tuned the circuits to 319.5MHz and not the second or fourth harmonic of the crystal frequency.

3. Transfer the meter leads to R15 and tune first C13 and then C14 for a peak reading of 1 to 1.5V. Again confirm with the wavemeter that you have tuned to 639MHz.

4. Transfer the meter leads to R19 and adjust C18, 19 and 20 for a peak reading of 1 to 1.5V on the meter. Use the wavemeter to confirm that you have tuned to 1278MHz.

5. Connect the power meter to the output connector.

6. Tune the wavemeter to 2556MHz and place close to L9.

7. Adjust C26, 27 and 28 for a peak reading on the power meter. It will be found that these three trimmers will resonate at close to minimum capacitance, with the setting of C27 (the middle trimmer) being particularly sharp. Confirm that the peak reading is at 2556MHz by tuning the wavemeter over several hundred megahertz either side of the wanted frequency. Also note that it is very easy to mistakenly tune to 1278MHz and get 50mW or more output. This is easily avoided if the trimmers are kept close to minimum capacitance.

8. Check that the output is between 5 and 10mW.

9. Having now aligned the unit, it is worth going back over the adjustments to ensure everything is peaked.

10. Check with the frequency counter that the oscillator is oscillating on exactly 106.500000MHz. Adjust the core of L1 to achieve the correct frequency. If the oscillator has to be pulled significantly the output power may fall; also the oscillator may refuse to re-start. If this condition is encountered then connect a 10pF (NP0) ceramic trimmer in the position Cx. With the low-value capacitor in series with the crystal, no frequency error or re-starting problems should be encountered. If the problem persists then consider using a different crystal.

This concludes the alignment. If you have access to a spectrum analyser that covers the frequency range to 2.6GHz then you can selectively measure the power output and carefully re-adjust the trimmers for best spectral purity. **Fig 3** shows the output spectrum of a prototype unit.

## COMPONENT SUBSTITUTION

Perhaps the most widely substituted components in this type of oscillator unit are trimmer capacitors. It is essential that only the recommended SKY types are used, except for C7 and C8 which may be either 10pF (black) SKY or the Cirkit type in the component list.

The prototype unit used Philips transistors. Motorola and Telefunken BFR96 devices have been used successfully in the TR4 position.

### COMPONENT LIST

**RESISTORS**

| | | | |
|---|---|---|---|
| R1, 3, 6 | 1k | R9, 13, 17 | 22k |
| R2 | 820R | R10, 14, 18 | 2k2 |
| R4 | 470R | R11 | 22R |
| R5 | 560R | R12, 16, 20 | 10R |
| R7 | 390R | R15 | 27R |
| R8 | 18R | R19 | 39R |

All resistors 0.25W miniature carbon film or metal film

**CAPACITORS**

| | |
|---|---|
| **C1, 4, 5, 11** | 1000p high-K ceramic plate, eg Philips 629 series |
| **C2** | 27p low-K ceramic plate, eg Philips 632 series |
| **C3** | 12p low-K ceramic plate, eg Philips 632 series |
| **C6** | 22p low-K ceramic plate, eg Philips 632 series |
| **C9** | 4.7p low-K ceramic plate, eg Philips 632 series |
| **C15** | 2.2p low-K ceramic plate, eg Philips 632 series |
| **C23** | 1.8p low-K ceramic plate, eg Philips 632 series |
| **C31** | 1$\mu$ tantalum bead 16V working |
| **C32** | 470p medium-K ceramic plate, eg Philips 630 series |
| **C33, 34, 35** | 100p low-K ceramic plate, eg Philips 632 series |
| **C10** | 0.1$\mu$ tantalum bead, 16V working |
| **C12, 16, 17** | 1000p trapezoidal capacitor from RSGB or Cirkit |
| **C21, 24, 29** | |
| **C7, 8** | 10p miniature ceramic trimmer (5mm diameter) SKY (black) or Cirkit 06-10008 |
| **C13, 14, 18, 19, 20, 26, 27, 28** | 5p SKY trimmer (green) from Piper Communications, Didcot (0235 834328) |
| **C22, 25** | 100p ATC series 100 or 130, type B (0.110 in cube) from Phase Components Ltd (0403 41862). |
| **C30** | Printed on the PCB |
| **Cx** | 10 to 33p type as C2, see text |
| **Ft** | 1000p feedthrough capacitor(s) for DC power input and optional crystal heater |

**COILS**

| | |
|---|---|
| L1 | Toko S18 5½ turn (green) with aluminium core |
| L2, 3 | 2 turns of 0.8mm diam tinned copper wire. Inside diam 4mm. Turns spaced to fit hole spacing on the PCB. Centre of coil 4mm above the PCB. Exceptionally 3 turns required at the LF end of the range, ie below 2.2GHz output. |
| L4-11 | Printed on the PCB. |

**SEMICONDUCTORS**

| | |
|---|---|
| TR1, 2 | BFY90 available from Cirkit, Bonex, Piper etc |
| TR3 | BFR91A available from Cirkit, Bonex, Piper etc |
| TR4 | BFR96 available from Cirkit, Bonex, Piper etc |
| TR5 | BFR91A available from Cirkit, Bonex, Piper etc |
| IC1 | $\mu$A78L09 available from Piper, STC Components etc |

**MISCELLANEOUS**

| | |
|---|---|
| X1 | 5th overtone crystal in HC18/U case<br>106.5MHz for 2556MHz<br>90.6667MHz for 2176MHz<br>The recommended temperature spec is 10ppm |

Tin-plate box type 45 (also known as 7768) available from Piper Communications. Size 55.5mm wide, 148mm long and 30mm high. Alternatively a box could be made from offcuts of double-sided PCB material. Printed circuit board (PCB) available from the RSGB microwave component service. Order as G4DDK PCB 004. Output socket, single-hole mounting SMA, SMB or SMC (CONHEX).

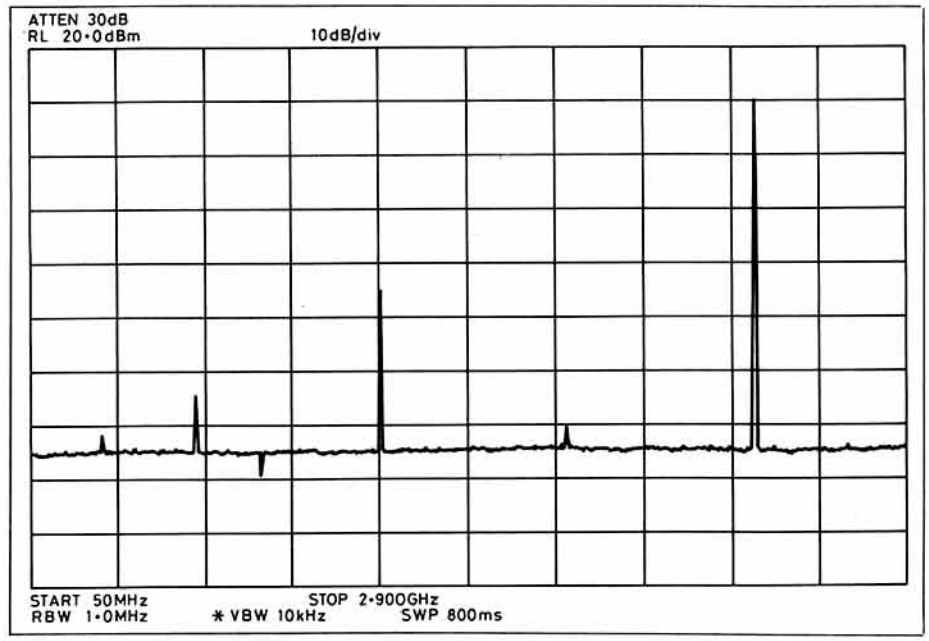



**Fig 3. Output spectrum of a typical board.**

Use only the specified Toko green coil for L1. Attempts to use other coils in the same series to overcome frequency-setting problems have been largely unsuccessful. If you need to operate at a frequency far removed from 106MHz then change the value of C3, not the coil.

## CONCLUSION

A number of these units have been successfully built by microwave enthusiasts both in this country and in The Netherlands. Results have been quite consistent, with between 10mW and 20mW output at 2556MHz achieved with careful alignment.

My own unit is currently driving a 2556MHz amplifier to 150mW output [5]. This in turn drives a 3dB splitter, giving two outputs at 75mW for use in the up and down converters in my G3WDG-based 10GHz transverter. A Murata posistor crystal heater provides open-loop control of the crystal temperature. With this arrangement frequency drift due to crystal self-heating and ambient temperature. With this arrangement, frequency 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!

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# BOOK REVIEW

## BRITISH INTELLIGENCE IN THE SECOND WORLD WAR

**Volume 4, Security and Counter-Intelligence**

**by: F H Hinsley and C A G Simkins**

***First edition 1990. Published by HMSO, xii + 408 pages. £15.95***

Younger members may be puzzled to find in *RadCom* the review of a book about spies, double agents and the use of signals intelligence in counter-intelligence operations a half-century ago. The reason is simple. This is the first book that explains officially how, 50 years ago, over 1000 pre-war amateurs and listeners with the ability to copy morse code became Voluntary Interceptors, the secret listeners of the Radio Security Service. Many of them were subsequently specially enlisted into the Special Communication Units, nominally part of the Royal Corps of Signals (as it then was) but in reality working under the direction of British Intelligence as MI8(c). In perhaps their own "finest hour", a large number of amateurs and members of the RSGB participated in the secret struggle between Allied Intelligence and Counter Intelligence and the German Abwehr (military intelligence) and the more ruthless Reichsicherheitshauptamt (RSHA).

As radio operators, they worked under the 'need to know' principle that left most of them largely in the dark as to whom they were listening to and the uses that were made of their intercepts. This new, and long overdue, "official history" has been compiled from official records but with the stipulation that names and places remain secret even though many of these have appeared in other recent publications. Nevertheless, it provides much previously unpublished information on the origins of RSS, the importance of the ISOS, ISK, ISOSOLES decrypts in running the "double agents" by the Twenty (XX) Committee and the work of the SCIU detachments on the Continent in the final months of the war.

ISOS (Intelligence Service Oliver Strachey) were the decrypts of the Abwehr messages sent between their main centres using what they believed to be a secure hand cipher that was broken at Bletchley Park from early 1941 in the section headed by career cryptoanalyst Oliver Strachey. ISK (Intelligence Service "Dilly" Knox) were decrypts of Abwehr Enigma traffic broken from early 1942, including the GGG Enigma traffic between Madrid and Berlin. ISOSOLES were the decrypts of SD (RSHA) traffic.

The book shows that as early as 1928, a subcommittee of the Committee of Imperial Defence recognised that for the wartime interception of illicit transmissions that might be made from the UK, "the War Office should use voluntary and unpaid enthusiastic amateurs of unimpeachable discretion". But it was a decade before this was followed up. "In 1933 it was decided that, under War Office direction, the GPO should be responsible for the manning, maintenance and technical operation of what became known as the Radio Security Service, but it was not until 1937 that the GPO was authorised to build three fixed intercept and D/F stations." The first of these was not operational until December 1938, "and only then was approval finally given for the establishment of a network of fixed and mobile stations supplemented by an auxiliary observer corps of amateur operators".

Recruitment of amateur radio enthusiasts into RSS finally began in June 1939. RSS was under the control of the War Office as part of MI1(g) until November 1939 when it became MI8(c), still within the War Office. The original brief (not included in the book) of the "Illicit Wireless Intercept Organisation" was defined as "to intercept, locate and close down illicit wireless stations operated either by enemy agents in Great Britain or by other persons not licensed to do so under the Defence Regulations, 1939".

During 1940, as the extent of Abwehr communications was unravelled by RSS, the work was extended to the interception and location of the communications of the Abwehr, and to associated enemy intelligence and security agencies anywhere in the world. It has soon became clear that the amateurs were outperforming the GPO interceptors in this work. By autumn 1940, RSS had about 1000 interception and technical staff "provided, not entirely to the satisfaction of MI8, by the GPO" and another 1000 part-time VIs (mostly amateurs recruited by Lord Sandhurst with the assistance of Arthur Watts, G6UN, (1939 President RSGB) and drawing on the Society's membership lists).

In October 1940, MI8 proposed that administrative control should be transferred to MI5 (the Security Service) but in January 1941, Lord Swinton (Chairman of the Security Executive) decided that RSS should be taken over "lock, stock and barrel" by SIS (MI6), and the transfer was effected in May 1941 when the GPO's agency for the provision of personnel and equipment was terminated: "The best of the operators from the PO staff and the VIs were enlisted ("for special duties") into the Royal Signals. Better equipment was obtained, some of it from the USA, and new intercept stations (Hanslope Park, later Forfar, etc) established."

RSS/SCU3/SCU4 thus for technical services became part of Section VIII (Brigadier (Sir) Richard Gambier-Parry, ex-G2DV) of MI6/SIS; working closely in conjunction with Section V (counter-intelligence external) and MI5 Division B1.

With BP progressively breaking into and reading the Abwehr traffic, the RSS intercepts played a vital role in enabling British Intelligence to gain a virtually complete insight into the activities of the Abwehr. It also enabled them to monitor the remarkable success of their running of the turned Abwehr agents, whose case officers also drew on RSS, in the operation of the radio links with Abwehr control stations in Hamburg, France and Spain.

Appendix 3, "Technical Problems Affecting Radio Communications by the Double-Cross Agents" is ascribed to "a former MI5 officer from his personal experience" (whom we can safely assume to have also been a life-long, still active G2-two-letter amateur). This Appendix describes how the Germans supplied their radio agents with HF/CW transmitters covering about 5-7MHz at powers of about 3 watts (battery sets) or 5-10 watts (mains). Under MI5, "case officers" double agents were encouraged to operate their own radios with an RSS operator sitting beside him or her, listening to ensure that nothing was sent to reveal that the agent was under control. It was also to become familiar with the "fist" of the agent so that contacts could be continued if there was subsequently any suspicion that the real agent was becoming uncooperative. In practice, a small number of pre-war British amateurs spent many hours at the keys of German agent radios right up to May 1945.

The book shows vividly how British Intelligence succeeded in controlling every radio agent sent into the UK by the Germans (though not "Sonya" who, married to an Englishman, successfully ran a clandestine station for the Russian GRU/NKVD services from near Oxford - an operation NOT mentioned in this book!).

Appendix 3 also reveals that to ensure that important deception traffic, in connection with "Overlord" (the D-Day Normandy invasion) from the Spanish double agent "Garbo", reached the Abwehr in Spain without delay, he reported to his masters that he had obtained a powerful transmitter. This was in fact a BC610 (Hallicrafters HT4) 600-watt transmitter, operated at 100 watts. It was finally moved to "the flat on top of MI5's London HQ, a very convenient arrangement for everyone concerned."

The now diminishing number of former VIs and members of the SCU 3, 4, 10, etc, may regret that it has been necessary to wait over 40 years for this "official" public recognition of their work as secret listeners. ***G3VA***

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# Grand Survey and Prize Draw

**I have over many years as an RSGB member, and latterly as an employee of the Society, seen many letters purporting to reflect the views of "most members" on the content of *RadCom*. Many of these are contradictory as no individual can possibly have spoken to anything like "most members" to discover what their views really are. Inevitably those who write tend to be the most vociferous, and published comments are frequently countered by a flurry of opposing views. With this in mind, my first task as Editor is to conduct some market research to find out exactly what it is that "most members" want to see and, for that matter, do not want to see in *RadCom*. Incidentally, the last time this was done on a membership-wide scale was over 25 years ago.**

**Ours is a rather special magazine. It acts on one level as a learned journal demonstrating that radio amateurs can still make real contributions to the science of radio communication; on another level it seeks to educate its readers; on another it is a journal of record, for instance publishing the text of new and revised licences; and, at its most basic level, *RadCom* is there to inform members of the work of the Society and how their money is being spent. Coupled with this, the membership of the RSGB covers a very wide range of interests and experience, far more so than amongst the readership of other radio magazines where competition forces each to find its particular niche in the market. Despite these constraints, *RadCom* must strive to appeal to all members.**

**Please spend a few minutes filling in the questionnaire and appending your comments. The bigger the response, the more representative the results will be. The aim is to keep *RadCom* at the forefront of the UK amateur radio press, to use it to attract more members to the Society, and to give you, the reader, a magazine you will look forward to receiving each month.**

***Mike Dennison, G3XDV, Managing Editor***

# WIN A PRIZE!

Everyone likes to win a prize now and then, particularly if it relates to a cherished hobby. So important do we consider this readership survey to the continuing success of *Radio Communication* as the leading European amateur radio magazine, that it seemed a good idea to offer a little incentive to encourage all members to participate.

Discussing the idea with a few of our advertisers brought forth a most positive and generous response in terms of the choice prizes that you see below. On behalf of the Society and yourselves, may we extend our sincere thanks to these companies for their most welcome and appreciated support.

How do you win? Every completed survey returned to HQ will be included in a "GRAND SURVEY PRIZE DRAW" to be held at the HF Convention on 29th/30th September in Daventry. The prizes will go to the first ones out of the "hat"! Naturally, to qualify you must be a fully paid up member and your survey form must be received by the deadline.


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| | More (tick box) | Less (tick box) |
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| Book reviews | ( ) | ( ) |
| Cartoon | ( ) | ( ) |
| Classified adverts | ( ) | ( ) |
| Club news | ( ) | ( ) |
| Commercial adverts | ( ) | ( ) |
| Competitions/puzzles/quizzes | ( ) | ( ) |
| Datacomms column | ( ) | ( ) |
| Direction finding rules/reports | ( ) | ( ) |
| DXpedition reports | ( ) | ( ) |
| EMC column | ( ) | ( ) |
| From the Secretary | ( ) | ( ) |
| Helplines | ( ) | ( ) |
| HF contest rules/reports (UK) | ( ) | ( ) |
| HF Propagation predictions | ( ) | ( ) |
| HF Spectrum Analysis | ( ) | ( ) |
| Licence conditions | ( ) | ( ) |
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| Product news | ( ) | ( ) |
| QRP column | ( ) | ( ) |
| Raynet column | ( ) | ( ) |
| Rig reviews | ( ) | ( ) |
| RSGB Mail Order price list | ( ) | ( ) |
| Satellites column | ( ) | ( ) |
| Society news | ( ) | ( ) |
| Special event callsign list | ( ) | ( ) |
| SWL column | ( ) | ( ) |
| SWL Spectrum Analysis | ( ) | ( ) |
| Technical construction articles | ( ) | ( ) |
| Technical theory articles (e.g In practice, EMC, propagation) | ( ) | ( ) |
| Technical Topics | ( ) | ( ) |
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| VHF contest rules/reports | ( ) | ( ) |
| VHF Spectrum Analysis | ( ) | ( ) |

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and finally, so that your form can be entered in the prize draw . . . .

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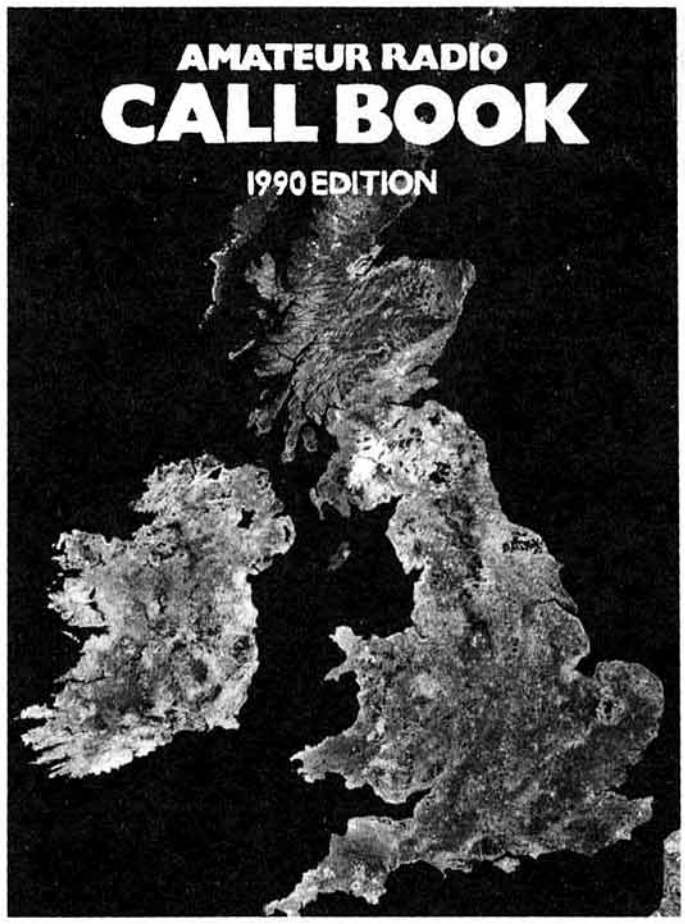


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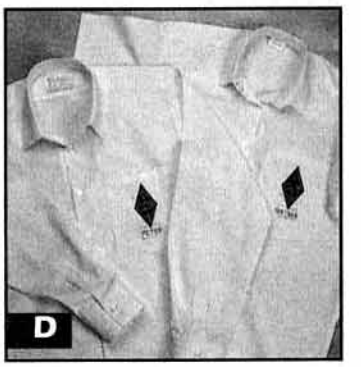






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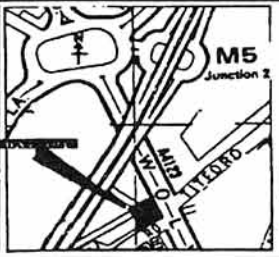


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The dual-band watch allows you to receive both MAIN and SUB band audio simultaneously, multiple scanning systems on the MAIN and SUB bands plus 99 memories, an easy to read central display and Icom's DDS sytem make this one of the most comprehensive multi-band transceivers available.

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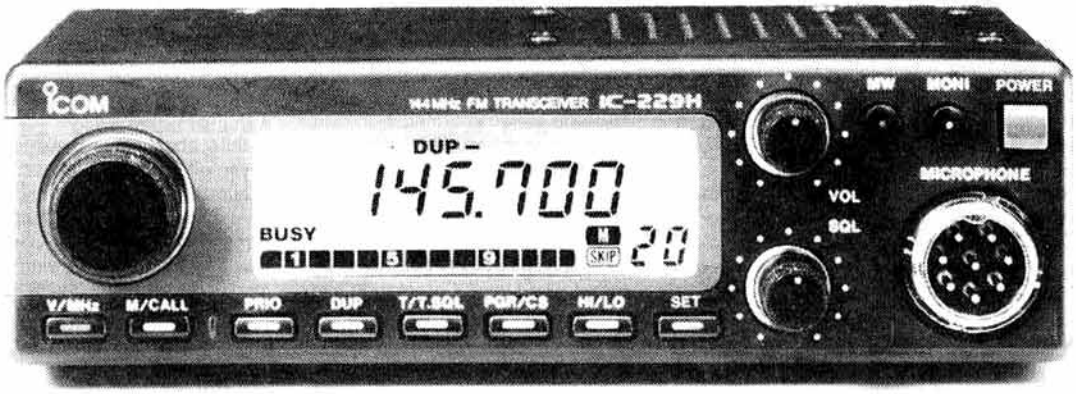
# NEW MOBILES

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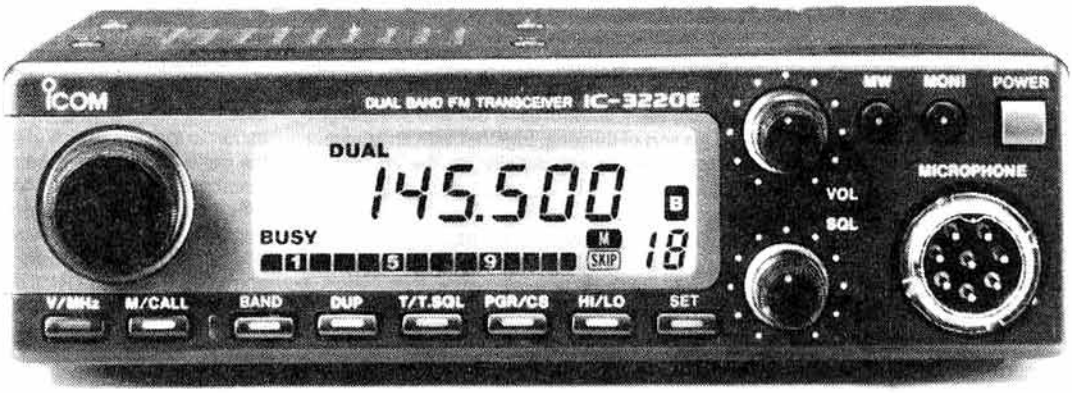


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# Superbug simulator

**Chas Fletcher, G3DXZ, has designed a simple, low-cost semi-automatic keyer with old-style CW qualities.**

Superbug? Not an antibiotic-fed megagerm, simply a bug-key simulator with superlative performance. However, in case any CW gentleman or lady (note the genteel accolade used in the noble art) recently converted to the persuasion is unsure of the animal to which I refer, let me first define the terms of reference.

When morse telegraphy was the only serious method of long-distance communication, telegraphists had to spend hours on end hammering away on straight keys. The strain on muscle and sinew at times induced a condition known as 'glass arm' which needed a rest cure and, in days gone by, probably incurred a severe lack of cash. To help reduce the effort needed to operate the key, the mechanical semi-automatic key was invented. Dots were produced by a horizontally vibrating arm suspended on a leaf spring; the dashes remained fully manual as they presented less of a problem than the dots. The thumb and forefinger keying action had arrived - the 'bug' was born, and with it a new sound to the CW operator's ear.

The fact that the bug's distinctive rhythm is still commonly heard on the HF bands, in the face of modern keyers with basically superior performance, is not just due to ageing operators wallowing in nostalgia. The bug puts a 'human' hand behind the CW, allows the experienced listener to recognize the sender long before the callsign appears, and yet is relatively simple to use.

Well, at least that is the concept! In reality those simple mechanical keyers, manufactured by companies with famous names like McElroy, Vibroplex, Lionel and Eddystone, varied enormously in their performance. The best were beautifully produced, light, precision instruments - some even with precious metal plating and jewelled pivots! Others were less than ideal. My own key, purchased surplus in 1947 after a hard life in the US Signals, was of the latter variety. In fact, my treasured bug key was a monster. The Lionel Corporation had produced a key suited to the touch of an elephant's midwife who habitually sent a 40 WPM plus, with a vibrating 'U' spring that produced very scratchy dots. Had it not been for the magic of the rhythm it produced, it could well have had a very short history. In fact, it continued to make code for over 30 years until I was overtaken by Iambic fever - hombrew of course.

So, now you can send perfect morse and, yes, you can belt it out with ease. But who's in charge?

This sort of thinking, together with an apparent increase in bug-key activity on the HF bands, brought the old bug out of storage. A quick dust-off and let's go! Oh dear! Gone was the expertise to use it. Automatic dash, dot and space keying had quickly removed the finger skills needed for semi-auto keys. On top of the lack of skill, the feel of the mechanical movement was worlds apart from the light touch of the iambic paddle. Not wanting to choose either key exclusively, I started to think about a bug simulator - a semi-automatic keyer with modern features: easy speed control, accurate dot/space ratios, dot-length spaces after each dot and dash, and a light touch. That was the aim and, in conjunction with any light-touch paddle, the following circuit will produce morse like the finest bug you have ever heard.

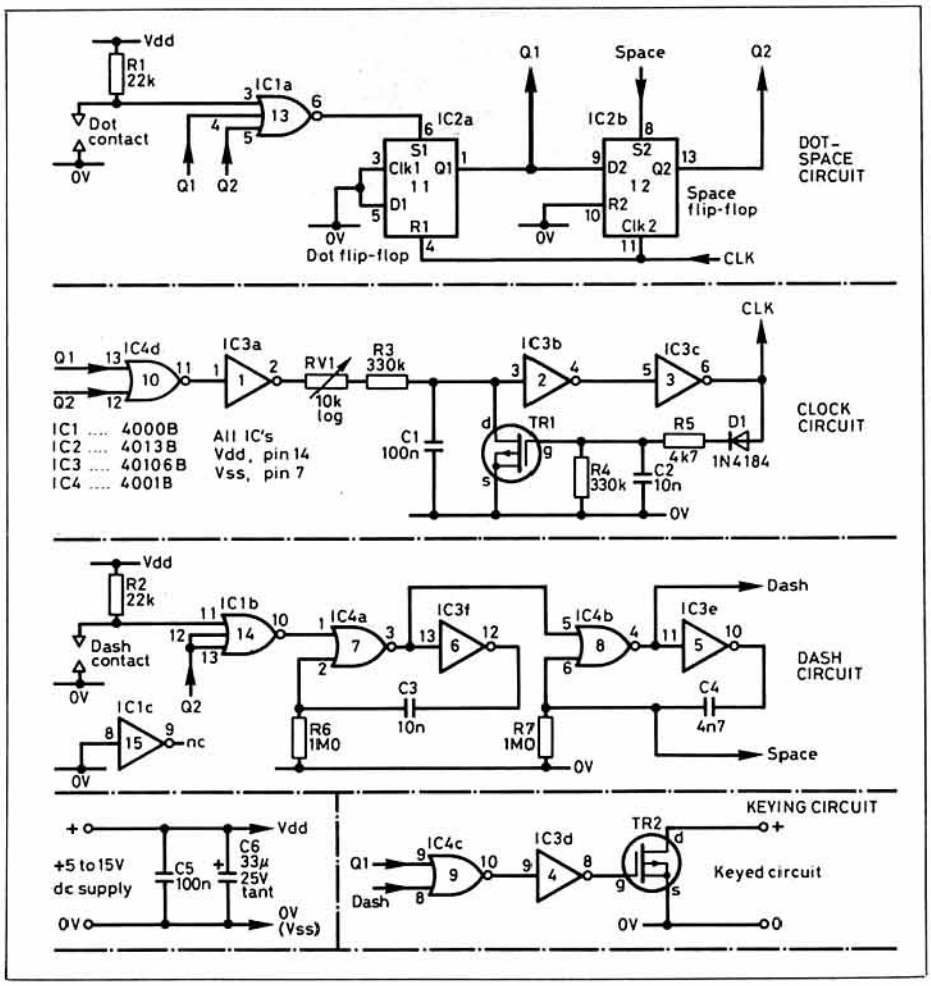



**Fig 1. Circuit of the superbug simulator.**

## KEYER CIRCUIT

In this description, the individual gates within the four ICs are given individual numbers, but their input and output terminals are the actual pin-outs on the chips used. Thus reference to 2(1) means gate 2, pin 1. Fig 1 shows the complete schematic.

The heart of a good keyer is the clock circuit which governs the dot and space intervals. It is essential that the interval from the start of the action to the occurrence of the first clock pulse is the same as the interval between any two subsequent pulses, otherwise inconsistent dots may be produced. The circuit to be described overcomes the problems. In the quiescent state, the 'D' flip-flop outputs Q1 and Q2 are low, 1(2) is low, 2(3) and 3(6) are low and TR1 is non-conducting, C1 is discharged and all is quiet.

### Dot/space sequence

Input 13(3) is pulled low by the dot contact which sets 13(6) and 11(6) high. 11(6) is the 'set' input of the dot flip-flop, device 11, hence the Q1 output at 11(1) is forced high. Q1 going high does four things: it starts the clock running with a high at 10(13), it causes a dot output with a high at 9(9), it sets the 'D' input of the space flip-flop, device 12, and it disables the dot input gate 13. Thus, having initiated a dot sequence, the key is effectively disconnected from the keyer until the sequence is complete.

In the clock circuit, C1 charges until the threshold voltage of gate 2 is reached. The Schmitt trigger gates 2 and 3 then switch state rapidly and start the discharge of C1 through TR1. The network D1, R5, R4, C2 ensures that C1 is completely discharged, the clock pulse length at 3(6) being about 10µs. If at this time 1(2) remains high, the cycle repeats.

The clock pulse at 3(6) resets the dot flip-flop via 11(4) and clocks the space flip-flop via 12(11). As the space flip-flop 'D' input was previously set high, the clock pulse transfers this high state to the Q2 output 12(13). Q1 is now low and Q2 high. The dot input gate 13 remains inhibited - now by the Q2 signal at 13(5) - and the clock begins another timing sequence, enabled this time by Q2. Meanwhile, the dot output is sent to the TX via gates 9, 4 and TR2. Nothing further can now happen until the space sequence completes and releases gates 13 and 14. After space, if the dot contact remains closed, the above sequence repeats but, if a dash input is detected by 14, a dash begins. Neither the following dash

**COMPONENT LIST**

| | |
|---|---|
| R1,2 | 22k |
| R3,4 | 330k |
| R5 | 4k7 |
| R6,7 | 1M |
| All resistors ¼W 10% | |
| RV1 | 1M log law |
| C1,5 | 100n disc ceramic 63V |
| C2,3 | 10n disc ceramic 63V |
| C4 | 4n7 disc ceramic 63V |
| C6 | 33µ tantalum 25V |
| D1 | 1N4184 |
| TR1,2 | VN10KM or VN10LM (Siliconix) |
| IC1 | 4000B (gates 13, 14, 15) |
| IC2 | 4013B (gates 11, 12) |
| IC3 | 40106B (gates 1, 2, 3, 4, 5, 6) |
| IC4 | 4001B (gates 7, 8, 9, 10) |

All components available from J Birkett, The Strait, Lincoln, and other suppliers. Vero microwiring pen, if required, is Verospeed code 79-1732G.

nor dot can be closer to the first dot than one space period. (Note - dot and space have exactly the same weighting in this design and this relation cannot be changed).

**Dash/space sequence**

The simulator does not produce automatic dashes, but it does remove any contact bounce or uncertainty from the action of the dash contact, and it adds an obligatory space period after each dash. Two monostables are used to clean up the dash input. Gates 7 and 6 operate on the 'make' and gates 8 and 5 on the 'break' of the dash contact. In both cases, the operation is sealed in for around 10ms which is long enough for any contact irregularity to clear. When end-of-dash occurs, the reflex action of gates 8 and 5 is used to set the space flip-flop 12 and lock out any further dash or dot for one space period.

**Keyed circuit**

This design uses a VMOS FET switch TR2 as a keying device. Using this type of switch has great advantages: it requires virtually no driving power, and it will key 250mA and withstand 80V or more in the keying circuit. It does restrict the keyed circuit, however, in that it must present a positive voltage to ground. There is no simple way to adapt this circuit to key negative voltages, except by the use of a high-speed relay which will increase dramatically the current consumption of the keyer. In the design given, standby current is effectively zero and no ON/OFF switch is needed. A 9V supply will result in a key-down current drain of 350µA, which means virtual shelf life from the usual PP3 battery.

For anyone with the negative-keying problem, the VMOS FET will make an ideal relay driver, provided a diode is connected across the relay coil to absorb switching spikes.

NOTE. Gate 15 is unused in the current design - feel free to improvise!

## CONSTRUCTION

One-off construction projects can absorb lots of effort for little result if PCB design is always employed. I prefer to microwire the components together using Veroboard to hold them in place, all unnecessary copper being removed. The result is not a thing of intrinsic beauty but it is quick, trustworthy and effective. Microwiring using a Vero microwiring pen also allows one to make mistakes and simply correct the error - not so easy with PCBs. However, microwiring does demand either good eyesight or a magnifier and a good light.

As a guide, the author's effort went comfortably on a 3" by 1.5" piece of Veroboard, 0.1". hole spacing, which in turn fitted into a 3" by 2.5" by 1.5" plastic box with plenty of room for the speed-control pot and a PP3 battery. □

# Malsor Kits UC1332 HF-144MHz Converter

### This kit will turn your 2m multimode into a general-coverage HF receiver. Peter Hart, G3SJX, takes a look.

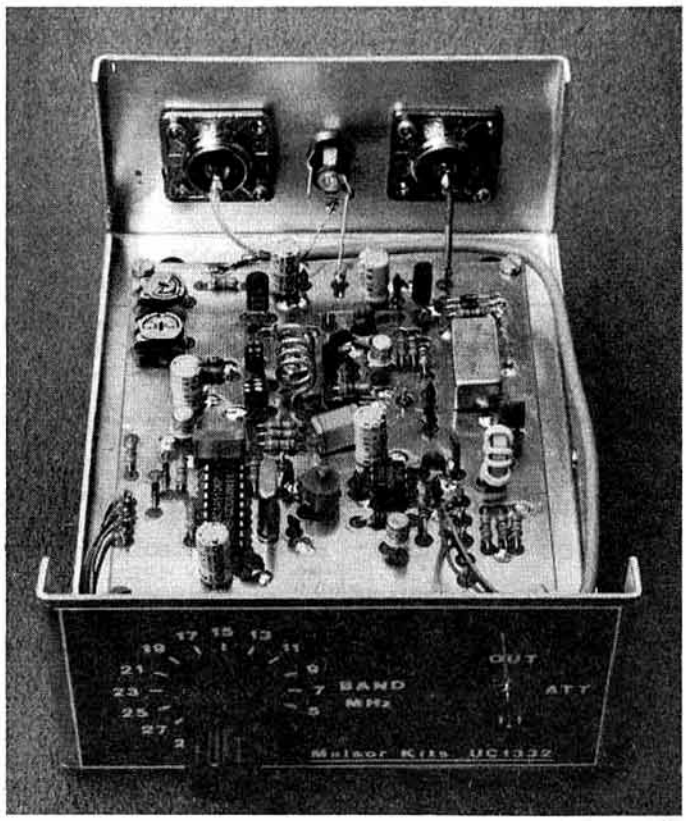
Steve Hunt, G3TXQ, is well known to readers of this magazine as the author of several constructional articles on transceivers and antennas. He also markets a range of kits under the name Malsor Kits, including the UC1332 HF to 2m receive converter, the DSM1100 direct reading SWR/power meter (see 'Technical Topics' March 1989), HFL238 receive loop antenna and the QCT40 40m QRP CW transceiver.

The UC1332 enables the HF band from 1-33MHz to be received on a 144MHz multimode rig in sixteen 2MHz bands. The band is selected by a 16-position hexadecimal rotary or thumbwheel switch. The circuit comprises a diode ring mixer with an input low-pass filter and switchable 20dB input attenuator. The local oscillator for the mixer is generated by a phase-locked loop using a frequency synthesiser IC and covers the range 113-143MHz in 2MHz steps. The unit requires a 13.8V nominal supply capable of delivering 100mA.

The kit comes complete with very comprehensive step-by-step assembly instructions which should enable a complete beginner to build the project successfully. Alignment can be completed using a multimeter. Those who wish can purchase the PCB ready built and tested or as a finished and cased unit. The two controls on the front are the band switch and input attenuator in/out. On the rear of the case are two SO239 coaxial sockets for connection to the HF antenna and 2m rig, and the DC power socket. There is no on/off switch.

The UC1332 needs to be used in conjunction with a multimode 2m rig covering the modes required for HF, ie SSB, CW and AM. An FM-only rig is of no use. The performance on HF is largely determined by the performance of the 2m receiver. The converter has a conversion loss of about 9dB which is about the correct compromise between sensitivity and strong signal handling for the average sensitive 2m rig. If using a transceiver, be very careful not to transmit into the converter or damage will invariably result. Using the review sample, good results were achieved across the HF range on SSB and CW and on AM broadcast stations. Switching in the attenuator was necessary on the lower-frequency bands, almost certainly due to the FT225RD 2m rig used for the tests.

The PCB and kit of parts to assemble the board (less hardware, case controls and sockets) is reasonably priced at £39.50. The assembled and tested board is available for £49.50 or as a finished and cased unit for £75. The PCB is available separately with the synthesiser chip for £15.




Malsor kits are promoted at rallies and similar events with the occasional magazine advert. Contact Malsor Kits at 21 Green Street, Milton Malsor, Northampton NN7 3AT.

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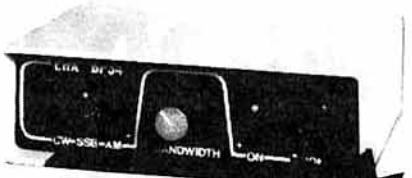

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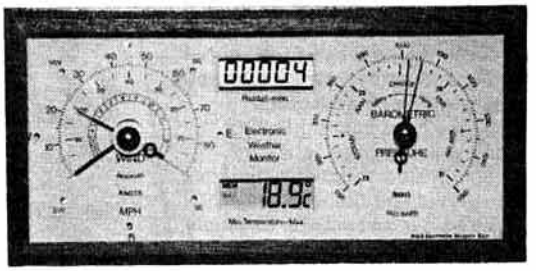

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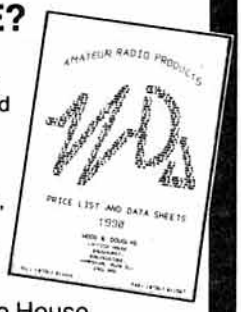


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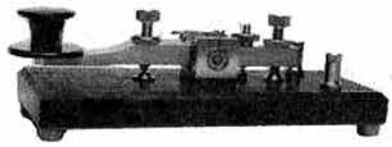

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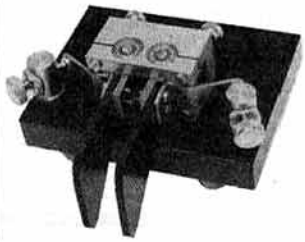

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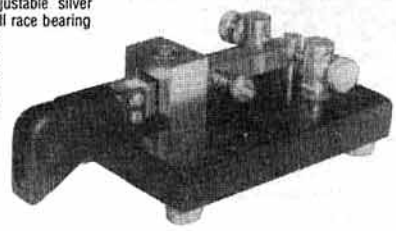

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At the time of writing, the holiday season had begun and the World Cup was in full swing. These have had a dramatic effect on the amount of material received from listeners for this column.

## NEWCOMERS

Peter-Walduck is BRS92940. He lives in Milton Keynes, and he has been a serious listener since the 'sixties when he was in the Army, but has not been a member of the Society for too long. He was a radio operator, taught by the Royal Signals. However, since he was demobbed 24 years ago, his morse has become rather rusty. He has an interesting selection of QSLs, but his shack has no 'top notch' receiver; a Saisho SW5000, a Skywood communications receiver and an ex-army R210, which is his favourite. His main interest is listening to broadcast band DX, but he also spends much time on the amateur bands too.

## QSL TECHNIQUES

The biggest source of mail from amateurs over the last couple of years undoubtedly centres on the question of the differing techniques adopted by listeners when sending reports. This month is no different. Before we look at what they have said, let's take a look at a few more 'do's' and 'don'ts'.

The first, and most important, thing to bear in mind is will the recipient find the report useful? If you think the answer is 'yes', go ahead with completing the card. Examples of 'yes' might be: the station is getting no replies to CQ calls, but is a good signal with you; the station is only using low power and will be pleased to get a report on his signals; the station is consistently working stations in another continent, but is perfectly audible in Europe; you are hearing good signals from a station who is in a rare location and is operating on any of the low frequency bands; you are reporting on signals heard at UHF or VHF, especially via meteor scatter, sporadic-E or aurora; or the station you have heard is a new country for you and you would like a card to add to your collection. Examples of when it might be best not to send a card are: when you hear a station who has obviously been licensed for many years and clearly would not be interested in receiving a card; a station operating from Europe on the HF bands; one who is working a string of G's on any band; one who is making many quick-fire contacts and is 5x9+. These are, of course, only a few examples. There are probably other equally clear-cut examples which others might quickly think of. In general, you will find that most DXpeditions, or stations with QSL managers, will QSL all SWL reports as they are employed by the DX station to answer all cards received. There is no real point in providing an 'essay' with these cards as the manager will just not be interested.

There are other important issues to be addressed. Most importantly, make your card presentable. There is no point at all in completing the card in pencil or in a 'scruffy' fashion. Take some time in preparing your report and use different coloured pens to highlight interesting facts and figures. As an example, it takes me about five minutes to prepare one card, and at least three different coloured pens are used. Include sufficient details to show the recipient that you are really interested in the signals you have heard. It is always useful to include the operator's name on the card. Saying "Good signal, OM" shows that you didn't really take a great deal of interest in the signals you heard, and the amateur will probably decide not to send you the card that you really want. Try to avoid sending cards to 'top British DXers' who you might hear on 14MHz working DX, but who might only be quite weak with you. Several G3's have told me they have received reports from listeners reporting on 14MHz QSOs between here and VK. The SWL's report to the G has been 4x4 and they have said the VK was about 5x5 with QSB. In truth, the VK has been a consistent 5x9 with the G and he is just out of skip with the listener. If you must have a QSL from a G on 14MHz, it might be best if you try and obtain one from a local amateur whom you know. Another very important thing is to make sure that the details on the card are accurate. You will never get a card in return if the date, the time or the band are incorrect. Also in this category falls the card that includes no details of the stations heard — as I have said before, try to include details of more than one QSO, especially if they are of the rapid-fire type when four or five contacts are made every minute. In these circumstances, reporting on one QSO is just downright stupid!

Before tying the ribbons on this piece, it might be worthwhile saying that if you intend to set out to send direct for QSL cards, you will need a reasonably up-to-date set of callbooks, or at least access to a set. This enables you to be able to address your card to the correct address. You will need to send return postage (in the shape of stamps of the country you are sending the card to), International Reply Coupons (available either from Post Offices for about 60p or secondhand for a little less), or a 'green stamp' (dollar bill). These act as an incentive to the recipient to reply to your card as you have saved him any expense by providing the return postage. There are, unfortunately, stations that will quite happily keep your IRCs and will not return a card. This is an 'occupational hazard'. It is also useful to read radio magazine DX columns, and take a subscription to 'DX Newsheet' to obtain as much QSL information as possible to ensure that your card is sent to the right place. There are enough tips here to ensure that the British SWL will never again be accused of sending worthless reports. There are undoubtedly other issues to be addressed, but if you heed all, or most, of these you will not go far wrong.

I did mention that I had received some comment this month about listener reports — let's look at what was said. G4IPW admits to never having been a shortwave listener, but he is saddened by negative attitudes associated with those who receive an SWL report. He indeed refers to some amateurs who openly admit over the air that they have "had another worthless SWL report" and that they have "filed" it in the waste bin. He has always taken a totally different view in dealing with the half dozen or so he receives each year. No matter what they are like, he replies to them all in the true spirit of the hobby. He refers to one such instance, in replying to a card from an OK2 SWL. He sent a report and postcards of his town in Czechoslovakia, and said that in addition to being an SWL he was also licensed as OK2BHE and asked for a sked. After a great many abortive attempts, they finally made it and it has now turned into a weekly sked. If he had not taken the time and trouble to reply to the listener report, the enjoyable experience of this weekly sked would not have materialised.

A further comment about QSLing came from G7BQD, who had been an SWL for many years prior to passing his RAE two years ago. However, in his time as G7BQD, he has only received one report on his 144MHz activities, and that was from a Belgian SWL. He really would appreciate reports on his transmissions from these shores and has indicated that he is often to be found on 144.380 or .440MHz operating in the WAB Nets.

## ILA NEWS

Trevor, GW4OXB has provided the latest news from the International Listeners Association. The latest issue of their *Just Listening* magazine had items on scanners, the Voice of America, an evaluation of the R535 Airband receiver, Awards and Contests. They had their latest contest on 21/22 April, which clashed with the NEC Exhibition, and this affected participation somewhat. However, a good entry was hoped for in their 3rd Prefix Contest held last month.

The ILA certainly covers many facets of the hobby, whether your interest is in broadcast DX, the air bands, HF, VHF, RTTY, fax, awards, contests or medium wave. There are also a range of ILA sundries, including QSL cards, log sheets, club badges and Geoff Watts (BRS3129) Prefix Lists. For licensed members, there is a club net on Sundays at 0930 on 3.687MHz. There is certainly something for everyone, and intending members should write to the usual address which is: ILA, 1 Jersey Street, Hafod, Swansea, SA1 2HF.

**1990 HF TABLE**

| Station | DXCC | 28 | 21 | 14 | 7 | 3.5 | 1.8 | Total |
|---|---|---|---|---|---|---|---|---|
| BRS25429 | 259 | 176 | 191 | 228 | 172 | 110 | 51 | 928 |
| BRS8841 | 227 | 137 | 154 | 168 | 127 | 95 | 47 | 728 |
| BRS25209 | — | 72 | 82 | 97 | 119 | 80 | 43 | 493 |
| BRS52543 | 165 | 66 | 68 | 79 | 120 | 96 | 34 | 463 |
| BRS1066 | 129 | 67 | 68 | 86 | 84 | 43 | 36 | 384 |
| G1VDW | 120 | 34 | 74 | 76 | 32 | 20 | 1 | 237 |
| BRS32525 | 113 | 56 | 34 | 64 | 33 | 23 | — | 210 |
| BRS40292 | — | 29 | 17 | 31 | 33 | 24 | 8 | 142 |
| BRS92755 | 70 | — | — | 70 | — | — | — | 70 |

## FINALE

That's about it for this month. Unfortunately, we got the date of the SWL Contest a little mixed up this year, with it clashing with VHF Field Day and not, as is usual, the IARU HF Contest. It did, however, take place at the same time as the Venezuelan DX Contest, so there should still have been some transmitting contest activity to liven up the bands.

While on the subject of SWL contests, I had a call from G4DFI to say that there will be a Cray Valley contest this year. I will provide a few more details next month but it seems that the CW event will be held on 15/16 September, with the SSB leg on 29/30 September. The rules are likely to be similar to last year. The Cray Valley Committee have decided that entries must show an increase of 100% on the 1989 results, otherwise they will cease to sponsor it. This means that there will have to be in the order of one dozen entries. If you want to see the event continue, please give it your support. The White Rose event disappeared from the SWL contest calendar this year, we do not want to lose this one.

I hope that the World Cup competition will not seriously jeopardise your input to the column this month, and I am really keen to have some shack photographs. There is an early copy date of 9 August so please ensure that I have your news by then.

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

## SOME NEW OPERATING AWARDS

Ian Cornes, G4OUT (QTHR), the Awards Manager, has recently listed some new microwave operating awards, some of them quite remarkable in terms of what can be done if conditions are right. The operator concerned has the right approach and the persistence to pursue potentially "marginal" contacts, and maybe the skill and knowledge to know where to look for the signs that bands are opening for DX. All this has, of course, been discussed at some length in the *Microwave Handbook, volume 1.* Having this guidance to hand doesn't detract from the considerable achievement behind some of the awards.

To John, G4BYV, two "firsts" in the form of certificate stickers number 1 for 50 squares confirmed (56 worked in 14 countries) on 2.3GHz and number 1 for 10 squares confirmed (12 worked in 5 countries) on 5.7GHz. Well done John - no mean feat, especially on 5.7GHz where there is relatively little activity at present. No further claim yet on 3.4GHz, but there his worked score is 23, also in 5 countries!

Next, to G3XDY, the remarkable number 1 sticker, for no less than 80 squares confirmed on 1.3GHz. This one sounds almost like a 2m or 70cm score! Also on 1.3GHz, Ela, G4HKM, wins number 13 for 35 squares confirmed. Scoring can be very difficult - and slow - when activity levels appear to be at an all-time low!

On the 10GHz band, one solitary 150km-plus award, number 98, went to Ian, G4SNL/P for a contact with GU4EFT/P in early May, whilst the other "high" band, 24GHz, attracted three "Beginners" awards for contacts in excess of 25km. These went to Chris, G0FDZ (No.2), Ron, G2DSP (No.3) and Terry Allen, callsign not given (No.4). Well done to all.

## MORE ON THE G3WDG NB 10GHz DESIGNS

In the June column I mentioned the G3WDG 10GHz narrowband designs using the latest "hi-tech" - on the kitchen table - techniques. First I must apologise for getting the modules wrong. The 'WDG001 unit is indeed, as stated, a 100mW CW/FM/FSK transmitter. The 'WDG002 module, described as a receive converter is, in fact, a linear up-converter or transmit mixer and amplifier, again designed to be easy to construct and align with an output level similar to the 'WDG001 design. Finally, the 'WDG003 module is a down converter for receive. Combining the 'WDG002 and 003 modules with a common G4DDK004 oscillator/driver source on 2556MHz yields a three-board linear transverter of considerable potency.

Second, it has also been mentioned that the designs would be published in the *Microwave Newsletter.* After discussion and considerable debate in committee, it was realised that the detailed description of constructional techniques necessary when introducing what is new and unknown technology to the majority of our readers would not fit into the *Newletter* format in a way which would do the subject adequate justice. Experience with the write-up of the G4DDK design also suggested that even *RadCom* might not be the right medium to introduce a whole new subject in anything like the detail necessary. So the Committee has decided to produce good quality "stand-alone" booklets which will be available through the Components Service as a stock item - part of the backup needed for this type of technology. As well as this departure from the "conventional," it was decided that "short-kits" or "mini-kits" would be offered for the designs since, during beta-testing, several of the non-professional (ie. divorced from electronics in its many guises) testers have had quite a lot of hassle in getting hold of some of the so-called common devices used. These may well be "on-tap" from drawers or stores in electronics establishments, but for the man in the street (like me) it means shopping round several sources to find odd items, like 7808 and 78L09 regulators and ICL 7660 voltage inverter ICs. It's annoying to find that these are the only items not obtainable from your favourite supplier!

After our collective experiences with the three basic designs a number of small problems have been revealed, all of which have now been resolved. The minimum output to be expected is 50mW and up to a maximum of 100mW, the differences being due to GaAsfet spread and spread of individual construction and alignment techniques. Spectrum analysis shows the output to be very clean. I'm pleased to say that "hi-tech on the kitchen table" is a now a reality. However there are some "rules" to be followed to virtually ensure success - hence the need for a very comprehensive write-up to guide the newcomer to modern techniques.

We're aiming for a launch early in August for at least the 'WDG001 board. If you can build and align this, then you're in with a very strong probability of going the whole course and ending up with some very advanced equipment.

Why don't you start thinking about having a go? The G4DDK004 boards and bits and bobs (see page 35) are available now and you'll need some time to organise yourself to build and align this one before the WDG bits become available. Crystal up using a 108.0090MHz rock and you'll come out in the right part of the narrowband section to run the design as a personal beacon or signal source. Dave, G4FRE, has some of his beacon EPROM keyer pcbs available and a number of committee members can program and blow your messages into EPROM for you.

## STIRRING UP THE ACTIVITY

Complaints about low activity on many of the microwave bands keep reaching the Microwave Committee, particularly 1.3GHz which, as we've just seen above, is capable of some pretty good results in terms of DX. These claims are probably substantiated by the lack of operating reports reaching this column, the 'VHF Spectrum Analysis' column and your *Microwave Newsletter.* Just what does one do about it? One suggestion is for more activity, rather than contest, orientated awards.

Ian Davies, G3KZR is one of the complainants insofar as he was forced, by circumstance, to miss all the 1989 1296MHz Cumulatives, due to other commitments on the evenings concerned. At other times - as seen from Surrey - activity is very low. He made a suggestion that there should be an annual trophy based on some or all of the following ideas. He has generously offered to back such a scheme, if this is what will encourage more and regular activity on the 1.3GHz band.

**Purpose:** to provide a regular period of activity on the band, to encourage the making of marginal contacts on the band, and to stimulate interest in looking for contacts under flat band conditions.

**Rules**

1. Contest sessions to take place every Monday evening between 1800 and 2330 UK local time throughout the calendar year.
2. Any mode and cross mode.
3. Scores from the entrant's best five sessions to count.
4. Points can be accumulated in four ways: (a) total accumulated QSO's from the best five sessions; total number of WAB Squares accumulated from the best five sessions - each square counts once only; (c) total number of counties accumulated from the best five sessions - each county only counts once, countries outside UK score as counties; (d) total number of distance points accumulated from the best five sessions scored on the radial ring system.
5. Total score comprises: WAB Squares x Counties x QSO's x Distance points
6. QSO exchange consists of RS(T)/Serial number/LOC/WAB Code/County. The serial number to start at 001 in each session.
7. Marginal contacts: incomplete exchanges can count towards the score provided that the callsign and RS(T)/Serial number are received and logged correctly.
8. Sections: (i) outright highest score; (ii) single operator, fixed station, any legal power; (iii) single operator, fixed station using not more than 10W output to the feeder.

Ian suggested that the Committee would be in a better position to judge what the scoring mix might be - I'm not sure we are, which is why it is being thrown in the air now for users' comments! I'm not sure whether many microwave operators are members/users of WAB - I suspect not. Be that as it may, it would be equally possible to use the locator in a similar manner instead of the NGR-based WAB which may be meaningless to those who are not members of WAB. Constructive comments as soon as possible please, to me or any other committee member - we'd like to start the ball rolling in conjunction with the VHF Contests Committee soon, if the idea is to be followed up.

# SATELLITES

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

## SHUTTLE COLUMBIA

Last month we reported that the launch of the shuttle Columbia had to be delayed from 16 May, due to problems in a Freon cooling system, and mentioned that amateur radio equipment would be carried on this 10-day mission. Following this delay a further one occurred, preventing a proposed launch on 29 May. Because of the danger of an explosion from a hydrogen leak in the engine compartment, Columbia had to be rolled back into the Vehicle Assembly Building for inspection and remedial action. The leak was found between two plates that connect the shuttle and the external hydrogen tank. The repair work may take a month or so to carry out. Complicating matters is the planned launch of the Shuttle Atlantis (STS-38) for mid-July. Since Atlantis is to carry a secret military payload, it has security priority over the scientific mission of the STS-35. NASA officials have announced that it could be August before Columbia can get off the ground.

## WEBERSAT-0.18 INTERESTING EXPERIMENT

For the past several weeks the Webersat Microsat has been sending three or four pictures a day from its CCD camera. These are part of an on-going experiment by students of the Weber State University to determine the amount of natural light which enters the CCD cameras for various iris settings, so these settings can be optimised to improve the picture quality. With the integration of the on-board earth sensors in the present software, the occurrence of over-exposed pictures or totally dark pictures taken when the satellite is not pointing to the earth is no longer a problem. Cris Williams (WA3PSD), who is involved in this work, says that the painstaking task of manually setting the iris from the ground and observing the results will help software engineers in the future as they continue to understand the CCD camera operation. "The early days of random picture taking are gone", he says. There are 256 possible settings which ground controllers can command the camera iris to: a 'zero' setting has the iris completely closed, a '255' setting has it wide open. What will ultimately come out of this experiment will be a look-up table in the software which will say "for this light, use this setting".

## VITA

This is a private, non-profit international development organisation, which makes available to individuals and groups in developing countries a variety of information and technical resources aimed at fostering self-sufficiency, needs assessment and program development support, by mail and on-site consulting services; information systems training; and management of long-term field projects. It is a USA-based organisation, with a strong volunteer force of workers to support its activities. VITA stands for Volunteers in Technical Assistance, and it holds the only experimental radio transmission licence for a PACSAT Communications Experiment (PCE). PCE is a prototype system for a PACSAT Communications System which VITA intends to use for a global information network. The predecessor to the PCE was the Digital Communications Experiment, which was carried on UoSAT 2 and launched by NASA in 1984. This became the first non-military digital store-and-forward system of its kind in the world. Built by the University of Surrey Spacecraft team, it is still in operation today.

The recent Ariane 4 rocket launch, in which seven satellites were launched from Kourou, put UoSAT 3 into orbit, thus beginning the second phase of the three-phase VITA PACSAT program. UoSAT 3 had on-board transmitters and receivers that can operate on both amateur radio bands and the experimental frequencies for which VITA has been licensed. Using these latter frequencies, VITA hopes to demonstrate the utility of storing and forwarding messages and computer files to and from the Third World. Being in a low-earth orbit, UoSAT 3 will pass over every part of the earth twice a day. When it is in range of a ground station, it will pick up messages from the sending ground radio station and then unload them when it passes over the designated ground station to which the message has been addressed.

If the system proves successful VITA is hopeful that a permanent frequency allocation may be granted to it by the ITU for a humanitarian-orientated service of this kind. This would pave the way for the third phase of the program, in which two such satellites would be able to handle store-and-forward communications for up to a thousand ground stations in developing countries throughout the world. This should have a wide application in the areas of disaster relief, weather monitoring, agriculture, education resource management, health care and field project administration etc. The project has attracted funding from the US Department of Energy, the US Agency for International Development and the Margaret W. and Herbert Hoover, Jr. Foundation. VITA would like to hear from organisations interested in furthering this project. Write to Volunteers in Technical Assistance (VITA), 1815 North Lynn Street, Suite 200, Arlington, Virginia 22209, USA.

## A PAKISTANI SATELLITE?

Considerable concern is being caused by the Pakistan authorities who have apparently built a satellite designed for use in the amateur bands. It is said to have a voice transponder with uplink of 435.030 and 435.512MHz, and downlink of 144.028 and 145.825MHz. It is designated BADR-A and has been described as Pakistan's first experimental satellite. It is said that it is not for amateur radio use, and only for Government communication and tracking purposes at the two tracking stations at Karachi and Lahore. These are the two which the UoSAT team set up for the Pakistan Amateur Radio Society a couple of years or so ago. Details so far to hand suggest a period of 98min, a DCE similar to that on UoSAT 2 and a voice transponder. Inclination is 28.5°, perigee 200km and apogee 1000km. Size is 19in, weight 50kg. Such information as was available was discussed at the IARU Region 1 Conference held in Spain recently and as far as could be ascertained its list of 'missions' seemed to have little to do with amateur radio. So here is another 'mystery object' to listen for! Any reliable information to G3AAJ or HA5WG please.

## NORTH POLE 90 EXPEDITION

In my capacity as Hon. Chairman of AMSAT-UK, received the following letter from Laurence Howell, GM4DMA, relating to the part amateur radio and the Amateur Radio Satellite Service played in the recent North Pole 90 Expedition.

Dear Arthur,
Thank you for your recent letter, which was much appreciated by both. May I say that the expedition has benefited in many ways through its association with AMSAT-UK, and how we have been gratified at the level of support shown to our group.

We made nearly 200 satellite contacts whilst on Sredniy Island, most through OSCAR 13. As you were probably aware, time was very short for amateur radio operations, but over 2300 contacts through amateur radio took place through March and April. We hope that AMSAT members enjoyed the opportunity to talk to the USSR, and to those members who assisted the logistic and financial support may the expedition offer its thanks. On a personal front may we please thank your hard working secretary Ron B. His dedication to this project has been exemplary.

Regards, Laurence Howell, GM4DMA

Many thanks, Laurence, for such a nice appreciation.

# EMC MATTERS

**HILARY CLAYTONSMITH, G4JKS**
115 Marshalswick Lane, St Albans, Herts AL1 4UU

## NOISY COMPUTERS

The bugbear of some radio amateurs is the noisy computer. In many cases the proximity of the computer to the amateur station causes terrible problems. Most computer hardware manufacturers do not seem to design their equipment with EMC in mind. When problems are discovered, the cost of modifying and testing the equipment becomes prohibitive. Improvements in the following areas will, however, have to be borne in mind in the lead up to 1992.

The main source of radiated emissions are of course related to clock-driven devices. The source of RF radiation from computer equipment is usually the switching transient which is caused by the state changes in the digital logic. The higher the clock frequency and the faster the switching rise time, the greater the problem. Grounding the clock crystal can is one suggested improvement. (Rather than soldering directly onto the crystal can, a wire could be clipped firmly to it and grounded).

The main source of conducted emissions is of course related to especially switched-mode supplies.

Poor grounding is another cause for concern. The widespread use of plastic cabinets for computers is a major factor; so also are poor bonding and grounding techniques in those with metal cases. Particular attention with this type of cabinet should be paid to joined surfaces which should not be painted (except with conductive paint). Panels should be joined together with as low an impedance as possible.

Conductive paint, sprayed on plastic cases can give up to 30dB of shielding effectiveness. If the interior of the computer case is sprayed with a silver coloured layer, or reflecting aluminium foil is used, radiated heat from the electronics will be prevented from escaping and could cause overheating. A layer of matt black paint on the silver coating should restore the status quo.

RF energy within computers can escape from the PCB, from the tracks themselves, or from cables connected to the PCB. Printed circuit board design can be altered to take into account the prevention of stray RF. I have just received details of a useful diagnostic tool to help with just this problem. It enables the electromagnetic performance of a board to be determined by pinpointing the location of high emission sources and showing how engineering changes can affect its EM performance. The scanner board is said to detect the electromagnetic energy and can analyse and display

it graphically using a conventional receiver or spectrum analyser and computer!

Radiation from cables is another area to be considered. Having minimised the interference generated by the computer with no cables attached (except the power cable!) it is often found that connecting cables to the computer monitor, printer, etc. cause radiated emissions to increase. If this interference is generated by the computer itself, rather than by the monitor, printer etc. there are two reasons why it could be radiated by a cable. The wanted signal in the cable could be radiating because the cable is not screened or is poorly screened. Alternatively there could be a common-mode interfering signal on the cable, in which case even a screened cable can radiate interference. Common-mode signals can be reduced by means of common mode chokes constructed by winding the cable through a ferrite toroid or a pair of toroids. To be effective on the lower HF bands, the number of turns squared, multiplied by the number of cores should equal 200. In the case of a UHF modulator output from a computer to a TV set, an effective way of reducing common mode signals on the cable is to fit a BB1 braid-breaker filter at the end of the cable nearest the computer. A recent development is clip-on split ferrite cores for use as common-mode chokes. These are most useful where thick cable is in use (as in a serial printer lead) or where connectors are permanently fixed. The EMC Committee is currently evaluating these devices. Ribbon cables can be shielded by wrapping with tin foil and connecting this to ground.

For a step-by-step guide to dealing with a noisy BBC computer, refer to Dec 1987 *RadCom*. On page 906, G4BAO gives some useful instructions for reducing the interference produced to a tolerable level. I can vouch for the efficacy of his advice as G3JKS spent a day making his BBC computer quiet enough to be able to hear even the weakest signals on 10m on Field Day - vital where the computer is sitting next to the rig for checklog purposes.

## LIAISON WITH MANUFACTURERS

The EMC Committee is currently in contact with several manufacturers whose products malfunction in the presence of amateur radio transmissions or cause interference to amateur reception. Our first task is to persuade manufacturers that, although their products may not currently contravene any EMC regulations, they could co-operate with us in solving any EMC problems they might have. Enlightened manufacturers seem more willing to co-operate nowadays, possibly due to impending EMC regulations resulting from the European Commission EMC Directive. Details of the outcome of our approaches to manufacturers will be published in the EMC column when negotiations are concluded and a statement has been agreed between the EMC Committee and the manufacturer concerned.

## DEALING WITH NEIGHBOURS

In virtually all the cases of breakthrough which are brought to the attention of the EMC Committee, the root problem tends to be an inability of people to get on with each other. Living with each other's foibles seems to be nigh on impossible for some people. Because of the difficulties some amateurs have in explaining simply and unemotionally the meanings of immunity and breakthrough, the EMC Committee has produced a leaflet to help in this matter. The leaflet is entitled "Neighbours' questions answered". It tries to put across the facts in a comprehensible manner.

It is advisable that this leaflet be kept handy along with commercially made filters and ferrite rings just in case the need arises - forearmed is forewarned. A booklet "How to improve television and radio reception" issued by the DTI is available from main post offices and is another useful publication which can be used in the task of educating neighbours.

For a copy of the new RSGB leaflet, send a SAE to me at the address above.

## TEST ANTENNAS FOR MEASURING FIELD STRENGTHS - Part 2

Below, Dicky Marshall, G3SBA, describes how to check the absolute calibration of an antenna by the use of two "identical" units.

The text book equations relating to antennas of gain $G$ - for example from *Electronic Engineers Reference Book*, 6th Edition page 40/3 - are :-

1. The power density $p$ in the far field at a distance $r$ from a transmitting antenna supplied with a power $Po$ is:-

$$p = Po\ G/4\ \pi\ r^2$$

2. The power $Pr$ received by a receiving antenna immersed in a field of power density $p$ is:-

$$Pr = p\ G\ \lambda^2/4\ \pi$$

When identical aerials are used for transmission and reception these two equations may be combined, giving:-

$$Pr = Po\ G^2\ \lambda^2/16\ \pi^2\ r^2$$

Hence $G = \sqrt{(Pr / Po)} \times 4\ \pi\ r / \lambda$

This provides a simple method for the absolute calibration of an antenna - provided that an identical one can be made. It is recommended that each antenna has a built-in attenuator of at least 6dB to avoid uncertainties due to a large SWR. The antenna spacing $r$ should be at least a wavelength - and the site should be at least as free from reflections as that on which the calibrated antenna is to be used and well clear of the ground.

# Amateur radio: a minor branch of hobby computing?

### A personal view by George Dobbs, G3RJV

A formal proposal from the Israel Amateur Radio Club to the International Amateur Radio Union Region 1 Conference at the beginning of April reads, "That IARU Region 1 agree in principle .... the CW test for radio amateurs be replaced by some form of operating proficiency test more suitable to the present day data operating modes of amateur radio" and further proposed to set up a working group to 'define the required keyboard skills, speed of data entry and acceptable number of errors'. It has been suggested that such a proposal could be racist and elitist. A strong reaction: but is it?

Morse code is the common and well proven international language of amateur radio. Where a country does not use the Roman alphabet, for example Russia, China, Japan and Arab countries, the would-be radio amateur can first learn the code in transliteration of his own language. He is then able to apply the code to the internationally accepted amateur radio abbreviations and the Q codes, thus being able to communicate with other amateurs all over the world, without any knowledge of their language. To do the same thing in data transmission would require translation software and, ideally, several different kinds of keyboard and this would be useless unless duplicated in the other station. The proposal therefore seems to favour those nations which use the Roman alphabet in their language. This excludes the majority of the population of the world, a lot of them being in poorer countries.

Even in the Western World, concern has been expressed over the cost of equipping an amateur radio station with commercial equipment. 'The thousand pound sterling' barrier has been quoted as a problem to the newcomer in the hobby. This cost is for the basic RF generating and reception equipment. To this will be added the cost of a computer, printer, terminal equipment and software if the hobby is to be computer dominated. Then amateur radio will really become a hobby for the elite or peoples of the richer nations. If amateur radio is to spread in the third world, simple, inexpensive, possibly home-built, equipment is required, which will allow communication without language problems. CW morse communication is the mode which meets these requirements. Equipment is simple, keys are inexpensive and training tapes are simple and inexpensive to produce. The building and operating of simple equipment also introduces self training. Oddly enough, the very criteria which would help the spread of amateur radio into third world countries may also be those which could appeal to young people in the western world.

A hobby based upon expensive commercial equipment hooked up to a personal computer, impersonally exchanging information seems less exciting than using understandable, perhaps home-built, equipment in direct communication. That is why I have been pleased to see the RSGB Novice Licence proposals with their accent on understanding, training and excitement in direct communication. It would be a pity to see our hobby become a minor branch of hobby computing. Am I prejudiced against computers? I have two computers, both of which are in daily use, one of which processed these words and I am about to install packet radio for routine message handling.

## BITS AND PIECES

**Corrigendum:** In the June "EMC Matters" - test antennas for measuring field strengths, when talking about the Datong 370 head unit, it stated "... which had a very high input resistance and an output capacitance of a few pF." This should have read "... which had a very high input resistance and an input capacitance of a few pF."

**WROCLAW '90:** The 10th International Wroclaw Symposium on EMC was held on 26 - 29 June. This Polish forum is for scientists and engineers in the field of EMC from east and west to meet and compare notes. SP9ZD was invited to arrange, on behalf of IARU Region 1, a session entitled "EMC in the Amateur Radio Service". A report will appear in due course.

**Vehicle Electronics:** The EMC Committee would like members who operate mobile to report on any problems encountered with their transmissions affecting the operation of vehicle electronics.

**Teleswitches**: A manufacturer of teleswitches has kindly furnished the EMC Committee with test reports of their units. These indicate that the units do already comply with the BS6527 class B limits. They have also loaned the Committee two units for evaluation. We will be working together to try and further reduce radiated emissions.

# 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.**

For those interested in home construction, home brewing aerials, or just in need of a wavemeter to keep on the right side of the RIS, the mulitipurpose transistor dip meter from Maplin Electronics seems just the thing. It covers 1.5MHz to 250MHz in six overlapping ranges and can be used as a dip meter, absorption wavemeter and apparently as a BFO. An audio output is also provided for connection to a crystal earpiece. Note that, if used to comply with the licence conditions concerning wavemeters, it should be able to check for the third harmonic, making this unit suitable for all bands up to 70MHz. Cost is around £50.
**Maplin Electronics: PO Box 3, Rayleigh, Essex. Enquiries 0702 552911**

Readers who operate from a lorry may be interested in the Smartbox from Communication Development Specialists Ltd. Fully insulated from the chassis, it reduces a 24V battery supply to 12V "delivering current capable of powering any 25W RF output power transceiver". CDS say that "without it a wrong decision may result in sparking, smoke and a gibbering engineer". You have been warned! Trade price is quoted as less than £30.
**CDS Ltd: PO Box 83, Basingstoke, Hampshire, RG25 2PX. Tel 0256 83528**

Cirkit have published a new edition of their Constructors Catalogue, 184 pages featuring more than 3000 product lines arranged alphabetically in sections from batteries to test equipment and tools. New products include a low cost high accuracy digital capacitance meter, a dual digital thermometer with two independent probes, a hand-held digital multimeter with an analogue bar-graph display, miniature UHF plugs, miniature 8 pin DIN plugs, 23 way D connectors, data switching boxes, gender changers and RS232 line testers, PC cards and 23 new books. The catalogue incorporates discount vouchers and a competition to win a £170 Bearcat scanner.
**Cirkit Distribution Ltd: Park Lane, Broxbourne, Hertfordshire, EN10 7NQ. Tel 0992 444111**

Now that the kinder weather is upon us, it is the right time to refurbish outside aerial connections - not when a gale is blowing and the feeder is running like a tap! A useful product, recently launched, is Rubbaweld which is a self-amalgamating tape. This acts like a rather stretchy insulating tape but it eventually amalgamates (hence the name) into a solid rubber coating, providing excellent electrical insulation properties and protection against water penetration and chaffing. A 3m x 25mm roll comes for £2.65 inc VAT and postage.
**Geedon Performance Coatings Ltd: Commerce Park, Whitehall Road, Colchester, Essex, CO2 8HX. Tel 0206 47556**

Bowman Electronics have a 28 page glossy catalogue depicting their range of connectors and allied products.
**Bowman Electronics plc: Europa Trading Estate, Fraser Road, Erith, Kent, DA8 1QL. Sales office 0322 4 38182**

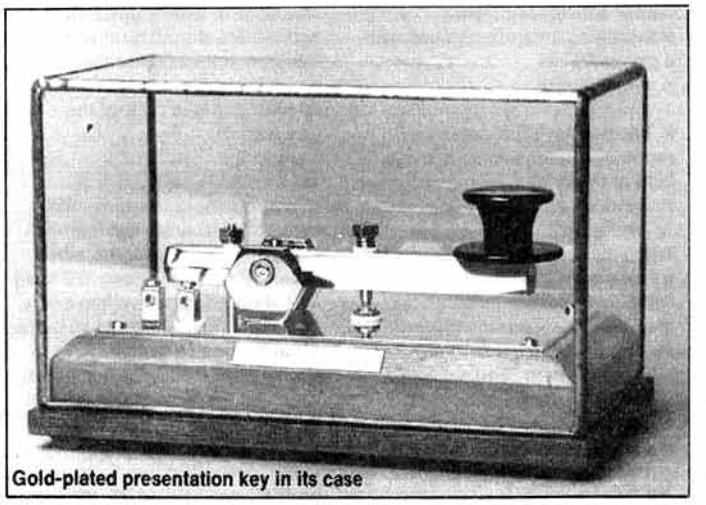
Jandek have introduced a new kit to their already comprehensive range. The JD016 is a crystal controlled CW transmitter capable of producing more than a watt into 50Ω for a little over £7. It is broadband and will operate on the 1.8, 3.5 and 7MHz bands without retuning. However, this makes it essential to buy harmonic filters for the appropriate band, which Jandek sell for £2.85 each. This seems just the thing for the budding (or rusty) constructor and Jandek obviously have one eye on the Novice Licence market.
**Jandek: 6 Fellows Avenue, Kingswinsford, W.Midlands, DY6 9ET. Tel 0384 288900**

Gordon Crowhurst, G4ZPY, tells us that CW remains alive and well in both amateur and professional circles; "Demand for handbuilt, precision straight and paddle keys has never been higher - we are working all hours to meet orders from all over the world as well as supplying a rapidly recovering home market". Since the announcement that CW would be phased out of many professional circuits, interest in CW operation has been revived and Gordon believes this has been responsible for valuable export orders.

G4ZPY Paddle Keys is an outstanding example of success under the Government's Enterprise Scheme. Launched just three years ago, they now have firm export orders to 19 countries, including Japan! Recent clients include the Royal Guard of the Sultanate of Oman, a Chinese shipping line, a host of Stateside amateurs and, here at home, the Royal Corps of Signals. Gold-plated trophy models top the G4ZPY range and are in demand by clubs looking for presentation ideas. An engraved plaque can be included.

Gordon concludes "We are agreeably surprised by the level of interest generated through our advertising in *Radio Communication*, a private collector in the States telephoned an order for everything we make, including the gold and silver versions, a Canadian has even requested a set of colour slides to use in his lectures, and a businessman from one of the eastern bloc countries wishes to be my agent in his country!". In this case it certainly appears that buying British is still the best. Further info can be obtained by sending a SASE or 2 IRCs to ...
**G4ZPY Paddle Keys: 41 Mill Dam Lane, Burscough, Ormskirk, Lancs, L40 7TG**

**The SRW Loudenboomer.**


**Gold-plated presentation key in its case**

Celsiclock is an ingenious device from Cobonic Ltd. It is a sticky label only 10mm in diameter with numbers corresponding to 5 different temperatures. The idea is that the label is stuck to a device where maximum temperature is important, like a power transistor. The background to the numbers changes from white to black permanently if that temperature is exceeded. This could prove useful, for instance, in checking the effectiveness of a heatsink, or in the diagnosis of a fault which has resulted in a device failure. Celsiclock can cover the ranges +40C to +260C in eight separate labels.
**Cobonic Ltd: 32 Ludlow Road, Guildford, Surrey, GU2 5NW. Tel 0483 505260**

When Steve Webb, G3TPW, returned to the HF bands after 20 years exile above 30MHz, he found a problem. Modern solid state rigs required a good 50Ω match so an ATU, together with an SWR meter, was needed to run full power at the band edges. This proved time-consuming to adjust, so Steve hit upon the idea of combining his ATU with a substantial linear and a large mains PSU, and replacing the SWR meter with an anode current meter. The result was simplicity itself - dip C1 and load C2 for 400 watts RF right up to the band edges. After £25,000 of development costs, Steve's Loudenboomer is available to all.

50 to 100 watts drive is enough to give an easy 400 watts PEP (or CW!) output on all HF bands. It is 14" long, 10" deep, and 5" high, and has an integral mains PSU. Weight is less than 7kg.

Four forced-air-cooled PL519s are used in grounded grid configuration. The output coil uses 14" copper gas pipe ensuring full output, even on 28MHz. The aerial output is filtered with a seven section LPF cutting off at 35MHz. The mains input is fully filtered and the entire unit is fully screened, including the meter and fan apertures. Transmit switching can either be RF sensed or via a jack socket. Price is under £700.
**SRW Communications Ltd: Astrid House, The Green, Swinton, Malton, N.Yorks, YO17 0SN. Tel 0653 697513**

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**IC 2SET** FM Handheld K'Pad DTMF
**IC 24ET** Dual Band Handheld
**IC 4SET** FM 70 Cms Dual Band H/H

### ICOM Mobiles

**IC 2400** Dual Band 2 display 45/35w.
**IC 3220E** Dual Band 25/35w.
**IC 3320H** Dual Band 45/25w.
**IC 229E** 2 mtr FM 50w.

### ICOM Receivers

**IC R1** H/Held .5-1300 RX AM/FM/FM wide.
**IC R100** mobile .5-1800 Mhz AM/FM FM wide.
**IC R72** HFRX .5-30 Mhz Gen Cov.
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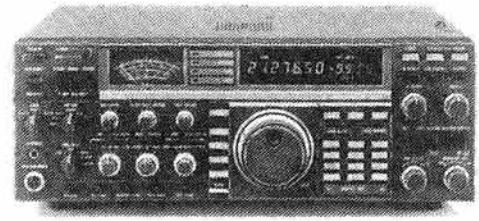

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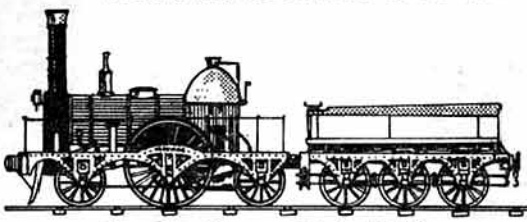
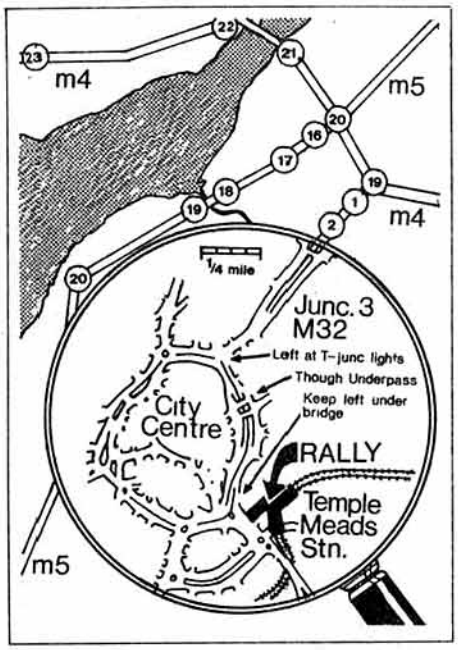


# Bristol Radio Rally 1990

Fire Fly Class - 2-2-2-1840

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RSGB

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(next to North Bucks Home & Garden Centre)

VISA

# The Club Bouvet 3Y5X Story

*continued from page 13*

## The Return

The departure schedule was discussed and agreed days in advance. We decided to leave the island on 13 January if weather allowed. That morning there was considerable wind and moderate visibility, but the weather improved and flying started at 1345. All equipment and personnel were brought back to Aurora in one continuous smooth five-hour operation which included more than 60 trips with the small helicopter. We were happy to be back on board Aurora, knowing that everything had gone according to plan.

**Strong gusts of wind from the east hit us with tremendous force, tearing tent guy ropes and creating loud noises and a lot of extra work and discomfort in the camp.**

As we returned to Norway, the logs were handed to QSL manager LA6VM who organized the computerisations through club stations LA1K and LAIT. 300kg (700 lbs!) of 3Y5X QSL cards were being printed in Japan and sent to Norway by air and sea for further processing. Incoming cards were arriving in large quantities, at a peak rate of 800 a day. More than 30 enthusiasts volunteered to help out with logs and QSL cards.

We were obliged to take up a major loan offer after our return, to fulfil our commitments vis-à-vis contractors. Before project completion, we hope to balance the books.

## Credits

Major sponsors and contributors for this project have been mentioned on the QSL card. We apologize to Lynx DX Group for inadvertently having omitted them from the card. Companies and the public sector contributed about 50% of the funding. We also appreciated the company of World Wide Fund for Nature (WWF), the Norwegian Polar Research Institute, the University of Trondheim and Nordnorsk Filmsenter as partners for this multi-mission operation.

PHOTOGRAPHER: JF1IST

Jacky, G2CW.

## Analysis

More than 47,000 QSOs were made, about 30,000 of which were on SSB, 16,800 on CW and 291 on RTTY. 47.3% were with North America, 31.3% with Europe, 15.8% with Asia, 3.9% with Central and South America, 0.9% with Oceania and 0.8% with Africa.

PHOTOGRAPHER: JF1IST

"Bouvet- Ladubay on the rocks, sir? " The waiter is stirred but not shaken.

PHOTOGRAPHER: JF1IST

The base camp at Nyroysa. The icebergs in the distance were several hundred metres deep.

Of the total, 11.8% were duplicate QSOs (dupes). Western Germany and Japan had the lowest percentage of dupes. Western Germany had the highest percentage of different callsigns. As expected, the dupe rate went up and the rate of different callsigns dropped as the operation progressed. At the end, every fifth QSO was a dupe on average and only every third QSO on average was with a new callsign not already in the log.

**The Logs were handed to QSL manager LA6VM who organized the computerization through club stations LA1K and LA1T.**

There was a somewhat uneven distribution of QSOs between the operators which must be seen in light of their different tasks. The two European guests were free to spend their time in the shack, and they usually were given priority at any time to be on the band and mode they preferred. Kare and Jin spent much time helping the others with antennas and generators. it was agreed that while in his shack, Jin should mainly concentrate on trying to work Japan. We (LA1EE and LA2GV) had many duties other than ham radio, as organizers of the whole expedition, effectively limiting our operating time on the air.

## Finale

This challenging expedition succeeded thanks to a number of individuals who had faith in the project from the very beginning and through all critical phases to completion. The nearly 1000 supporting members of Club Bouvet laid the foundation and became essential parts of this operation. The project team wishes to take this opportunity to thank all.

## Major Sponsors And Supporters:

A/S Thor Dahl (N)
A/S Bulls Tankrederi (N)
A/S Ambra (N)
Jotun A/S (N)
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Lynx DX Group
OH DX Boys
JA1BK, VE3MR, K2ON, KA8ANQ.

# CONTEST NEWS

## RULES

### RSGB CLUB CALLS CONTEST "CCC" RULES

#### (FORMERLY VERULAM CONTEST)

#### AIMS OF CONTEST

To encourage contacts between Affilliated Societies; to put club callsigns on the air; to encourage "B" class operators to operate under supervision of their club members.

#### RULES

Eligibility: The contest is open to all licensed amateurs and shortwave listeners. Portable, mobile and fixed stations may take part.

Period: 2000 - 0000GMT, Saturday 10 November 1990.

Frequency: 1900 - 1990kHz. Any mode.

Exchange: RS(T), serial number (commencing 001 and incrementing by 1 per QSO), name of your club (or no club), or name of club + "club station" if you are operating a club station.

Scoring: Three points per contact (in points column). A bonus of 5 points for the first ordinary member worked from each new club (in bonus column). A bonus of 25 points for working an affiliated club station (in bonus column). A bonus of 50 points for working the RSGB HQ station.

Totalling logs - a full page of contacts is 40x3(=120) + total of bonus points = page total.

Logs: Standard RSGB HF logsheets should be used. Logs must include GMT, callsign of station worked, RS(T)/serial number sent, RS(T)/serial number received, club name received (or non).

Definitions: Members of more than one club may claim membership of whichever one they prefer, but must use the same one throughout. Club names should be kept brief. All club calls must belong to bona fide affiliated societies as listed in Amateur Radio Callbook.

Entries: Entries should include an RSGB HF cover sheet, giving the following information: callsign and station address, equipment used, entrant's address (if different), full name of club with abbreviation if sent. Also included should be a signed declaration that the rules and the spirit of the contest and the terms of the entrant's licence were observed. Entries should be postmarked no later than 15 days after the event and sent to Mrs M H Claytonsmith, G4JKS, 115 Marshalswick Lane, St Albans, AL1 4UU.

SWL Entries: Scoring will be the same as for the transmitting section with the following differences: (a) Only stations taking part in the transmitting section will count for points. (b) Logs must include GMT, callsign of station heard, callsign of station being worked, serial number and club name sent and points claimed. A particular station may appear only once in the "station heard" column.

Certificates: Awarded to the leading radio club/society call, the leading individual club member, the leading SWL and the individual non-club member giving away most points.

*G4JKS*

### VHFCC CONTEST RULES OCTOBER-DECEMBER 1990

#### 432 MHZ - 24 GHZ IARU RSGB & SWL

Date: 6 - 7 October.

Duration: 1400GMT Saturday to 1400GMT Sunday.

Three Sections: S Single Operator; M Multi Operator; L SWL

Eligible entrants: All licensed amateurs in IARU Region 1 (entries will be forwarded to appropriate host nation). RSGB entrants use radial ring scoring (also score at 1pt per kilometre if you want logs forwarded). Any UK entrants who are not RSGB members please state this on cover sheet. No high power licences to be used!

Contacts: Each station may be worked once only per band, whether fixed, mobile or portable, if a station is duplicated then it should be marked as such and no score will be allowed. Unmarked duplicated contacts will be penalised by 10 (ten) times the amount of points claimed for that contact. Any contacts made on SSB in the CW (A1A) sub bands will not count for points.

Types of emission: A1A R3E J3E F3E. F2A may be used above 1GHz. Only one transmitter to be used on each band at a time.

Normal contest exchange RS or RST plus serial number followed by locator eg 579103 JO01IN.

Separate cover sheets are required for RSGB and IARU entry, the same log sheets are used for both contests. (you do not have to send duplicated logs).

Adjudicator Andy Cook G4PIQ Fishers Farm Colchester Road, Tendring, Clacton-on-Sea Essex.

#### 10 GHZ CUMULATIVES

Adjudicator G4KGC QTHR

#### 1.3 AND 2.3 GHZ CUMULATIVES

Dates: 9 Oct, 25 Oct, 10 Nov, 26 Nov, 12 Dec.

Sections: Single Operator Fixed; All Others; SWL.

Times: 2030 - 2300 Local time (not GMT), use GMT on logs.

Scoring: Radial ring, (NO NORMALISATION)

Adjudicator: G3ZXX D.A. Bonniface, 59 Gale Way, Wincanton, Somerset.

Please use summary sheet for each evening. Choose best 3 of 5 evenings but please submit all logs for checking purposes.

#### 432 MHZ CUMULATIVES.

Dates: 17 Oct, 2 Nov, 18 Nov, 4 Dec, 20 Dec.

Sections: Single Operator Fixed, All Others, SWL.

Times: 2030 - 2300 Local time (not GMT), use GMT on logs.

Scoring Radial ring, (NO NORMALISATION)

Adjudicator: G4OUT, Ian L Cornes, 6 Haywood Heights, Little Haywood, Staffs.

Please use summary sheet for each evening. Choose best 3 of 5 evenings but please submit all logs for checking purposes.

#### 70 MHZ CW

Date: 21 October.

Sections: All stations, SWL

Scoring: Radial ring.

Certificates for leading single op, leading other station and SWL.

Time: 0800 - 1200GMT.

General rules apply.

Full QTH information to be supplied including locator.(Rule 13).

#### 144MHZ CW AND MARCONI IARU CONTEST

Date: 3 - 4 November 1990

Time: RSGB 6 hour, 0800GMT - 1400GMT, 4 Nov;
Marconi 24h, 1400GMT - 1400GMT 3/4th Nov.

Scoring 1pt per kilometre.

Sections: S Single Operator Fixed; O All others; L SWL. This applies to both RSGB and Marconi.

Adjudicator: G3ZXX as above.

#### 144 MHZ FIXED STATION, AFS, SWL, SINGLE AND MULTI OP CONTEST.

Date: 2 December.

Time: 0900GMT - 1700GMT

Sections:

A AFS (Groups of up to five stations acting as a team, where total points of each station are added to make up team total). Clubs or groups must be Affiliated to RSGB, individual operators do not have to be RSGB members), AFS or Clubs can submit as many groups of up to 5 stations as they wish, please mark each group "a" "b" or "c".

S Single Op. (RSGB Members from the above section A will also be listed in single op section, if applicable)

M Multi-Op. (RSGB Members from section A, multi op groups, will be listed in this section as well).

L SWL

F Foreign Entrants.

Scoring: Radial Ring (foreign contestants please note).

Adjudicator: G3ZXX (on behalf of the Three Counties Contest Group) address as above.

#### 144MHZ CW CUMULATIVE. NEW CONTEST

Dates: 5 Sept, 21 Sept, 5 Oct, 26 Oct, 11 Nov

Time: 2030 - 2300 Local Time (use GMT on logs)

Best 3 of 5 logs will be used for entry, but please send in all logs for checking pur-


**Sheppey Western CG - overall winner 432MHz Trophy Contest - 1951 Council Cup.**

**Warrington RC and CG - winner Restricted Section VHF NFD - Arthur Watts Trophy.**

**Northern Lights CG swept the board winning the 1.3GHz Trophy Event (VHFCC Cup), the 2.3GHz Trophy Event (G6ZR Memorial Cup), the 50MHz Trophy Contest (Telford Trophy) and the Multi Op Section of the 144MHz Contest (Mitchell-Milling Cup).**

**South of Scotland CG - winner VHF NFD - Surrey Trophy.**

poses. Please use summary sheet for each evening (1 sheet but with details of score for each evening as per 432 and 1.3/2.3 cumulative contests).

Scoring: Radial rings, normalisation will NOT be used.

Adjudicator: G8HHI J. Pilags 43 Bartons Drive, Dungells Lane, Yately, Camberley, Surrey.

Please remember to enclose separate large SAE's if your require MOT or Placement certificate (see *RadCom* June 90).

## 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.

# RESULTS

## 1.8MHZ SSB CONTEST RESULTS

This year's event was the first outing for the revamped version of the old Town and County contest and, despite low publicity, it was a reasonable success. Over 90 UK stations were active during the four hours, but disappointingly only 22 entries were received. The HFCC were pleased to see two Class B licences in the SWL section.

Band conditions were good with a fair cross-section of British Isles and Continental traffic although there were more QSOs available outside the lower frequency limit of 1860kHz, which was imposed to maintain a contest-free segment. Since the event coincides with the WPX SSB leg, it would appear logical to extend this frequency limit to 1840 in future events.

The winner Dave Sharred, G3NKC, is no newcomer to the LF bands, being an avid 160m SWL in the 1970s before taking his uncle's callsign. Dave was guest-operating from the G3NAS location with a TS940 and a dipole at 100 feet. Runner-up was G3SJJ, who is more usually to be found around the top end of the 1.8MHz CW contest ladder but defected to give the event a whirl. Equipment consisted of a TS930 and a dipole at 60 feet.

*HFCC.*

### BRITISH ISLES SECTION

| Posn | Callsign | QSOs | Mults | Points |
|---|---|---|---|---|
| 1 | G3NKC | 128 | 59 | 22656 |
| 2 | G3SJJ | 102 | 52 | 15860 |
| 3 | G4HTD | 89 | 43 | 11481 |
| 4 | G4PKP | 76 | 41 | 9307 |
| 5 | G4NVA | 71 | 37 | 7881 |
| 6 | G4RFR (G3SQX) | 66 | 35 | 6930 |
| 7 | G0GNF | 60 | 38 | 6840 |
| 8 | G8CA | 63 | 35 | 6580 |
| 9 | G4ERW | 63 | 34 | 6426 |
| 10 | G3FFH | 62 | 33 | 6138 |
| 11 | G3BPM | 56 | 32 | 6048 |
| 12 | G4UHI/P | 48 | 31 | 4402 |
| 13 | G3OLB | 33 | 21 | 2058 |
| 14 | G3NKS | 30 | 21 | 1890 |
| 15 | G0GBI | 29 | 22 | 1870 |
| 16 | G4GNK | 28 | 20 | 1680 |
| 17 | G3ZGC | 26 | 18 | 1404 |
| 18 | GM3UM | 23 | 18 | 1242 |
| 19 | G3TKR | 22 | 16 | 1056 |
| 20 | G3ZRZ | 19 | 13 | 741 |
| 21 | G3GMM | 17 | 13 | 663 |
| 22 | GM4TJD | 14 | 10 | 410 |

### OVERSEAS SECTION

| | | | | |
|---|---|---|---|---|
| 1 | EI9FK | 83 | 43 | 10707 |

### SWL SECTION

| | | | | |
|---|---|---|---|---|
| 1 | G8FMC | 51 | 36 | 5508 |
| 2 | BRS52543 | 30 | 19 | 1710 |
| 3 | G7AOU | 11 | 11 | 429 |

Check log gratefully received from UP2BSD

## ERRATA

In the table of results of the Affiliated Societies' Contest published in the June edition of Radio Communication, the 36th and 90th places were ascribed to the York ARC when they were in fact the YEOVIL ARC 'A' and 'B' entries. Apologies to both groups.

*HFCC.*

## RULES OF COVENTRY QUALIFYING EVENT

Date: 19th August

Map: 140 (Leicester And Coventry).

Assembly: 1300 for start at 1320BST.

Location: Burbage Common & Wood, off A47, 2 miles NE of Hinkley, NGR 452951.

Competitors requiring tea should notify N.Rathbone, 7 Foreland Way, Keresley, Coventry, CV6 2NN; Tel 0203 337124 not later than 12 August.

# DIRECTION FINDING

## RESULTS OF GEOFF PECK MEMORIAL TROPHY D/F EVENT

All Fools Day provided plenty of bewilderment and exercise for the fourteen teams who entered this early season D/F event. From the start, at Nomansland Common near St.Albans, a strong signal from G3NCL to the east, and a weaker signal from G3UJO to the north, tempted the majority of competitors to the eastern site first. Here they were rewarded with a mile run into and out from the transmitter, which was situated under wind felled logs and brambles at Bayfordbury, just south of Hertford. G3UJO proved rather easier to find, in dense undergrowth just north of Harlington, by the side of the Bedford-London railway line. George Whenham held on to a slender lead at the first site to win the event from Brian Bristow, with the remaining competitors trailing well behind.

| | Name | Club | Time at TX "A" | Time at TX "B" |
|---|---|---|---|---|
| 1 | George Whenham | Coventry | 14.52 | 16.10 |
| 2 | Brian Bristow | Mid Thames | 14.54 | 16.12 |
| 3 | Trevor Gage | Mid Thames | 16.25 | 14.37 |
| 4 | Derek Newman | Northampton | 14.53 | 16.28 |
| 5 | Geoff Foster | Mid Thames | 14.53 | 16.28.5 |
| 6 | Alan Simmons | Mid Thames | 16.29 | 14.25 |
| 7 | Gary Brightman | - | - | 14.59 |
| 8 = | Mike Hawkins | Colchester | 15.01 | - |
| 8 = | Andy Collett | Colchester | 15.01 | - |
| 10 | Min Standen | Mid Thames | - | 15.13 |
| 11 | Graham Nicholls | Banbury | 15.14 | - |
| 12 | Bill Pechey | Mid Thames | 15.17 | - |
| 13 | Chris Plummer | South Manchester | 15.31 | - |
| 14 | Adrian Lisle | Mid Thames | 16.29 | - |

## RESULTS OF SALISBURY D/F QUALIFYING EVENT

Fifteen teams assembled at Woodhenge for the start of Salisbury's RSGB D/F Qualifying Event.

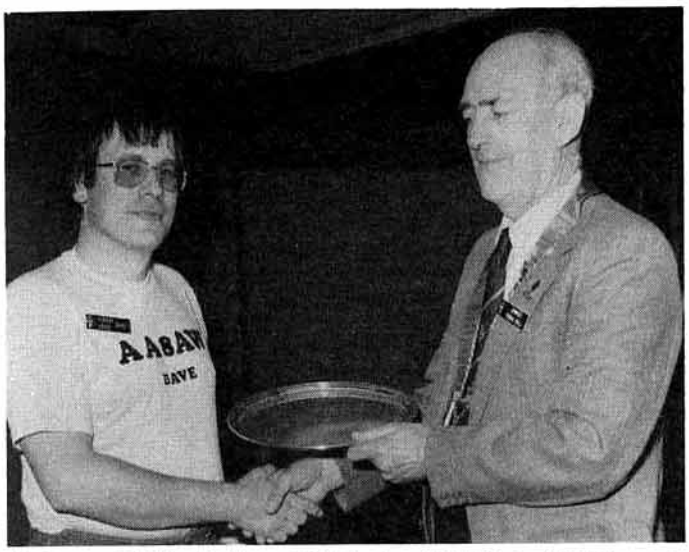
The weather was ideal and signals good. Most headed for the "A" station first, G3TRY/P, which was hidden in maze of prickly bracken on a ridge only 6km from the start - but in line with several other choice sites. Using a very long aerial of about one and a half wavelengths and many dBs of attenuation damping the output (giving a slightly broad minimum and the impression of distance) caused many to overshoot.

The expected approach to the "B" station, G4MDF/P, also lined up with several good spots (Old Sarum, Whitbury Down, etc). However, looking the least probable place (on the map), and breaking with our traditional country sites, the station was concealed on the edge of a steep ridge overlooking Salisbury City.

The tea at the Activity Centre was arranged by Margaret (XYL of G3ZNH) and helpers. Thanks to G4LDR, G4RLF,G6JEK and G3ZNH who all had an uncomfortable afternoon operating the two outstations, and to Sir Evan Nepean G5YN for managing the event.

| | Name | Club | Time At TX "A" | Time At TX"B" |
|---|---|---|---|---|
| 1 | A Collett. | Chelmsford | 14.35 | 15.31 |
| 2 | B Bristow. | Mid Thames | 14.36 | 15.32 |
| 3 | C Plummer | S.Manchester | 14.40 | 15.46 |
| 4 | G Foster | Mid Thames | 14.42 | 15.47 |
| 5 | G Whenham | Coventry | 14.38 | 15.53 |
| 6 | P Clark | Torbay | 14.39 | 15.54 |
| 7 | C Wells | S.Manchester | 14.38 | 15.56 |
| 8 | A Simmons | Mid Thames | 14.42 | 16.02 |
| 9 | A Mead | Chelmsford | 15.00 | 16.05 |
| 10 | D Newman | Northampton | 14.40 | 16.19 |
| 11 | S Holly | Salisbury | 15.20 | 16.22 |
| 12 | G Nicholls | Banbury | - | 14.46 |
| 13 | J Hall | Ripon & District | 14.51 | - |
| 14 | T Cage | Mid Thames | 15.38 | - |
| 15 | M Standen | Mid Thames | - | 15.51 |

A Collett and B Bristow qualify for the National Final to be organised by the South Manchester Radio Club on 30 September.



"McSheppey CG" (Dave Robinson, G4FRE) - winner 70MHz Contest - VHF Manager's Trophy.

Andrew Cook, G4PIQ - winner Single Op Section 144MHz Trophy Contest - Thorogood Trophy.

VHF Contest Awards were presented at the VHF Convention by RSGB President, Frank Hall, GM8BZX.

## CONTESTS CALENDAR

### RSGB HF CONTESTS

| | |
|---|---|
| 29 Jul | Chelmsford DF (Jul 90) |
| 19 Aug | Coventry DF (Aug 90) |
| 26 Aug | ROPOCO 2 (Jun 90) |
| 1, 2 Sept | SSB Field Day (Jul 90) |
| 9 Sept | Torbay DF |
| 10 Sept | 2nd 28MHz Cumulative |
| 18 Sept | 2nd 28MHz Cumulative |
| 26 Sept | 2nd 28MHz Cumulative |
| 30 Sept | DF National Final |
| 4 Oct | 2nd 28MHz Cumulative |
| 7 Oct | 21/28MHz Phone Contest (May 90) |
| 12 Oct | 2nd 28MHz Cumulative |
| 21 Oct | 21MHz CW Contest (May 90) |
| 10 Nov | Club Calls Contest (Aug 90) |

### RSGB VHF CONTESTS

| | |
|---|---|
| 28 Jul | 144MHz Low Power/SWL (May 90) |
| 29 Jul | 432MHz Low Power/SWL (May 90) |
| All Aug | 432MHz Activity (Jun 90) |
| 12 Aug | 1·3 & 2·3GHz Trophies (Jun 90) |
| 19 Aug | 10GHz Cumulatives (Jul 90) |
| All Sep | 1296MHz Activity (Jun 90) |
| 1,2 Sep | 144MHz Trophy/SWL (Jun 90) |
| 5 Sept | 144MHz CW Cumulative |
| 9 Sept | 10GHz Cumulatives (Jul 90) |
| 16 Sep | 70MHz Trophy/SWL (Jun 90) |
| 21 Sept | 144MHz CW Cumulative |
| 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

### OTHER CONTESTS

**First Tuesday each month**
144MHz Scandinavian VHF/UHF/SHF Activity Contest (Jan89 VHF/UHF)

**First Thursday each month**
432MHz Scandinavian VHF/UHF/SHF Activity Contest (Jan89 VHF/UHF)

**First Monday each month**
Microwave Scandinavian VHF/UHF/SHF Activity Contest (Jan89 VHF/UHF)

Dates of publication of rules in *RadCom* are shown in parentheses

## SWL SPECTRUM ANALYSIS

**Continued from page 25**

between 1600 and 2045 stations in Scandinavia were audible). This was a particularly good opening because it was the first decent one to those parts since the SM's and OZ's were allowed to use the band. Some interesting DX was heard, including LA8WF/M (JP4O), 0HOBT (Aland Is: KO09), OZ1IWZ (JO56), OZ1IPU (JO57), OZ1BTE (JO66), SM6PU (JO67), OZ1BUR (JO46), LA6HL (JO28) and SMO0UG (JO89). David, in IO93 had a good day on the 12 June with a mixture of Es, Tropo and Aurora starting at 2020. SM3JGC (JP71) and SM3EQY (JP81) provided two good squares at 2022, but the main activity started with the aurora later in the evening. DF5LQ in JO44 was 59 just after 2200 via Es, but the stations he was working in G were auroral. David logged many G's, GM's, GI's, OZ's, DL's and SM's via aurora. His last logging was at 2306. 16 June was another good day with Es propagation at 50MHz virtually all day. At 0739, OE6MGG was 59, and the board provided signals from OE, DL, I, ZB2, CT1 and SV. It was good to hear the SV's at good strength. Between us, five were heard — ADG, DA, DH, EN and OE. 18 June saw David log ZC4AB at 1758 and his first GD — GD4HOX, and LX1JX (JO30). At this QTH, there was no sign of any of them, but DK5QI/SM7 (JO87) provided a new square. Some short skip Es was heard too, with the first ON's heard at this QTH. The 19th saw GM's, I's and 9H's at 0850, and Band 1 TV signals were audible from as far afield as Iceland and Spain. The TF beacon was also good copy in London. Later in the day, various SM's and LA's were available, and OY7ML (IP62OA) was 59 in both London and Harrogate. Indeed, David heard OY9JD in IP61 as well. All-in-all, a very successful few weeks — David's squares/countries tally for 1990 being 98/27. All Time he had heard 186/44. Here, 58 countries had been heard, but some well-known amateurs had, by mid June, amassed over 80! Mick Toms BRS31976 will soon be enjoying 50MHz too, as he, at last, has erected his beam. His VHF mast, on the roof, now comprises a 2 element 50MHz/3 element 70MHz dual bander at 30ft, a 9 element 144MHz beam at 34ft and a 19 element 432MHz beam at 37ft.

**144MHz:** Mick, and Martin Parry BRS52543, provided the only details I have this month of activity on this band. Mick mentioned hearing GB3LER for the first time on 1 May. This was followed by GM8XOC in 1097. SMOKAK/1 was heard on meteor scatter from JO96 on 2 May. The 19th provided the Angus beacon, plus GM4ZUK/P (IO87), GM4CCC/P (IO75) and GM3WGV/P (IO76). The SM1 was a new square bringing the All Time total to 217/39. He had also acquired the software for his computer to run AMTOR, RTTY, SSTV and high speed CW. The latter is, of course, good for MS as it has an upper speed limit in excess of 250wpm. He had already heard several stations and achieved good copy. As Mick says, it sure beats using the tape recorder to record and then replay at a slower speed, and as it is not so noisy he can use it late at night without disturbing the xyl! Martin briefly mentioned his exploits on 50MHz, but mentioned an Es opening at 1757 on 4 June when he heard EB7BQI and EA7GAA, both in IM67. Otherwise, the 144MHz Es situation had been very poor at the time of compiling this piece.

Stephen Slater BRS92755 reported taking the RAE in May. He had spent all his listening time on 14MHz where he had heard IG9/IT9JKY (Pelagica Is), KP2A, TI2BK/MM (in the Med.), HC2XD, YS9YS and 9K2KS.

## FINALE

There you have this month's offering. There is a lot of 50MHz news because some of the openings in the last few weeks have provided many firsts, many new countries and many new squares. I hope that by detailing the good conditions, it will tempt a few more listeners to obtain some equipment for the band. With all the current Es activity and the likelihood of another good winter season of F2 propagation, the prospects for the band are indeed first class. It would be good to receive news of tropo openings on 144 and 432MHz, and what of 70MHz? Several listeners have equipment for the band. It would be good to know of some activity to report. Remember, stations in ZB2 have access to the band, and I understand that one of the ZB0's which were active in June did work back into the UK. On HF, I hope to receive a few more reports of activity in time to compile next month's column, the deadline for which is 9 July.

# Members' Ads

**Conditions of acceptance are published on the Members' Ad order form inserted into the wrapper with every issue of *Radio Communication* posted to members. This form must be used when placing an advertisement; and please note that FOR SALE, WANTED and EXCHANGE advertisements must not be mixed on the same form. A new, more flexible, pricing scheme has been introduced. Details are on the form. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain. Please note that because this is a subsidised service to members, no correspondence can be entered into.**

## FOR SALE

● 3 traps and loading coil from 18AVT/WB: £35. Mem keyer by Telegraphy Systems: £50. Carr.extra. G3MEA QTHR. (Durham) 091-373 4560.

● 4CX250BM valves, brand new, boxed. ITT: £20. Plus post. Paul. 0843 61448.

● 6M log periodic yagi engineered to high standard. Pwr gain 12dB and F/B 24dB claimed. Exc.performance worldwide 8ele incl 5 driven on 18ft boom (9ft sections for transport). Impedance about 75ohms: £40. A small fraction of commercial prices. Buyer collects. G0MDZ QTHR. (Nr. Southwell, Notts) 0636 830005.

● 6M module for Yaesu FT726R: £150. Garry, G1UWM QTHR. (Telford) 0952 461316.

● AEA Pakratt PK232 with fax VHF/HF, incl s/ware: £225. Icom IC2SE, case and h/set: £225. All boxed and mint. G4ODK. (Ilminster) 0460 57684.

● ALINCO 2m 45W FM tcvr with selectable scan steps and 14mem channels. Mint cond: £240. G4KOU QTHR. (Worthing) 0903 62129.

● ALINCO 30W 2m linear, seldom used. Mint: £50. Superstar 360FM, Spectrum conversion to 10m, immac inside and out: £120. Shure 526T mic as new: £45ono. Mark, GI3YDH QTHR. (Belfast) 795783.

● AMSTRAD CPC6128 computer, colour monitor: £200. Yamaha PSR50 keyboard: £200. Both good cond, orig.packing. Buyer inspects/collects. G7GQF QTHR. (Swindon, Wilts) 0793 870681.

● AR2002 scanning rcvr 25-550, 800-1300MHz, AM, NFM, WFM. As new: £295. (Bedford) 0234 711904.

● BBC Master 128 with dual-drive plinth plus spare 5.25 drive. Lots of radio s/ware: £400. G0FXS QTHR. (Stafford) 0785 44023.

● BBC-B computer with dual DSDD disk drives, sideways RAM, RTC and manuals: £230. Marconi Q-meter TF1245 with manual: £60. Marconi VTVM TD1300 with manual: £15. Tektronix 545B scope, VGC with 9 plug-ins type B, D, L CA N, N , 1A2, 1M1, 1A6: £70. Will split plug-ins: £15ea. Pye A200 100MHz PA, 25W O/P: £20. Drae 12V/12A PSU: £45. G3WPO Alpha 160m SSB/CW tcvr: £75. Jennings 1000pF vacuum variable cap: £25. 14in mono VGA monitor, brand new and boxed: £70. 128k RAM card to suit IBM PC/XT/AT: £10. Hard disk controller card to suit IBM PC/XT/AT: £10. PW Texan stereo amp: £20. Have mortgage - will haggle. John, G4FIT QTHR. (Reigate) 0737 241491.

● BBC-B computer, fitted with Watford DFS-ROM, Cumana double-sided dual disk drive + over 100 games, joystick and manual. G0LGA not QTHR. (Burnham) 0628 665245.

● CAPCO loop ants covering all HF bands with controller: £550. Price negotiable. G0HHJ. (Rugeley) 0889 584983.

● CAPCO SPC300 ATU, new. Surplus to requirements. Will deliver within 25 miles radius otherwise purchaser to collect: £230. (Trowbridge) 0225 766512.

● CLEAROUT. Icom R7000 15kHz-2GHz, remote control, speech syn, TV O/P: £800. Yaesu FT73R 70cm handport, boxed, case, nicad: £195. Dressler AR900 AE, b/new: £65. Voice 64-way decoder/encoder for scanners: £30. Storno 5000 mobile 5W, 70cm, 6ch RB3 fitted: £45. Monta 12/18A PSU protected, b/new: £50. Marconi dig 10-520MHz sig.gen 2015-2171. VG: £500. Cost £2500. Plus post on above. (Ipswich) 0473 8203.

● CODAR AT5 TX with PSU, partly boxed: £50. Drae slow scan rcvr. VGC: £70. G3CQL QTHR. (Sudbury) 0787 74128.

● COLLINS S-line equip. 30LI HF linear 500W O/P for 70-100W drive, ALC, 2 new spare valves: £450. 75S3B HF rcvr stands alone or can be used with S-line TX or tcvr. Some spare valves: £250. Both units are wing emblem, little used, in orig unmarked cond and c/w h/books and leads. Wired for 240V op. G3SPJ QTHR. (London) 081-311 8405.

● COMPUTER BBC-B Watford Electronics sideways RAM board. Disc-Doc, Printmaster, Beebug utility ROMS 40/80T disk-drive. Mono monitor. Speech synthesiser. Scarab SSTV interface with program. G3WHO RTTY program. Incl cables, manuals: £325. Might split. Prefer buyer collect else plus carr. G3XII QTHR. (Leyland) 0772 422121.

● CRAVE DX? Prof quality 30ft winch up lattice tower, rotor head unit, KR400RC rotor, 10ft 2in alloy scaffold pole, 3ele TET33SP tribander, 10m 1/2wave, all coax, all cable, buyer collects and will be assisted in dismantle. Offers around: £600 secure. G0ANC. 071-247 6097 day.

● CRTS Philips 73D14GH 14cm diagonal rectangular flat face. GEC 1074H double gun 9.5cm flat face. Large carbon. Demi-johns. Number of valves eg HRO types 6C6, 6D6 etc. SAE requirements please. Magslips. One Selsyn. G8DPS QTHR. (Surbiton) 081-399 8787.

● DISH 3.1m Saturn petalised, with manual. Cost over £700. Accept: £150ono. G4CXL (Weybridge) 0932 843267.

● DRAGON 32 computer PSU 2x joysticks, G4BMK RTTY s/ware TU: £80. MM 28/144 tvtr: £80. Heil table mic, new: £45. Archer rotator: £25. G4GEE QTHR. (Coventry) 0203 614779.

● DRAKE R7A gen.cov RX, S/N3661 immac, boxes, NB 4, 1.8, 0.3 filts aux7, MS7, spkr, manuals, R7 manual: £35. TR7 manual: £35. R4C late 5/0.6 Sherwood first IF 1.8 Sherwood 16 pole and 500, 300Hz filts. Sherwood PSU demod and audio mods MS4 spkr manual: £650. 8877 1kW output 2m: £100. Precision altimeter type FA7: Offers. (Shrewsbury) 0743 884858.

● DRAKE SPR4 comm.rcvr 150kHz-30MHz programmed with xtals. 23 xtals fitted 80m/40m/20m and marine bands. 12VDC or 240VAC operation: £220ono. G4AQA QTHR. (Hull) 0482 655856.

● EDDYSTONE 958 10kHz-30MHz fitted with Marconi F200S/01 higrade SSB filter and orig h/book: £350. Marconi TF801D/8/S sig.gen 10-485MHz with copy manual: £50. Buyer to collect. Michael O'Beirne. (Esher) 071-248 3024 day 0372 62268 eve.

● EDDYSTONE S640 rcvr 1.8-30MHz CW/AM/SB good cond and working order: £50. (Saffron Walden) 0799 30763.

● FDK multi 750E with expander 430X. 2m and 70cm multimode. Mobile or basestation. 10W: £300. Carr. by arrangement. G2DPL QTHR. (Bury, Lancs) 061-797 6736.

● FL2100 HF linear: £300ono. Datong auto RF speech processor, unused: £45. G0AUG QTHR. (Greystoke, Penrith) 08533 456.

● FL2100Z WARC, one owner. V.low mileage, unmarked, mint cond with orig.packing: £550. Prefer buyer collects. G3EFR not QTHR. (Hull) 0482 654966.

● FL7000, FL7000, FL7000 500W PEP HF solid state linear and auto ATU. Cost £1600: £1000. Howard G0HZH. (Ipswich) 0394 460474.

● FREE 18ele 70cm parabeam kit when you buy my FT790R, exc.cond, hardly used, orig.packing: £270. Mike, G0JVC not QTHR. (Stevenage) 0438 353040.

● FREE standing commercial quality lattice tower 3x10ft sections plus head unit: £80. MM28/144 tvtr: £80. MM10/50 70cm linear: £95. JVC keyboard with voices, orchestra etc: £75. Icom IC25E extended TX/RX, DC lead, Heatherlite mic: £210. 2m ants 2BCX 12ele ZL and Slim Jim. Welz SP15M and SP45M swr/pwr meters: £30ea. PC type 5.25in low density disk drive: £25. PC keyboard: £10. Buyer inspects and collects. G0HAS. (Swindon) 0793 874614 eve-w/e.

● FRG7700 with FRT7700 ATU and MM dual-range 432/436 cvtr. Complete rcvr. All manuals. Orig.packing. GWO: £290. G3CGQ QTHR. (Luton) 0582 25519.

● FT101E with FM, WARC, CW filter, spare valves, ALC fault, c/w Europa-B 2m tvtr: £300. Era Microreader: £100. Martin G4WJX. (Stoke-on-Trent) 0782 330613.

● FT102 HF rig. Mint cond. All recommended mods done. 200W exc DXER. QSL cards to prove: £550ovno. GW0LBJ QTHR. (Penarth) 0222 530070.

● FT200, FP200, new valves: £180. ST5 RTTY TU: £20. Amstrad DMP2000 printer: £80. HP Deskjet font cartridges 22706Q Helvetica: £45. 22706E Times 12 point: £25. Buyer collects. G4BAO QTHR. (Cambridge) 0223 862480 8-10pm.

● FT290R multimode, manual, Mutek, nicads, chrgr, carry case and strap. Up/down shift mic. VGC: £230. Carr.paid. G7BJV QTHR. (South Shields) 091-537 4822.

● FT480R 2m multimode in exc.cond. V.little used: £240. Plus post. G4SLG QTHR. (Lincoln) 0522 751920.

● FT726 70cm HF 2m sat board, mint, orig.packing. Owned from new: £750. Also mic. FT101ZD Mk3, fan, FM, mint cond: £450. ATU: £100. Phone patch spkr: £35. W/shop manual, little used: £580 complete. Going QRT. G0JAU QTHR. (Banbury) 0295 250169 day.

● FT726 with 2m/6m/70cm/sat and ext spkr: £800. FT690Mk1: £185. FT790Mk1: £185. BNOS 2m LPM-3-180: £200. BNOS 70cm LPM-3-100: £200. Standard C500 with 2x nicads many extras: £450. Welz RS3050 30V/30A PSU: £100. Tagra 40A/12V PSU: £75. Pwr/swr meter Trio SW200 with 4-heads: £120. Trio desk mic MC80: £30. Dating speech processor: £60. FRDX400: £60. Yaesu G1000SDX rotator, new: £200. KR600RC rotator: £100. Small rotator: £25. Aerials CA-2x4MAX 2m/70cm dual-band colinear: £85. Jaybeam Q8 2m 8ele quad: £30. Jaybeam 8Bele 70cm multibeam: £20. ZL Special 2m 16ele: £20. Loop quad 23cm 48ele: £55. Tagra 10-11m 3ele beam: £25. Pulsar 11m minibeam: £15. P.Haworth, G6OWI QTHR, 120 Ormerod St, Accrington, Lancs, BB5 0QG.

● FT757GX with MH1B8 scanning mic. As new, orig.packing. Used QRP only: £595ono. GW4FMD. (Fishguard) 0348 831641.

● FT757GX, FT757AT 20A PSU for above. Portable use, 2x 90AH 12V batts 24/12V cvtr, G-whip ant. Telereader CD670. FT726R, 2m 50MHz options, 70W linear, new 12ele 2m CL spcial ant Palm II, 2m 6ch h/held trans: Offers. Going QRT. (Cwmbran) 06333 67636.

● FT767 in mint cond, 2m fitted 10mths old: £1200. SSTV SCI cvtr in exc.cond: £375. (Rotherham) 0709 364569 anytime.

● FT77 with FM and marker, all bands: £350. Belcom LS102L 10m all-mode: £150. Ham Int 500A 2m FM 25W 144-148: £120. FT727R dual-band h/held: £180. All in exc. working order. G4PFR QTHR. (Wendover, Bucks) 0296 623802 eve-w/e.

● FT780R with m/mount. New PA fitted has 7.6MHz repeater shift, hence: £240ono. G6UGI QTHR. (Royston) 0763 243570.

● FTDX401, FV401 matching spkr some valves working? Offers please. Ant 18AVT/BW vert 80/40/20/15/10m: £60ono. G3OUX QTHR. (Barton-upon-Humber) 0652 635162 after 2pm.

● GOING QRT, Age 81. TS530S, 3 xtals, T230, SP230, LP filter, h/book, dummy load, spare 3 valves. 250ft 1/2in coax, keyer, Avo bridge GDO, BC221, 26 RadComs etc, etc. Offers around: £700. Plus many other items. Exc.cond. No split. G4KFW. 021-357 2009.

● GOING QRT. Yaesu FT7 mobile HF rig 80-10m: £200. Icom IC3210 dual-band mobile 2m 70cm: £350. MFJ 949E ATU 2mths old: £100. Navico 2m TX/RX 6mths old: £180. 3x PSUs 1x 12A, 1x 10A, 1x 6A, 2x dual-band mobile ants. 1x WX1 ant: Offers. (Newcastle) 091-268 8466.

● GRUNDIG Satellit International 650 148-30000kc/s plus FM. Mint cond AM/CW/SSB. Keypad tuning. Superb reception: £325ono. G3HNP QTHR. (Gt.Yarmouth) 0493 393560.

● HAMMARLUND HQ170A comm.rcvr & matching HX50A transmitter. Both with manuals and some spare valves. Best offer over: £350. Will not split. G4DAN QTHR. (Colchester) 0206 395968.

● HF mobile, Sommerkamp FT767DX (FT707) plus Spectrum FM boards, Datong ASP auto RF speech clipper, Heatherlite safety mobile mic, all mounted on mobile cradle, VSWR meter, complete set of G-whip helical ants 80-10m, mounted on roof rack (inc) ideal mobile or portable setup: £400ono complete. All working order & VGC. 10m preamp free if you buy all items otherwise: £25. G0ANC. 071-247 6097 day.

● HF5B Butternut Butterfly 5-band minibeam: £100. No offers. Colin, G0HQN QTHR. (Little Hulton, Manchester) 061-799 5024.

● HONEYWELL multiuser UNIX system. Floor standing tower unit. 65MB fixed disk, 2MB RAM, 1 parallel port, 4 serial ports and UNIX system 5 release 2 operating system: £450ono. G4UCU QTHR. 0282 692791.

● HRO coil sets. 50-100kHz, 100-200kHz, 180-430kHz: £5ea. Plus post. G3ISD QTHR. 0795 477431.

● HYGAIN TH6DXX beam: £175. Kenwood TS520 little used, boxed: £225. 30ft 3-section lattice mast c/w fittings: £50. Daiwa 7600 rotator, controller and cable: £50. G3NAO. (Dewsbury) 0924 465065.

● IBM laptop PC convertible computer, 512k RAM 2x 720k disks. Serial/parallel outputs. Full 80x25 LCD screen, interface for ext monitors, carry case, mains supply/chrgr, DOS3.3 and IBM application s/ware, operating and technical reference manual: £500ono. (Southampton) 0703 260584.

● IBM PC convertible rech batt/mains portable, twin floppy, LCD screen, thermal printer, integrated s/ware package, WP, SS, Comms etc. Also Dowty modem Minimo +3. Immac. Reasonable offers, or swap for 2/70 mobile. Also Husky Hunter prof h/held computer/terminal. Suit portable packet: Offers. Steve, G6FDK QTHR. (Chester) 0244 300779.

● ICOM 275E multimode base rig, superb cond. Completely as new with SM8 desk mic: £750. Yaesu FP707 PSU: £110. Diamond CP5 5-band HF ant: £75. AOR2002 scanner, superb cond, boxed: £325. G0AHB QTHR. (Hertford) 0992 589481.

● ICOM 735 with SM6 desk mic, mint cond: £700. KW1000 linear, exc.cond: £250. Will accept £900 for both together. AOR950 scanner, mint: £175. Buyer collect. G3DPR QTHR. (New Milton) 0425 615676.

● ICOM 735: £625. FL2100Z: £450. FC102: £120. AMT2 AMTOR/RTTY/CW TX/RX. MM 28MHz to 2m tvtr: £60. All equip in good cond and working order. Genuine reason for sale. G4XMP QTHR. (Basingstoke) 0256 469405 eve-w/e.

● ICOM IC260E 2m multimode tcvr. With mic, manual: £225ono. Star LC10 printer, boxed. VGC: £110ono. George, GI4SJQ QTHR. (Portadown) 0762 334648 after 6pm.

● ICOM IC260E, scan mic, IC2E spkr mic, rotator, 3x 9ele tonna, 2-way splitter, Amtech ATU, all surplus to requirements. G1FWS QTHR. (Stevenage) 0438 369017.

● ICOM IC271E Mutek F/E: £425. Olivetti M15 laptop PC twin 720k disks, chrgr, case etc: £375. Homebrew 14MHz-70MHz 4CX250B amp: £175. Altai 6A PSU: £10. Yaesu FT290R with FL7010 10W amp: £300. G4DGU. (Holsworthy) 0409 241493.

I ICOM IC32E 2m/70cm xcvr. Chrgr, belt clip, earpiece etc. Barely used, owner emigrating to W2: £320. G3TZD QTHR. (Southampton) 0703 262207.

● ICOM IC551 50MHz tcvr basestation c/w mic and orig.packing: £400. + carr. GW3WSU QTHR. (Barry) 0446 781261.

● ICOM IC740, mint, boxed, int PSU, FM marker. Would deliver: £485. G4CRB QTHR. (Reading) 0734 665283.

● ICOM R7000: £680. Icom R71: £560. Icom PS60 30A PSU: £175. 10A PSU Trio: £65. Icom 2400 2m/70cm: £450. (SE London) 081-463 9300.

● IMMAC FT290 with Mutek. Never used mobile or opened: £240. PSU: £12. MML 30LS linear: £60. Trio 9000 multimode in exc.cond: £275. Buyer to examine, test and collect. G4VKA QTHR. (Cleckheaton) 0274 871267.

● JST135 HF tcvr bandwidth option fitted NBD520 PSU/spkr. New 12.1.90. Minimal QRP use, warranty Lowes, supplied mint cond, mic, manual, boxed: £1400ono. Save £400+ on new. Yaesu FP12 12A PSU/spkr, good cond: £60ono. GW4RLP QTHR. (Caernarfon) 0286 5264 eve.

● JUNKER key: £35. Datong morse tutor: £35. Kenwood HS5 phones, unused: £25. Kent brass morse key: £30. Kent practice oscillator: £10. Supa-Tuta: £45. MMS morse keyer: £125. Both new, boxed. Prefer buyer collects. G1HPJ. (Stevenage) 0438 354857.

● KATSUMI electronic keyer EK150: £50. Himound morse key EK706: £12. Datong morse tutor D70: £30. Reace model UH74 swr/pwr meter 50/144/430MHz: £15. Ameltone FS1-2X VHF swr/pwr meter: £10. All above as new. KW match swr meter 75ohms: £10. Johnson prof swr/pwr meter desk mounting with separate directional coupler 52ohms 1kW: £20. KW lowpass filter 75 ohms: £5. Hy-gain 18AVT vert ant 3.5/28: £50. Unused Dee-Comm traps and centre insulator for 160/80m trap dipole c/w info re suitable ant and feeder dimensions: £8. G6SX QTHR. (Southport) 0704 67436.

● KENWOOD ATU AT230 as new, boxed: £150ovno. G4ISB QTHR. (Manchester) 061-766 5265.

● KENWOOD MC50 desk mic: £25 Tonna 6m 5ele yagi: £25. Both mint. Box of 50-odd assorted valves. All 1930s/WW2 vintage: Offers. G4FOH QTHR. (Cheshire) 0829 260860.

● KENWOOD PSU430: £100. Ext SP430 spkr: £20. 20m mobile whip: £15. 3ele tribander: £100. Carr.at cost. (Stoke-on-Trent) 0782 395017.

● KENWOOD RZ1 scanner 500kHz-950MHz. No gaps, VGC: £335. MFJ941D Versa Tuner II, not used on transmit. As new: £70. Tono 9000E Comm Terminal never used on transmit: £300. Plus post. Many years RadCom + others for clearing out. Ask for list. Some other rcvrs to clear out. All modern types. Ask for list. Phone for details any item. No dealers thank you or time wasters. (Bristol) 0272 828586 anytime.

● KENWOOD TS520SE also AT200 and Kenwood MC50 desk mic and G5RV: £500ono. Buyer collects, mint cond. GW4WVE. 0792 796435.

● KENWOOD TS711E 2m base tcvr: £500. KAM TNC: £175. Yaesu FT209RH with chrgr, car adaptor and h/set: £150. BBC-B computer with DFS and 80tr D/S disk drive: £160. Trio JR310 HF rcvr: £70. Pair of 14ele met 2m yagis: £25ea. Single section galvanised tower approx 28ft with base plate winch for wall mounting: £100. MM4000 RTTY module with keyboard: £35. All items are for sale on behalf of silent key and are in GWO. G0OIR QTHR. (Richmond, N.Yorks) 0748 5036 after 3pm.

● KW2000 valve tcvr c/w pwr unit/spkr mic and manual: £150ono. Vibroplex key: £20. Metrohm batt operated 500V insulation and continuity tester: £20. BC221: £12. Buyer collect or carr.extra. G3BZM QTHR. (High Wycombe) 0494 712733.

● KW2000A PSU, spkr, h/book: £180ono. Eddystone 830/7 h/book. V.good cond: £175ono. G4AFE QTHR. (Middleton-in-Teesdale) 0833 40907.

● KW2000B GWO mains/PSU/spkr, manual fist mic: £220ovno. Buyer inspects and collects. G4XPR QTHR. (Slough) 0753 645954 after 6pm or w/e.

● KW2000B with matching PSU, Shure 2CI mic, manual, cir.diag, orig.box. One previous owner: £195. Barry, G4USA QTHR. (Fareham) 0329 663918.

● KW202 RX, 204 TX c/w boxed Howes CW/SSB filter: £200. G0CBU QTHR. 04024 45135.

● MASSIVE clearout. 25yrs accumulation must go. One giant job lot incl: 2x video monitors. 2x optical VDUs, 1/2 teachest full of cable and wire, allsorts. 200 assorted boxed valves. Colour TV (faulty) and loads of TV panels. Boxful knobs.

Hardware. Metal panels, chassis, aluminium sheets, PCBs containing thousands' components. Items of equip, record players, car radios, loads of components, relays, caps, resistors, pots, semis, many new, computer keyboard, meters. Metal boxes for projects etc, etc. Much too much to list. Enough to fill (totally) a car and a 4x3ft trailer. Must be the bargain of a lifetime. Only: £75 the lot. Yes £75! Incl free local delivery (30 miles). Phone now to arrange delivery/collection. Go-4-it! (Birmingham) 021-472 3688.

● MFJ949D ATU cross needle readout, swr/pwr 300W dummy load, takes long wire, coax, balanced line ants, 6-position switches, reads peak pwr and average illuminated dial. 2mths old. Mint cond: £125 plus post. Save £45. G4SLG QTHR. 0522 751920.

● MFJ949D Versa Tuner: £100. Kenwood SP230 spkr: £30. AR40 rotator and control unit, new cond: £130. G4BXR QTHR. (Stony Stratford) 0908 566266.

● MIC Mod morse talker MMS1, got me my Class A licence no problem: £40. Trio R1000RX 0-30MHz 1MHz steps AM/LSB/USB: £150. Maplin 12V/3A regulated PSU: £10. All plus carr at cost or collect. Ron Gosling. (Hemel Hempstead) 0442 57839.

● MOONBOUNCE dish 3m diam 70cm focal length good to 10GHz. Very substantial solid aluminium in frame with 5.7GHz feed: £150. 4x 23cm 28ele loop yagis: £18ea. Many transformers. Carrier deviation meter 4-1000MHz: £28. Jaybeam 144MHz 8ele: £8. G4NVA QTHR. (Knutsford) 0477 33011.

● MOSLEY TA32JR, AR40 rotator controller with cables: £90. Yaesu FT75B tcvr mobile, AC supply, VFO: £90. G3DJM. (Christchurch) 0202 485569.

● NAVICO AMR1000 6mths old, boxed as new: £165. G3AAZ QTHR. (Huntingdon) 0480 456781.

● ONE member to join me in design and making of packet radio, digital and other equip. A level maths and algorithm ability plus live West Herts. Spare time and interest only other requirement. (Hemel Hempstead) 0442 56940.

● PAKRATT 232 with Navtex, boxed, manual, all cables. Exc.cond: £195. AR2001 VHF/UHF scanner 25-550MHz. VGC with adaptor: £140. Yaesu FT707 tcvr with hand mic, manual. Exc.cond: £295. Buyer collect or arrange/pay for carr. GD0EOT QTHR. (Braddan, IOM) 0624 26794.

● PANASONIC type DR49 rcvr MW/LW/VHF/FM/SW. 1.6-30MHz, 11-bands, USB/LSB dig readout, batt, mains, signal meter. GWO. H/book incl: £120ono. GW7FLA QTHR. (Haverfordwest) 0437 721769.

● POCOM AFR2010 RTTY and CW decoder c/w video board and Novex 12in monitor: £395. Icom 271E 2m multimode Mutek F/E: £395. Icom auto tuner unit AT100: £95. SEM QRM Eliminator: £30. Desk mic RM6: £25. Jim, G0BFY QTHR. (Swindon) 0793 528471.

● PSION XP2 Organiser 32k mem, 32k datapak, Oxford spelling checker datapak, mains adaptor: £100. Post at cost. G6VS QTHR. (Liverpool) 051-733 6415.

● R1155 WWII rcvr in orig.cond with mains PSU and spkr. Buyer must collect/pay carr. Glyn, G4CFS QTHR. (Doncaster) 0302 770747.

● RACAL preselector MA197C, exc.cond with manual: £65. G4BMH. (Kettering) 0536 712273.

● RACAL RA117E prof valve RX, 0.5-30MHz, 30ft scale (equiv), 6 bandwidths 100Hz-6kHz, superb cond: £180. (Crawley) 0293 514788.

● RACAL RA17 GC RX. GC: £150. Eddystone EB35. GC. B/C RX: £50. Buyer collects. GM3MAS QTHR. (Glasgow) 041-956 4897.

● RACAL RA17 HF rcvr: £140. Eddystone 730/4 HF rcvr: £70. Pye Europa UHF on RB6, RB11 SU8 RX, needs retuning: £30. G8RHU. (Eastbourne) 0323 768656.

● RN Electronics 144/50MHz tvtr. Tar 3ele 6m beam: £170 lot. Both as new. G7DRG QTHR. (Stevenage) 0438 312749.

● SAGENT 14/mcs end fed Zepp: £30. DX Tristar HF vert comp w/radials: £55. G3OAZ QTHR. (Basingstoke) 0256 465126.

● SHACK clearance. FT790R: £250. AOR2002 scanner: £350. KW107 Supermatch ATU: £100. Yoko multiband TV: £50. Racal RA17L HF RX: £175. MM2001 RTTY/TV cvtr: £50. FT707 HF rig: £350. All items ono. Buyer inspects/collects. Ian G0AFH. (Gravesend) 0474 814809 6-10pm & w/e only.

● SHACK clearout. 10m LDF550 heliax, unused: £55. 3x5/8 70cm whip with gutter mount: £20. Cellular tcvrs and accs, Motorola, NEC, Mobira. All working but can only be sold for spares. Call for prices. 500 used 2764 Eproms, all good cond 250nS. Only: £0.50ea or: £200 the lot. G6ANU QTHR. (Bishops Stortford) 0279 654834 eve-w/e.

● SIEMENS PT88 inkjet printer, parallel interface with spare ink cartridge, manual. Good cond: £80. Imhof 19in rack cabinet, grey paint, glass door, with 5 shelves. Good cond: £80. Used BT modems, various types all working with manuals. SAE for list please. Mike Gathergood, G4KFK, 24 New Rd, Datchet, Slough, SL3 9JB. 0753 40520.

● SILENT keys G3BTO/G3CBU sale. 30ft steel lattice tower, rotator and tiltover extension: £100. Heathkit HM2141 VSWR meter: £20. HW8 tcvr with PSU: £75. HW101 tcvr with PSU: £150. Codar AT5 TX with PSU: £40. Realistic DX300 RX: £100. Archer 15-1225 rotator: £40. AEG LP30MHz filter: £5. Rotary 3-way ant switch: £5. Pushbutton 3-way ant switch: £5. SWR20: £5. SWR50: £10. VSWR meters KW Match ant tuner: £10. Jaybeam PBM14/2m: £15. MBM80/70cm: £20. Ants. Air Ministry type-D No.1 wavemeter, mains: £5. RadCom in binders 1947-1988, RadCom VHF/UHF h/book, Microwave Technology and Terman: Offers. All others ono. G8FMH QTHR. (Basingstoke) 0256 23979.

● SOMMERKAMP FT277ZD with FC902, immac, boxed: £500. 10FM CBconver with 50W LIN. Good mobile: £30. GW0BTB QTHR. 0248 852029.

● SONY ICF2001 portable rcvr, freq range 150-29999 AM, 76-108 FM: £80. Philips CD player CD371: £80. Sony Trinitron Viewdata Teletext/Prestel TV set: £250. Phil RS50215. (Hull) 0964 630707.

● SOTA 23cm tvtr 144MHz IF: £90. MM144/28 tvtr 28MHz IF 10W O/P on 144MHz: £70. QM70 144MHz transistor amp, 10W in, 50W out: £40. All 3 ono + GWO. G4XEN QTHR. (Wellingborough) 0933 677573.

● SP600/R274B rcvr, 0.54-54MHz. Good cond, aligned and calibrated with manual: £120. Heavy, buyer collects. G3FMO QTHR. (Chelmsford) 0245 71604.

● SPECTRUM +3 with RMS3 and filter: £140. Icom 202S: £120. Scope CT22: £20. G2CKI QTHR. (Evesham) 0386 881155.

● STANDARD C7800 70cm tcvr, good cond with h/book: £120. Simon G8ANT. (Sutton) 081-644 9564.

● SUPERB VHF/UHF QTH 600ft ASL yet only 15m central London. Flint and brick semi-det period cottage in completely rural location at Downe, Kent. 6m Bromley. 3 beds, dining room, sitting room, fitted kitchen, bathroom, det garage, full CH etc. 60ft HD tower, 447 squares and 66 countries worked 144MHz. Offers around: £124,950. Clive Penna, G3POI QTHR. 0959 75992.

● SYNTHETIC ruby rod from lasers to make clock jewels, for sale ordered by mistake, C-MOS microprocessor IC 65C22P3 by RS: Offers. G4LSA QTHR. (Stafford) 0785 74388.

● TEKTRONIX 190B constant amplitude sig.gen reduced: £70. Avo Type III sig.gen: £24. Dynatron SRX25 tuner/amp chassis: £10. Working Solartron CD711S-2 scope, buyer collects. Will dismantle unless reasonable offer within 14 days. SAE for parts list & shack clearance lists. Acorn Electron package: £60. Toshiba PC4030 metered cassette deck. Was £167, sell: £67. G8YBF QTHR. (Stockport) or messages 061-477 5303 not QTHR.

● TEN-TEC 5A PSU: £60. Heathkit swr/pwr meter kit: £35. Lowe 10m FM rig, unused: £40. Ray, G0CGQ QTHR. (Wilmslow) 0625 529713.

● TEN-TEC Argosy 2 with 270Hz filter and cir. breaker. Exc. Going all Homebrew: £500ono. G3YCC QTHR. (Hull) 0482 650410.

● TEN-TEC Century 22 CW tcvr. Exc.cond with manual: £250. 70cm beam and Slim Jim: £7.50 the pair. G4UHM. (Ingatestone) 0277 355731 eve.

● TEN-TEC Corsair I little used, immac cond, orig.packing, c/w ant tuner and PSU. This was the best Corsair price: £1150ovno. G6XNC not QTHR. (Biggin Hill, Kent) 0959 75179.

● TEN-TEC Corsair Mk1 with all filters fitted. Good cond: £550ono. FRG7 digital freq.counter SSB filter, xtal, BFO, good cond: £175. Datong D70 morse tutor, boxed as new: £45. Alan, G0KMC QTHR. (Aylesbury) 0296 29342 eve-w/e.

● TL922 HF linear c/w valves. Absolutely mint, boxed, manual. VFO 230 for TS830S. Other items also. G0FXQ QTHR. (Nottingham) 0602 625047.

● TONNA 70cm ants 2x 19ele: £15ea/£25. Decwriter IV printer: £50/Offers. 12V batt 125A/Hr, almost new: £45. Welz swr/pwr meter 1.8-500MHz: £35/Offers. G1KDF. (Ormskirk, Lancs) 0695 574868 eve.

● TONO 5000E CW/RTTY/ASCII/AMTOR terminal with built-in 4in monitor and keyboard. Cond as new: £300. Re-advertised due to time wasters. G4ZEK. (Colchester) 0206 851343.

● TRIO 530S exc.cond, orig.packing and manual. GEC 3kW heat fans. Ken, G0HJA QTHR. (Horsham) 0403 52023.

● TRIO 7500: £140. Overhauled. Trio TM201A: £190. Warranty. Hudson, G4MMV QTHR. (Hull) 0964 622396 after 7pm.

● TRIO R2000 rcvr exc.cond: £500ono. GM4SVM QTHR. (Stirling) 0786 75834.

● TRIO TH415E 70cm h/held, PB2 x2, SC12, BT5. All as new: £240ono. (Robertsbridge) 058083 558 eve.

● TRIO TR9000 2m multimode c/w m/bracket, mic and manual: £285. G4YPK QTHR. (Basingstoke) 0256 27922.

● TRIO TR9000 with BO9 base unit 2m multimode, service manual, boxed: £290. S/case, m/mount for TR2200: £5. G3TCG QTHR. (Maidstone) 0622 813474.

● TRIO TS180S slight fault on LSB, hence price: £300. FC707 ATU: £120. ARD40 rotator: £80. 100W dummy load: £50. G4OVG QTHR. (Stanford-le-Hope) 0375 642312.

● TRIO TS430S, PS430, good cond: £675. Yaesu remote VFO for late FT101DM: £100 or exch VFO suitable for use with FT901. G4MXU QTHR. (High Wycombe) 0494 20639.

● TRIO TS711E 2m multimode basestation. Immac cond, orig.packing: £600. Trio TR9130 2m multimode incl m/brkt, mic, boxed. GWO: £310. Yaesu FT902DM HF station. FT901 ATU, FTV901R tvtr with 2m/6m/70cm modules. Yaesu YD844A desk mic: £1100. Would consider splitting. Hy-gain 2ele TH2 Mk3 10-15-20m tribander. Ant and balun: £90. Buyer inspects/collects or pays carr.extra. G0FIG. (nr.Brighton) 0273 462696 or 0860 316437.

● TRIO TS820 fitted digital display, HF tcvr with mic, good cond: £355. Manual incl. 14E 2m yagi: £15. G0LSS QTHR. (Bishops Stortford) 0279 870903.

● TRIO TS830S c/w CW filter and mic, boxed: £700. MM MMT432/28S 432MHz tvtr, 28MHz IF: £100. G4LOO QTHR. (Hitchin) 0462 811591.

● TS530S tcvr 1.8KC and 500CS filters. Dig VFO230, 5mem, cross freq work facility: £650. G3PTN QTHR. (Leeds) 0532 654644.

● TS530S, CW filter, 2x mics. Silent key: £500ono. Buyer collect/arrange carr. Orig.packing. G3MA QTHR. No phone.

● TS680S HF + 6m: £800. FT101Z HF tcvr: £350. PK88 with C64 s/ware: £100. BNOS LPM50-10-100: £150. Bill. (Clackmannan) 0259 723792 eve-w/e.

● TS830S as new, barely used, boxed: £690. Datong FL1 audio filter: £30. Pye PF2UBs (2off) spares or repair: £5. G4ECY. (Bingham, Notts) 0949 37917.

● UNIDEN HR2510 25W, 10m amateur multimode tcvr. Icom ICO2AT 140-152MHz, 2.5/5W programmable 2m h/held, boxed + BP7 batt + case. Both new, unused cond: £200ea. Yaesu FT221 2m multimode tcvr, exc.cond: £270. Heathkit 32ft tower, regalvanised + prop pitch rotator + dig. controller: £220ono. Hygain TH3 tribander, VGC: £90. Cue-Dee 2m 15ele long yagi: £35. New TX valves 4-250, 4X250B, TT21, 6146A, 13EI. clearance incl computer system, Eproms, components. SAE list. GM0BWT QTHR. (Stirling) 0786 78257 after 6pm.

● UNUSUAL small lattice telescopic tower. 11in sq section, 10ft extends to 17ft with rotator and lift motor mounted on side. All remote control. Was specailly made to fit in valley roof to elevate beam above chimney pots. Hardly seen when retracted. Best seen in action. G2RX QTHR. (London) 081-693 5512.

● US Army Signal Corps BC640B transmitter type T5031B in perfect cond c/w manual. V.large if you collect. VHF cov, same as Lowes have in their collection: £50. G4GWW QTHR. 0572 722470.

● VALVE 2C39, new: £25. Valve 2C39, used, good cond: 15. N-type relay RK500 2off: £30ea. N-type relay type HF400 plus aux contacts: £75. Trio HF lowpass filter: £10. BNOS 6m, 2m, and 70cm lowpass filters: £10ea. Sony colour video camera: £100. H100 low-loss coax 25m length 6off: £20ea. P.Haworth, G6OWI QTHR. 120 Ormerod St, Accrington, Lancs, BB5 0QG.

● VALVES - 250 assorted valves late 1920-1960s, untested but approx half boxed: £25. Mics, matched stereo pair 600ohms onmidirectional, medium quality: £12 pair. All open to offers and plus carr. Ian, GM3LGU QTHR. (Dunoon) 0369 87341 eve-w/e.

● VHF rotator AR200XL c/w 45ft 5-way cable. Exc.cond, little used: £30. 2ele beams, 70MHz and 50MHz: £7ea. Yaesu YH55 comm h/phones. VGC: £15. Buyer collect or pay post. (Southampton) 0703 791049 before 8pm.

● VHF/UHF log periodic ant Jaybeam type 7084 68-500MHz in exc.cond. Will sell for: £175ono. Or swap for HF tribander such as Jaybeam TB3 or Cuschcraft A3 or similar. John. (Preston) 0772 864174.

● VHM88S Escort, taxed, tested Nov: £300. Or exch for 2m multimode or triband ant. G0EUD QTHR. (Spalding) 0775 724499.

● WORK sats via packet. G3RUH modem. 1200PSK. Connects to TNC. Fully built and tested by Amdat c/w ext fittings and full insts. Never used or unwrapped. Cost £85. Sell for: £55. G0GSZ QTHR. (Norwich) 0603 748338 anytime.

● YAESU 726R, sat unit, CW filter, HF/2m/70cm: £850. Yaesu 209R h/held, mobile brkt: £155. Yaesu YM24A spkr/mic: £15. Telereader CW685E morse/RTTY terminal: £350. 2m Cuschcraft boomer ant: £15. Teac 3440 4ch tape deck, mint: £425. Nakamichi NR200 noise reduction unit: £150. Nakamichi 580 cassette deck: £250. Transtel teleprinter: £25. Centronics 737 printer: £50. Commadore Pet 4032, twin disks, Commadore printer: Offers. Variac transformer 0-240V/8A: £15. Wavemeter type NPL 1C: £15. G6CJB QTHR. (Maidenhead) 081-847 3995 day 0628 21718 eve.

● YAESU 767GX 2m/6m modules fitted. Used twice only. 18MHz dual-beam scope. GWO with manual: £1400. :£100. S.key sale. Brian, G0KEK QTHR. (Brixham, Devon) 08045 3646.

● YAESU 790 multimode 70cm mobile (brand new): £260. Icom 290E 2m 10W multimode, exc: £270. Icom 471H 75W 70cm base plus PS15 20A PSU, mint: £740. BNOS LPM432-1-50 50W linear with preamp, mint: £135. Daiwa Search 9 marine rcvr fully xtalled with VFO: £40. Yaesu 726 technical manual: £6. Icom 45E 1/10W FM mobile, exc.: £190. (Lancs) 0253 864136.

● YAESU FC902 ATU 160-10m, boxed: £125ono. Telescopic tilting tower, tubular construction, 25ft down, 40ft up: £125ono. Colour TV 12in: £60ino. Yaesu phones: £10ono. (Halifax) 0422 835144.

● YAESU FL2100Z 1.2kW PEP linear with manual, perfect: £500. (FRB757 if req'd) would take p/exch FT290R: £200. FC757AT: £200. TNC. G0LRI. (Cheltenham) 0242 680248.

● YAESU FRG7700, no mem unit and needs attn to SSB section together FRV7700 cvtr. Deal! Bargain: £180. Yaesu FT23R and desk chrgr: £130ono. Toko HL35V 2m linear: £35. Direct ED video editor: £300. Vivanco 3044 enchancer and sound deck: £110. Items with manuals and GWO. Prefer buyers collect and inspect. G8EHU QTHR (1990). (Ramsgate, Thanet) 0843 596389.

● YAESU FT101E MkII, spare valves, manual. VGC: £340. 2m multimode FDK750E, twin VFOs, manual, good cond. Ideal mobile/base: £195. Sony ICF2001, HF scanner. VGC: £80. Kenwood TH205E, 2m handy spkr/mic. VGC, chrgr etc: £145. G4JXK QTHR. (Fareham) 0329 230737.

● YAESU FT101ZD full coverage amateur bands FM fitted, boxed, exc.cond c/w Yaesu desk mic: £450ono. SEM Tranzmatch with Ezitune and dummy load: £90ono. AR2200 rotator and control box c/w mast mounting bkts: £55ono. Hansen FS210 auto swr/pwr meter 1.8-150MHz: £30. Daiwa CS401 4-way coax switch: £25. Spectrum 128 c/w Amatyer s/ware: £85. G0JDG QTHR. (Mansfield, Notts) 0623 552912.

● YAESU FT101ZD, FTV901R tvtr, FC902 ATU, with matching spkr. Manuals and mic. All in good cond: £650ono. G4FYM QTHR. (Watford) 0923 223478.

● YAESU FT208 2m h/held, case, chrgr, spkr/mic, manual: £95. Yaesu FRV7700 VHF cvtr for FRG7700 c/w manual: £30. G4PBN. (Taunton) 0823 259573.

● YAESU FT2700H dual-band mobile, unused: £375. Icom IC47E 70cm mobile: £250. Bearcat 200XLT scanner: £195. BNOS linear 144-10-100: £95. R537S airband portable: £45. Fortop 70cm ATV: £85. Packet/RTTY/CW system: £100. Everything VGC. Boxes, etc. Could demo deliver S.East.(Brighton) 0273 582823 eve.

● YAESU FT270R: £200. AEA PK232: £200. 100MHz freq.counter: £40. Oscar GP144W colinear base aerial: £30. G6IOX QTHR. (Basingstoke) 0734 811134.

● YAESU FT290R case, nicads, chrgr. Exc.cond: £225. G1UMX QTHR. (Kingston-upon-Thames) 081-546 9886.

● YAESU FT707 HF tcvr, 80-10m incl WARC with scanning VFO FV707DM, only used basestation: £550. Collect or pay Securicor. Datong PC1 gen.cov cvtr: £100. Datong FL1 freq agile audio filter: £55. SEM QRM eliminator: £60. 5x 4CX250B valves, little used but not powered for 20yrs but believed OK. One air system socket/chimney: offers? G2BUP QTHR. (Bath) 037387 432.

● YAESU FT708 h/held 70cm tcvr, case: £110. FT208 2m tcvr, case, NC7 chrgr, spkr/mic, ant, manuals. MML144/100 lin/preamp, 12V car batt: £240. G0DDV QTHR. (Watford, Herts).

● YAESU FT727R dual-band handie c/w NC15 quick chrgr/DC adaptor PA3 car adaptor/chrgr MH12 spkr/mic: £300. (Northampton) 0604 751928.

● YAESU FT736 boxed as new: £1000ono. (Wolverhampton) 0902 783299.

● YAESU FT757GX with YM38 desk mic. Little used on TX: £525. Datong speech processor: £60. SEM Zmatch: £60. Stan G0LZQ. (Preston) 0772 614349.

● YAESU FT790R2 70cm multimode portable. Usual accs plus 3x 5/8 colinear if reqd. Absolute giveaway at: £325. Consider taking FM handie 2m/70cm in pt/exch or exch WHY. (Test gear, ant, linear etc). Arthur, G0DKJ (QTHR not correct). (Halifax) 0422 368021.

● YAESU FT901DM tcvr, CW filter, hand mic. FT902 ATU, little used. Exc.cond. All manuals incl w/shop manual: £525. Carr.extra. No split. Prefer collect but would deliver 50 mile radius. G4HHN QTHR. (Market Weighton, York) 0430 872547.

● YAESU FTDX401 tcvr with ext VFO FV401, mic, manual, most spare valves, no spkr. Fine for beginner exactly as is, expert will tweak up 10m which, like owner, getting bit deaf. Usual 401 advantages, built-in PSU, xtal calibrator, noise blanker, CW filter. Could deliver Suffolk area, better buyer inspects, collects please: £250. No split. G0BYY QTHR. (Bury St.Edmunds) 0284 702281.

● YAESU FTV107R 2m module fitted: £120. ITC video camera, new tube fitted: £40. Also 70cm SSTV modules: Offers. Bob, G4UYI QTHR. (Workington) 0900 63719.

● YAESU h/held FT411 2m with 2 batt packs, chrgr, spkr mic and m/brkt. Latest model: £250. Peter. (Leeds) 0332 872806 eve.

● YAESU/Sommerkamp HF rig. FRDX400 160-10m RX, FLDX500 80-10m TX plus matching spkr: £150. G3GII QTHR. (Southampton) 0703 693191.

# WANTED

● 10GHZ wavemeter, Marconi TF1026/1, 2, 5 wavemeters. Info Microdesk MkII type WI612 made Microwave Instruments. G3VVB QTHR. (Shirebrook, Northumberland) 0726 842368.

● A scrap R1155, so that I can rescue the screw-on labels from the front panel. Also any accs for the Collins TCS12 TX/RX and T1154, especially connectors. Other ex-Ministry gear also reqd. WHY? Peter, G0DRT QTHR. (Kent) 0795 876277.

● ALL equip for receiving/decoding weather sats. Bird Thruline equip. Cushcraft VHF/UHF aerials. 0467 25365 after 8pm.

● AP1086 Issue One 1938/1952 RAF stores Ref Nos. All Sections particularly 10-10A to 10Z relating to radio, radar and navigation equip ie Babs, Oboe, Loran, Gee, H2s etc. Exc. prices offered. Would purchase post-war to current magnetrons, klystrons, T/R cells, TWTs, photo multipliers, most CV types, and special types of EEV, Ferranti, Varian, M-OV, RCA valves. M.Gee, 17 Foxley Cl, Mountford Est, Farncliff Rd, Hackney, London, E8 2JN. 071-252 9083 or 071-790 2846 anytime.

● BIRD Thruline modules and accs. Cushcraft HF and VHF aerials. Maybe pt/exch some of LP collection? 0467 25365 after 8pm.

● BITS for BC348, knobs, case, dynamotor. Early Hallicrafters working or not. SX28 orig with good panel. BC348 JN or Q model. Mods no object but clean interior and wiring. Dynamotor for MN26 compass. Control for ARR2. 52 Bramble Lane, Mansfield.

● CODAR AT5 TXs with AC pwr units. Precise cond/price. Marris, 35 Kingswood Hse, Farnham Rd, Slough, SL2 1DA.

● EARLY 60s 3rd ed of RSGB h/book wanted. Mint cond preferred but good clean copy considered. G0FNZ QTHR. (Shepperton) 0932 221586.

● EARLY Philips U-Matic Beta tapes containing TV programme series from early 70s or late 60s. Anything considered SciFi, Dr. Who, Doomwatch, Survivors, childrens series plays. Adult series detective wanted for loan or purchase WHY? Steve, G0EVJ QTHR. (Lichfield) 0543 251915 after 7pm.

● 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.

## MEMBERS ADS

● EDDYSTONE bug key 689 and Eddystone spkr in round case. G3PKR QTHR. (Hayes, Middx) 081-756 0308.
● FL101, FT101, or 277B to go with my FR101. G1DXQ QTHR. (Norwich) 0603 745734.
● FM/AM board D3000184 for FT102. Also SSB filter XF8.2HSN. Bob GM0LEY. (Livingston) 0506 32868 after 6pm.
● FOR Storno CQM 634D oscillatur units X0631A and X0632A loose or in scrap units. Loan of manual for copying relevant pages. Also details of conversion to 70MHz. G3JAU QTHR. 0202 514078.
● FT301/FT221R for spares. (Crawley) 0293 514788.
● FT707, FT7B or similar. Clean, working and reasonable price please. G3RXW QTHR. (Hitchin, Beds) 812611.
● G2DAF rcvr working order or at least complete and undamaged. G4DAN QTHR. (Colchester) 0206 395968.
● GOOD home for Collins TX/RX TCS12 circa 1945 orig.manual ex US Navy. Sensible offers. H.Horne, G8XEM/G0MEX. (Rossendale) 0706 227819.
● I am constructing a replica of a Baird Televisor to display 30 line TV and would like to purchase any orig. components to speed up the project. Pete, G4JNU QTHR. (Reading) 0734 477573.
● I am interested in purchasing very old morse keys and memorabelia. G4ZPY QTHR. 0704 894299.
● ICOM 720A, FM fitted, preferably full TX. Must be mint or VGC. No faults or rubbish please. Also FT790R, same cond as above. Could exch or p/exch with FT101ZD+ or FT726R 2/70/HF/Sat. Will collect at reasonable distance ie 100 miles. G0JAU. (Banbury) 0295 250169.
● KEF Concerto or similar quality spkrs, home constructed acceptable. Also wanted, decent cassette deck, stereo etc. G4LSA. (Stafford) 0785 74388.
● KENWOOD VB2530 pwr amp, SMC20 spkr mic and HMC1 headset with Vox. G7DPU QTHR. (Leicester) 0533 813466.
● MAIN mains transformer for Mullard high speed valve tester or dud tester with intact transformer. G3YNN. (Battle, E.Sussex) 0424 893078.
● MANUAL for sick Marconi insts TF1370A wide range RC oscillator and TF1313A universal bridge. Buy or borrow or where repair? All expenses paid. John Carver, G8ZNR, 13 Trapham Rd, Maidstone, ME16 0EL. 0622 681980.
● MARCONI marine morse key. G4WYF QTHR. (Blackpool) 0253 56811.
● METER, 30uA for Avo valve characteristic meter type 3 movement OK case cond not important. Movement assembly 40329H. John. (Farnborough) 0252 24461 x3504.
● MIZUHO, Mizuho, Mizuho, Mizuho MX 14MHz QRP rig in GWO. G3SEQ. (Newcastle, Tyne & Wear) 0207 544374.
● MORSE keys, RAF Type D, 10A/7373. Marconi Marine 365A, 365EZ. Also Canadian Wilson bug RCAF 10F/7390. G3TSS QTHR. (Corbridge) 0434 633125.
● PHILIPS sig.gen PM6456 or equiv stereo. To buy or borrow. G8DPS QTHR. (Surbiton) 081-399 8787.
● PK232, KAM all-mode, Tiny 2, must be GWO. Datong VLF cvtr and active aerial wanted. G4INX. (Chester) 0244 678679.
● PLESSEY TDMS70, DTSG10 and Racal RA17 cir.diags, manuals to purchase or loan for photocopy. All expenses paid. Dave Hare BRS27239, 39 Dyctoe Lane, Welbourn, Lincoln, LN5 0NL. 0400 73268.
● 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.
● REDIFON R1000 rcvr unit suitable for use with RC1000 control. G7FQY, 5 Emsworth Dr, Brooklands, Sale, Cheshire. 061-969 1964.
● SCARAB RTTY terminal unit to interface with Amstrad CPC464. Ken, G3KNB QTHR. (Stafford) 0785 44964.
● STEREO playback head by Bogan Germany as fitted Brenell Engineering reel tape deck MK6, circa 1972. Would purchase complete deck in good cond. Present address Brenell Engineering or Bogan Germany would help. G8UQ QTHR. (nr.Kendal) 05395 61117.
● URGENTLY wanted to complete amateur station based on tactical radio equip. Racal PRM4040 (part of PRM4041) HF tcvr, Racal ST719615 backpack carrying frame, Racal MA945 batt chrgr, Racal MA4025 batt, vehicle mounting kit, interconnecting leads. Interested in the above items in any cond, plus Racal operating or service manuals. Also wanted, moving map display made by Sperry, green metal case approx 17x17x5in with hinged top covering map. £10 reward to reader offering info leading to the purchase of one these, known sold surplus last year! Bob. (Redditch) 0527 64885.
● VALVES type 801 '10 and '71A. Also needed RCA valve manual wartime or earlier. Bernard Litherland, G4IMT QTHR. (Bath) 0225 891254 anytime.
● VFO230 ext VFO for TS830S. Must be in good cond. Ron, G0GHX QTHR. (Wimborne) 0202 880194.
● VLF rcvr or cvtr 5-148kHz. Also wanted Tranzmatch ATU minibeam 6-20m 8ele 2m quad. G4XFF QTHR. (Chesterfield) 0246 864012.
● 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 desk mic for FT101ZD, MD1B8 or equiv. Williams, G0DNX QTHR. (Conisbrough) 0709 862231.
● YAESU FL2100Z or similar, Kenwood PS50 or PS430, Collins CW filters for S-line. G3VBL QTHR. (Preston) 0772 612289.
● 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.

## EXCHANGE

● ELEKTOR first 34 editions. Two binders, for early technical h/book WHY. Post about £3. G8NN QTHR. (Sheffield).
● WANTED 4m tvtr module for Yaesu FTV range, mem keyer, 4m linear, and FC107 ATU for FT107. Have TH41E 70cm h/held, Siemens PT88 inkjet printer, various BT modems incl V21/23 and V22, and Imhof 19in 4ft high cabinet. Cash adjustment available if necessary. Mike Gathergood G4KFK. (Slough) 0753 40520.

## RSGB SPORADIC E HOTLINE

# 0426 952211

The RSGB Sporadic E Hotline trial is currently operating for the 1990 season. This recorded message will contain details of potential $E_s$ locations within Europe and, when available, the recent Boulder K index. It is not a forecast, but we hope it will be a guide to more profitable operating, based on results from previous years. The special telephone number is 0426 952211 which is a local rate call within the UK.

The Hotline is an experimental service run on an ad-hoc basis by Anglia Weatherman, Jim Bacon, G3YLA, and will be updated as new data becomes available. The precise cause of $E_s$ is still not clearly understood. However, by taking part in openings amateurs can usefully add to the current level of knowledge - so please try it and then send your logs to G3YLA, IARU Region 1 Sporadic E Coordinator, QTHR,.

Note that RadCom May-August 1989 contains a background series of articles.

## HELPLINESHELPLINESHELPLIN

### A.E.L. 3015 HF TRANSCEIVER

Roger Basford, G3VKM, seeks info on the A.E.L. 3015 HF transceiver. This is a commercial radio and is at present set up for the 2MHz shipping band. G3VKM wishes to convert it to 6.9MHz for use by the local Sea Cadets. Any info will be welcome, especially retuning details. A letter to the makers has produced no response at the time of writing. All copying or other expenses will be covered.

### COLIN NEEDS HELP

Is there anyone in the Cumbernauld area prepared to help Colin Watson, BRS 46598 repair his 144MHz Wood and Douglas receiver pre-amp? His phone number is 0236 724630.

### IT DOESN'T WORK!

Has anyone built the Top Band Transceiver featured in Sept 87 *RadCom*, and modified to 80 metres, March 88 *RadCom*? Colin Teasdale, G3ZOP, has built one but the PA doesn't work. He would appreciate any assistance, and can be found QTHR or on Hinckley 615629.

### INTERESTED IN SWAPPING MAGS?

If you fancy a view of amateur radio from down under, Mike Hutchins, ZL1MH, would like to exchange back numbers of the NZARTS magazine *Break-in* (this is not the burglars' monthly of the same name) for back numbers of *RadCom*. His address is c/o Tcheke Private Bag, Kaikohe, Northland, New Zealand.

### HAVE YOU GOT A COPY OF ELECTOR?

Mr E R Gauntlett, G3VLL, is looking for a copy of *Elektor* magazine, No:6 dated Sept 1975, or at least a copy of the article "Versatile Digital Block" contained therein. Mr Gauntlett's address is correct in the current RSGB Call Book or he can be telephoned on 0302 857339.

### RIG CONVERSION INFO REQUIRED

Bert McCann, G3AZI, who describes himself as "QTHR in all editions of the RSGB Call Book!!", would like information on converting a rig to 144MHz. It is a dash mount 6-channel FM Dymar Lynx, with a label "Essex Telecommunications Type ETV50. It is currently crystalled for around 170MHz. His phone number is 0772 38715.

### FT101 OWNERS CLUB . . .

"Is there still an FT101 owners club?" asks Mr E J Edwards, G8HLJ. In addition, he would like to find a unit for converting his FT101B for FM. His address is 8 Anderson Court, Plymyard Ave, Bromborough, Wirral, Merseyside, L62 6GF.

### MR COLLINS NEEDS A REPLACEMENT

Mr C A Collins, G3THX, needs a replacement non-reversible power supply connector for his Eddystone EC10 receiver. Does any member have such a thing, or know of a source? Mr Collins resides at 60 Alexandra Road, Skegness, Lincs, PE25 3RE.

### PETER HAS A PIECE MISSING

Peter Head, G4FYY, is restoring an early FT301 transceiver - the 10W version - which is missing the Vox/Calibrator/Sidetone PCB. A similar module may be used in the FT221. If anyone has this unit from either rig in a "fit only for spares" state, Peter would be delighted to receive a call on 0293 514788. He is QTHR.

### "THANKS"

*Helplines* receives many letters reporting successful use of the column. The following is typical . . .

*7 July 1990*

I put a bit in Helplines *about 5 weeks ago and it appeared in the July issue. I wanted to find an integrated circuit LD3141. I have had two replies, from G3OIH and G3ZII. Cricklewood Electronics and T Powell are said to stock the device. I am quite amazed that it is available. I have learned one lesson from this . . . if one wants to locate a chip, the best thing to do is send a circular letter to all the known suppliers (or contact* Helplines, *of course!). One of the things I did in my first search was to contact the maker of the faulty chip, by fax, at his European HQ. He was very helpful, but had never heard of the chip that bore his name! My application to* Helplines *was therefore a despairing gesture. It has turned out to be efficient beyond my wildest dreams. Please take a bow,* Helplines, *and thank you very much.*

Fred Sammon, GI4PCY

*[You're welcome Fred - Ed.]*

### VHF GREAT-CIRCLE MAP NEEDED

Ian Galpin, G1SMD, has got the usual great-circle map, found on most shack walls these days, but finds the detail is limited at shorter ranges. He is looking for such a map which covers approx 2000-4000km radius from the UK for use on VHF. Anyone know of a decent-sized map (similar size to the RSGB one) which fulfils this requirement?

Ian also offers help with the query regarding PTFE sheet, rod etc in February's Helplines, mentioning that there is a supplier local to him: Bren Gordon, G4GHP, 113 Pound Lane, Poole, Dorset. He attends several of the bigger rallies under the name of Gordon High Precision.

### C500E EXPERT REQUIRED

Are there any experts on the programming of the C500E digital handheld? Stan White, G4EGH, has such a rig and, quite by chance (such as when close to a high RF field) a five figure frequency appears, the fifth digit being 0 or 5. He is unable to recreate this using the programming diodes and wonders how it can be done. He *has* contacted the importer who, although most helpful, couldn't solve the mystery. Contact Stan on 0634 388760.

### CIRCUIT DIAGRAM OF PHILIPS KBX6, PLEASE

Tony Parker's (G8VMQ) son is having difficulty obtaining circuit diagrams and details for a Philips KBX6 telephone system and for a KT2 five-extension telephone. He has tried the manufacturers and various dealers, all to no avail. If anyone can supply these circuit diagrams, and if anyone in the North West area has a second-hand KT2 telephone with 5-ext for sale, he would be very grateful. His phone number is 092 575 2938 and he is QTHR.

### BONE CONDUCTION HEARING AID REQUIRED

G3VMR is looking for old hearing aids of the bone conduction type, which were very popular 20 years ago, as a pair of robust spectacles. Instead of the usual ear phone, an electromagnetic transducer rests on the bone behind the ear to give reproduction to a person with a good 'inner ear' if the outer eardrum is defective. This type of aid has now become obsolete by reason of drug treatments and improved surgery, and there are few sources of new ones or spares for repairs. He would be most interested to hear from anyone who has an old pair of hearing aid spectacles. He is QTHR, phone 0628 24929 or via GB7VMR.

### HAVE YOU BEEN A MEMBER OF BIRMINGHAM UNIVERSITY ARS?

The above radio society is trying to find out some of its past history and has requested any past members to get in touch to try to fill in the various gaps in their record. The society callsigns are G3IUB and G8IUB. The person to contact is Mr K Webster, G7DWV, secretary of the RAD, Guild of Students, University of Birmingham, Edgbaston, Birmingham, B15 2TU.

### GIRLS' SCHOOL NEEDS GEAR

Watford Grammar School for Girls needs help in setting up its new amateur radio station. They are attempting to fulfil the requirements of the Duke of Edinburgh Scheme radio construction projects. The £10 allocation for funding this project does not go very far, so they wonder if any amateurs have equipment to donate to the school. They are willing to collect and will accept anything, irrespective of age and condition. Please contact Tony Kelsey-Stead, G0COQ, on Watford 223403.

### CUMBERNAULD AMATEUR RADIO SOCIETY?

Could anyone interested in starting an amateur radio society in Cumbernauld please contact Colin Watson, RS46598, 10 Torbrex Road, Carbrain, Cumbernauld, or telephone him on 02367 24630.

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 October 1990 issue must be sent to HQ marked "Club News - DIARY", to be received by 20 August 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 - 20, video "Aerial Circus" by Dud Charmans, G6CJ; 26, mobile picnic at Ashton Court; Sept 24, talk "Working with the RIS" by Mike Blake, G3OUK.
South Bristol ARC - 1, lecture TBA; 8, 2 metre activity evening; 15, Dx broadcast TV activity; 22, top band activity evening; 29, progress meeting - club library; 29, committee meeting - Bristol Rally 1990.
Thornbury & DARC - no formal meetings during August.

### BEDFORDSHIRE

Bedford & DARC - 21, preparations for Special Event Stations GB0JDC & GB0BOB; 24, Special Event Station - GB0JDC - Jaguar Drivers Club - Old Warden; Sept 4, talk "Home Construction" by Richard, G1ZOJ; 8-16, Special Event Station GB4BOB - Battle of Britain - Hawkinge - Kent coast; 18, de-briefing GB0BOB. Details 0234 266443.

### BERKSHIRE

Maidenhead & DARC - 2, 2 metre foxhunt on S14; 21, demonstration of Amateur Radio Software by Steve, G4YFB; Sept 6, talk by Derek, G3ZOM of Jandek Kits. Details 0628 25952.
Reading DARC - 2, boat trip to Burghfield, leaving from County Lock, Reading at 7.30; 9, illustrated talk "Club History" by G4JTR; 11, Special Event Station at Knowl Hill Steam Rally in aid of Hospital Radio Reading. Details 0734 744042.

### BUCKINGHAMSHIRE

Aylesbury Vale RS - 1, talk and demonstration "60MHz Microwave TV Links" by Barry Carter, G3KGQ. Details 0280 817496.

### CHESHIRE

Warrington ARC - 7, beginners night; 14, barbecue at GYCC; 21, open forum; 28, final arrangements for HF Field Day; Sept 4, beginners night/mini statement by Mike Mansfield; 11, open forum. Details 0928 715070.

### CLWYD

Delyn RC - 14, open forum and discussion night; 28, RSGB video night; Sept 11, talk "The Art and Science of Photography" by Glyn Jones of G&G Photographers.
Wrexham ARS - 7, field night; 21, demonstration on "Resonance" by John, GW3RBM. Details 0978 261482.

### CORNWALL

Cornish RAC - 2, CRAC main meeting - Perranwell Village Hall; 7, radio constructors workshop - Perranwell Village Hall; 13, CRAC computer club - Treleigh Church Hall; Sept 6, CRAC main meeting - Perranwell Village Hall.

### CUMBRIA

Eden Valley RS - 23, visit to Police HQ, Carleton Hall, Penrith. Meet in car park 7 p.m. Details from G0MDV.

### DERBYSHIRE

Derby & DARS - 1, junk sale; 8, rally preparation at the former Lower Bemrose School, St. Alban's Road, Derby; Sept 5, junk sale. Details 0332 669157.

### DEVON

Exeter ARS - 13, free and easy evening; Sept 10, talk "Working on the Market Reef" by Steve, G4EDG. Details 0392 78710.

### DORSET

South Dorset RS - 5, RSGB National Mobile Rally at Woburn.

### ESSEX

Chelmsford ARS - 7, talk by Waters & Stanton; Sept 4, Marconi talk by Stan Woods. Details 0245 260831.
Loughton & DARS - 24, drinks at Victoria Tavern, Loughton. 8pm; Sept 7, TBA. Details 081-504 4581.

### GREATER LONDON

Acton, Brentford & Chiswick RC - 21, discussion on "Variable Low Power Stabilized Power Supplies".
Coulsdon ATS - 13, quiz v Wimbledon & DARS; Sept 10, talk "Local Radio" by Martin Charman, G4FKK. Details 081-684 0610.
Crystal Palace & DARC - 18, talk "Working DX on Top Band" by Dave Hayes, G4AKY. Details 081-699 6940.
Edgware & DARS - 23, SSB Field Day briefing; Sept 1/2, SSB Field Day; 13, TBA.
Southgate ARC - 9, talk "Nicam Stereo" by Gerry Meek of Fergusons; 23, DF equipment checking evening; Sept 13, talk "Power Distribution" by Roger Platt of CEGB. Details 081 360 2453.
Sutton & Cheam RS - 16, TBA; 27, SES at Sutton Environmental Fair, Carshalton Park, Carshalton (provisional); Sept 20, talk "Facts & Fallacies of Learning Morse" by Tom Mansfield, G3ESH.
Wimbledon & DARS - 10, night on the air (at camp); 4/12, WDARS summer camp; 13, CATS v WDARS quiz at CATS; 31, film night.

### GREATER MANCHESTER

Eccles & DARS - 7, talk "101 Holidays in a Bedford CF4 Van" by G8VF; Sept 4, demonstration "V22 Modems" by G6MEI. Details 061 773 7899.
Stockport RS - 8, TBA; 22, TBA; Sept 12, talk "The Hong Kong Connection (QRP)" by Keith Ranger, G0KJK. Details 061 439 3831

### HAMPSHIRE

Fareham & DARC - 1, test equipment night.
Horndean & DARC - 2, talk "Chemistry in Electronics"; Sept 6, talk "Army Communications". Details 0705 483676
Three Counties ARC - 1, computer night; 15, talk "Electronics in Air Traffic Control" by Duncan Tribute; 29, construction night; Sept 12, talk "Mapping the World's Oceans" by Andy Harris.
Waterside ARS - ***New Secretary*** Phil Bridges, G6DLJ, 9 Hollydean Villas, Southampton Road, Hythe, Southampton, SO4 5HU.

### HEREFORD & WORCESTER

Bromsgrove ARS - 25, Mappleborough Green Fete; Sept 11, talk and demonstration "Jaybeam Antennas". Details 0527 503024.
Bromsgrove & DARC - 10, talk "Modern Short Range Radar and Amateur Applications" by Ray Macmillan, G4JVB; Sept 1, SES GB0BC - Blue Cross Animal Welfare Centre, Wildmoor; 2/3, SSB NFD. Details 0527 33173.
Vale of Evesham RAC - 2, talk "Technical Ceramics" by G8BKL; Sept 6, talk "Underground Radio" by G3ZLM.

### HERTFORDSHIRE

Cheshunt & DARC - 5, Woburn Rally; 8, portable evening - Baas Hill Common, Broxbourne; 22, portable evening - Baas Hill Common; Sept 5, video evening "Battle of Britain"; 19, talk "EMC and The EMC Committee" by Dave Lauder, G1OSC. Details 0992 464795.
Verulam ARC - 28, annual bring and buy sale.
Welwyn-Hatfield ARC - 6, video night; 20, informal; Sept 3, talk "Birth of Radio".

### HUMBERSIDE

Goole R&ES - 3, contest discussion; 5, treasure hunt; 17, video evening; 31, social evening; Sept 14, construction competition; 21, Annual General Meeting.
Hornsea ARC - Sept 5, barbecue with "Serendipity".

### ISLE OF WIGHT

Binstead ARS - meets Mondays from 7.30pm but the radio shack is available for use at any time that a committee member is available. First Monday of month is "surplus equipment" auction. Club caters for all aspects of radio. Morse lessons given for those wishing to take the test. Details from G0ISB, QTHR, or G4VJF also QTHR.

### KENT

Bromley & DARS - 21, operating evening; Sept 18, talk "Basic Electricity (Back to Square One)". Details 081-462 2689.
Maidstone YMCA ARS - 3, club Bar-B-Q; 10, Morse class and "on air" training; 17, Morse class and "on air" training; 24, Detling Steam Fair (station planning); 26, Detling Steam Fair (Saturday) contest planning meeting. Details Paul Martin, G0BUW, tel: 0622 30544.

### LANCASHIRE

Bury RS - meets every Tuesday at Mosses Youth & Community Centre, Cecil Street, Bury. 7, visit to Barton Aerodrome; 14 August, committee meeting; 21,28, informal.
Fylde ARS - 9, DF foxhunt; 23, informal; Sept 13, construction competition. Details 0772 635464.
Preston ARS - ***NEW SECRETARY*** Mr. Eric Eastwood, G1WCQ, 56 The Mede, Freckleton, Preston PR4 1JB, telephone: 0772 686708. 9, talk on "Crime Prevention"; 23, rally arrangements; Sept 2, Rally - Lancaster University (Preston ARS's own); 6, talk "In the Footsteps of Tesla Hertz & Marconi"; 20, talk on "Fire Prevention".
Thornton Cleveleys ARS - 13, talk "The Work of the Post Office"; 20, talk "Astronomy" by Ken Porter, G3KEN.

### LINCOLNSHIRE

Lincoln SWC - 12, foxhunt; 22, construction contest; 26, club barbecue. Details 0522 751920.

### NORFOLK

Fakenham ARC - 7, (change of programme) final arrangements for "Splash Week" with Dave, G4DCJ; 20-24, 'Splash Week' Schools Police liaison activities for the summer holidays. 10 - 16 yrs of age; Sept 4, visit to Eastern Communications Shop at Happisburgh - a talk and demonstration by Fred, G4HXK.
Norfolk ARC - 1, talk "Meteor Scatter" by Paul Turner, G4IJE; 5, club outing to Woburn Rally; 8, HF SSB FD/Town & Country Show briefing; 15, "Real Radio" evening; 22, talk "Amateur Radio Programmes for the Micro"; Sept 1/2, HF SSB FD at Cart Gap, Happisburgh; 5, Town & Country Show final briefing; 9, club station demonstration at Town & Country Show, Royal Norfolk Showground, Costessey; 12, inter-club quiz with Leiston and Fleixstowe; 19, talk "Weather Satellites" by Henry Neale, G3REH.

### SHROPSHIRE

Telford & DARS - 1, club antenna repairs night; 8, foxhunt 7.30pm, 144.600MHz.

### SOMERSET

Yeovil ARC - 2, talk "Designing jFet Amplifiers" by G3MYM; 9, talk "Designing jFet Oscillators" by G3MYM; 16, talk "Tuned Circuits" by G3MYM; 23, talk "SSB" by G3MYM;; Sept 6, talk "Lambda Diode Projects" by G3MYM.

### SOUTH GLAMORGAN

Cardiff RSGB Group - 13, general natter night; Sept 10, talk "Packet Radio" by either Ernie White, G3LAD or Bill Andrews, GW2DHM. Details 0446 773212.

### SUFFOLK

Felixstowe DARS - 6, talk "The Novice Licence" by a speaker from RSGB; 19, DF hunt and barbecue; Sept 3, night on the air; 12, 3-way quiz challenge vs Norwich and Leiston clubs at The Norfolk Dumpling, Norwich (provisional). Details 0473 642595 (daytime).

### SURREY

Dorking & DARS - 14, informal - Falkland Arms; 28, informal - King's Arms, Ockley; Sept 11, informal - Falkland Arms.
Reigate ATS - 21; talk "DTI Radio Technology Labs" by John Mellish, G4HUK and Steve Jones, G0FMZ. Details 0737 771579.

### TAYSIDE

Dundee ARC - 14, visitation British Telecom Exchange, Willison Street, Dundee - 7pm; Sept 6, visitation Tayside Police Radio Workshops, Baluniefield Road, Dundee - 7.30pm.

### WARWICKSHIRE

Mid Warwickshire ARS - 14, families' evening get-together; Sept 11, talk & demo "Raynet" by Van, G0IZZ.
Rugby ATS - 7, talk "St Kilda Island"; 14, 144MHz Direction Finding Competition, round four; Sept 11, 144MHz Direction Finding Competition, fifth and final round.
Stratford-Upon-Avon RS - Sept 10, introductory meeting.

### WEST GLAMORGAN

Swansea ARS - 16, final preparations for SSB Field Day; Sept 1/2, SSB Field Dat at Upper Killay. Details 0792 818100.

### WEST MIDLANDS

Coventry ARS - 3, night on the air and morse tuition; 10, computer night - bring your own if you can!; 17, outdoor operation evening - Hartshill Haze; 24, quiz, with Neil, G7ASZ; 31, talk "Operation Raleigh I" by John Layton; Sept 7, talk "Operation Raleigh II" by John Layton; 14, 2m DF contest (outdoors). Details 0203 523629.
Midland ARS - 21, junk sale; Sept 18, 18th foxhunt - leave 2pm. Details 021 443 5157.

### WEST SUSSEX

Crawley ARC - ***NEW VENUE*** Hut 18, Tilgate Forest Recreation Centre, Tilgate Park, Crawley. Details from David Hill, G4IQM, QTHR, tel: 0293 882641.

### WEST YORKSHIRE

Halifax & DARS - 21, talk "Propagation" by Charlie, G2FKZ; Sept 18, Annual General Meeting.
Keighley ARS - ***NEW VENUE*** The Ingrow Cricket Club, near Hainworth Village, Keighley every **THURSDAY**. 14, night on the air G0KRS; 28, talk "Home Brew the Right Way" by G4YDI; Sept 18, planning meeting Spec. Event. Details Bradford 496222.
Northern Heights AR&ES - 1, visit to Emley Moor - meet at Emley Moor at 8pm; 15, DF foxHunt; Sept 5, talk "How Do Aircraft Navigate" by Andy Rackham.
wTodmorden & DARS - Sept 3, talk "Antique Radios" by Jim Fish, G5MH.

### WILTSHIRE

Blackmore Vale ARS - ***NEW SECRETARY*** A. Rowlandson, G3WRV, 1, Little Bridge, Stoke Trister, Wincanton, Somerset, BA9 9PP. 14, junk sale; 28, equipment operating evening; Sept 11, homebrew contest, judged by Steve Hawkins, G1ZTO. Details 0935 442319 (working hours).
Trowbridge & DARC - 1, talk "Auroral Prediction"; 15, social at TA Club, Towbridge. Details from G0GRI, tel: 0380 830383.

# MOBILE RALLIES

This is a list of all rallies, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Rally News - DIARY'.

### 5 AUGUST

Woburn Rally - Woburn. Details from RSGB HQ.

### 12 AUGUST

Derby Mobile Rally - Lower Bemrose School, St. Alban's Road,(just off the A5111 Derby Ring Road), Derby. Gates open at 10.30am. All the usual attractions including the famous giant junk sale.Details from Kevin Jones, G4FPY, 20 Pinecroft Court, Oakwood, Derby DE2 2LL. Tel: 0332 669157.
Flight Refuelling Hamfest - Flight Refuelling Sports Grounds, Wimborne, Dorset. Opens 10 a.m. Free parking and overnight camping on the Saturday night by prior arrangement. Radio and Electronics trade stands. Craft and Gift Fair. Bring & Buy. Vintage Wireless Exhibition and full family entertainment. Talk-in on VHF S22. Details from John, G0API, tel: 0202 691649 or Rob, G6DUN, tel: 0202 479038.

### 19 AUGUST

Royal Forest of Dean, Glos, Speech House Rally. All the usual Rally stalls plus picnic and parking. Details from Terry, G4HZT QTHR, tel: 0594 33334 (mid evenings).
West Manchester RC Red Rose Summer Rally - Bolton Sports & Exhibition Centre, Silverwell Street, Bolton. Opens 11 a.m., 10.30 for disabled visitors. All usual trade stands. Large bring & buy. Snacks and meals, plus bar extension. Venue is all at pavement level, with toilet facilities for disabled visitors. Admission 50p, children free. Details from Dave, G1IOO, tel: 0204 24104 (evenings only).

### 26 AUGUST

Galashiels and DARS. Open Day - Focus Centre, Livingstone Place, Galashiels. Trade stands. Bring & Buy. Catering. All the usual activities. Talk-in on S22. Details from John Campbell, GM0AMB, 9 Brunton Park, Bowden, Melrose. Tel: 0835 22686.
Torbay ARS Mobile Rally - STC Social Club, Brixham Road, Paignton, Devon. Details G3HTX QTHR.

### 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, G3DWQ, tel: 0772 53810.
Telford Radio Rally & Exhibition - Telford Exhibition Centre, Telford, Shropshire. Details from G3UKV, QTHR, tel: 0952 255416.

### 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

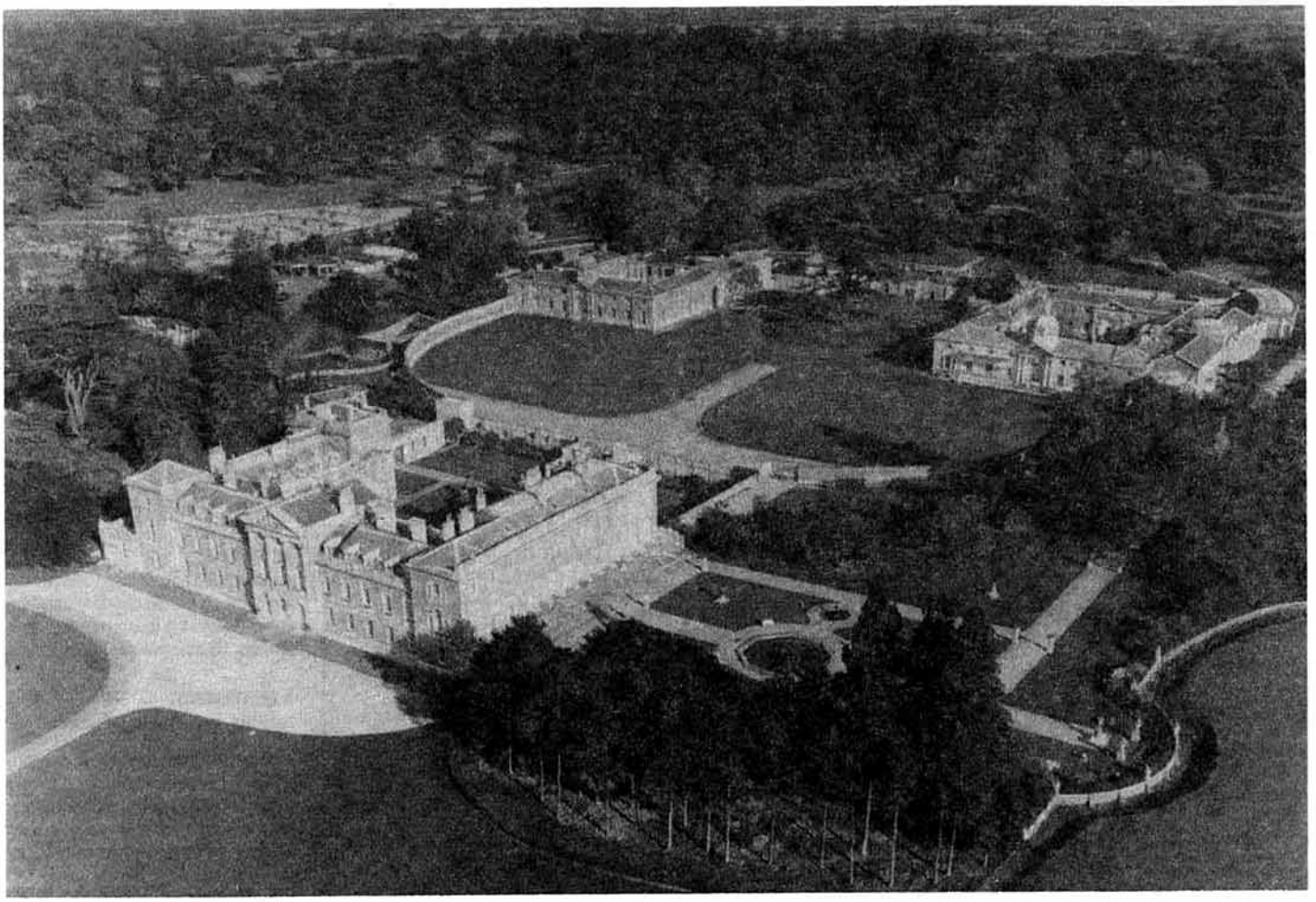
Bristol Radio Rally - Brunel's Great Train Shed, Temple Meads Station, Bristol. Doors

***continued on page 74***

# RSGB NATIONAL MOBILE RALLY

## SUNDAY 5 AUGUST 1990 OPEN 10AM

## WOBURN ABBEY BEDFORDSHIRE (COACH PARK SITE)



**• LARGE TRADE EXHIBITION (20,000 SQ FT) • RSGB BOOKSTALL AND ENQUIRIES STAND • MEMBERS' MART • RAYNET STAND • BARTG STAND (all under cover)**

Members' Mart this year will be charged at £3 per hour per table, which will enable members to sell direct. Tables will be offered on a first-come first-served basis.

A limited number of outside tables are also available — advance booking only (Martin G3SZJ, QTHR).

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

Limited overnight caravan stay at £3.75 per night. Booking forms available from Norman Miller, G3MVV.

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

### HOW TO GET TO THE WOBURN RALLY

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

Avoid routes signposted to "The Wild Animal Kingdom" or "Game Reserve". The rally takes place in Woburn Park and correct routes are signposted to "Woburn Park" or "The Abbey". Also watch for RSGB signs. Usual talk-in facilities will be in operation by Dunstable Downs RC on 144 and 432MHz.

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

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*Continued from page 72*

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. Greath 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 stnads. 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.

### 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 Cenbtre, 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.

### 9 DECEMBER
▶Verulam Christmas Rally - Hatfield Polytechnic. 11am - 5pm. Details from Steve, tel: 0923 249456.

### 20 JANUARY 1991
▶Oldham ARC Rally - Queen Elizabeth Hall, Civic Centre, Oldham. Details from Kathy, G4ZEP, tel: 061 624 7354.

### 27 JANUARY 1991
▶University of Lancaster ARS & Central Lancs ARC. The Lancastrian Rally - Lancaster University. Details from Sue Griffin, G10HH, 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).

### 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.

### 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 87 1086.
▶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 all special event stations licensed for operation during this month and up to 7 September. It was taken from the HQ computer on 10 July. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

### 1 AUGUST

| | | |
|---|---|---|
| ▶GB0CDN | COASTAL DEFENCE NEEDLES | G3RJK |
| ▶GB1CDB | COASTAL DEFENCE 'B' | G6MWY |
| ▶GB1CDN | COASTAL DEFENCE 'N' | G0JBU |
| ▶GB1MAD | MONTGOMERY ACTIVITY DAY | G1MAB |
| ▶GB2LBD | LES BACORES DX | G0KJV |
| ▶GB2SCA | SOUTH CERNEY ANGLERS | G0HZQ |
| ▶GB4MAD | MONTGOMERY ACTIVITY DAY | G4ZAU |
| ▶GB4MCS | METHERINGHAM CLUB SCOUTS | G4MUY |
| ▶GB6CDW | COASTAL DEFENCE 'W' | G6MWY |
| ▶GB6RRP | RED ROSE PLATINUM | G1EHY |
| ▶GB6SS | SANDWELL SHOW | G0JAA |

### 2 AUGUST

| | | |
|---|---|---|
| ▶GB4TCF | TOWN & COUNTRY FESTIVAL | G4VCX |

### 3 AUGUST

| | | |
|---|---|---|
| ▶GB1KJ | KERNOW JAMBOREE | G6FBK |
| ▶GB2VGG | ORIGINAL CLUB CALLSIGN | G4IVJ |
| ▶GB4SGJ | SCOUT GUIDE JAMBOREE | GOFHT |
| ▶GB50BOB | BATTLE OF BRITAIN | G0JOD |

### 4 AUGUST

| | | |
|---|---|---|
| ▶GB1CIJ | CAMBS.INTERNATIONAL JAMBOREE | G8XSO |
| ▶GB4DTS | DUDLEY TOWN SHOW | G4DAR |

### 8 AUGUST

| | | |
|---|---|---|
| ▶GB0CCE | CULTURAL CAPITAL OF EUROPE | GM4FDM |
| ▶GB2ER | ELIZABETH REGINA | G4TIX |

### 10 AUGUST

| | | |
|---|---|---|
| ▶GB2YFT | YEOVIL FESTIVAL TRANSPORT | G0LNI |

### 11 AUGUST

| | | |
|---|---|---|
| ▶GB4BIF | BILLINGHAM INT FOLK FESTIVAL | G4GGP |
| ▶GB2IRC | IPSWICH RADIO CLUB | G4IFF |
| ▶GB2JAN | JANUS '90 | G4YGU |
| ▶GB2NHR | NORTON HILL RAILWAY | G4DCJ |
| ▶GB2XS | X-RAY SIERRA SQUARE | GW4VVX |
| ▶GB8CA | CULTURAL STATION 'A' | GM0HRT |

### 12 AUGUST

| | | |
|---|---|---|
| ▶GB4WCF | WOLVERLEY CHURCH FETE | G0MJY |
| ▶GB50BOB | BATTLE OF BRITAIN | G0BDG |
| ▶GB8CP | CULTURAL STATION 'F' | GM0KTO |

### 14 AUGUST

| | | |
|---|---|---|
| ▶GB2WBC | WORLD BOWLS CHAMPIONSHIPS | G0FRL |

### 15 AUGUST

| | | |
|---|---|---|
| ▶GB0VJD | VICTORY JAPAN DAY | G3LP |

### 17 AUGUST

| | | |
|---|---|---|
| ▶GB2DTG | DARWEN TOWN GALA | G2AKK |
| ▶GB2KHC | 2ND KIRK HALLAM CARNIVAL | G0KUZ |
| ▶GB2RB | ROBERT BURNS | GM2BUD |

### 18 AUGUST

| | | |
|---|---|---|
| ▶GB0EHA | EWELL HORTICULTURAL ASSOC. | G4YBU |
| ▶GB0LCS | LAIRG CROFTERS SHOW | GW4VVX |
| ▶GB2TS | TOLLERTON SHOW | G3WVO |
| ▶GB5GB | 5GB ORIGINAL C/S DAVENTRY RT | G4SFB |
| ▶GB5XX | 5XX EXPERIMENTER C/S DAVENTRY | G4SFB |

### 19 AUGUST

| | | |
|---|---|---|
| ▶GB4FOD | FOREST OF DEAN | G4NIF |
| ▶GB5SM | STAMFORD MERCURY | G3HEE |

### 20 AUGUST

| | | |
|---|---|---|
| ▶GB2FSW | FAKENHAM SPLASH WEEK | G4DCJ |
| ▶GB4GCB | GUYLL CHURCH BARNOLDSWICK | G4GOZ |

### 25 AUGUST

| | | |
|---|---|---|
| ▶GB0CDG | COASTAL DEFENCE 'G' | G0DHZ |
| ▶GB0WNF | WEYMOUTH NOTHE FORT | G4FJO |
| ▶GB2SOF | STRETTON ON FOSSE | G0CXJ |

### 26 AUGUST

| | | |
|---|---|---|
| ▶GB2EAS | EPWORTH AGRICULTURAL SHOW | G4GZB |
| ▶GB5TP | TRENT PARK | G0JUZ |

### 27 AUGUST

| | | |
|---|---|---|
| ▶GB2RVF | RUSKINGTON VILLAGE FETE | G3RGO |

### 31 AUGUST

| | | |
|---|---|---|
| ▶GB0WFS | WELLOW FLOWER SHOW | G0LIB |
| ▶GB1WDR | WEST DURHAM RAYNET | G4WUI |
| ▶GB4WDR | WEST DURHAM RAYNET | G4WUI |
| ▶GB6BD | BLACK AND DECKERS | G4WUI |

### 1 SEPTEMBER

| | | |
|---|---|---|
| ▶GB2GAF | GLOUCESTER AIR FORCE | G3MA |
| ▶GB2RRP | RED ROSE PLATINUM | G4NRN |
| ▶GB2SSK | 25YRS.ST.KENELM'S | G4XOM |
| ▶GB4TRG | TELFORD RALLY GROUP | G0JCN |
| ▶GB50BOB | BATTLE OF BRITAIN | G0KUC |
| ▶GB6CDQ | COASTAL DEFENCE 'Q' | G6MWY |

### 2 SEPTEMBER

| | | |
|---|---|---|
| ▶GB4TDY | TAXI DRIVER OF THE YEAR | G4KAB |

**Rowan Griffin, G0KLH, (left) being presented with the G6NB Trophy by Billi Biltcliffe, G6NB, for winning the Aylesbury Vale RS home construction contest with his magnetic loop antenna and remote control tuning system.**

# the last...

## POOR SPOTS

Have I just got a lousy set up, or does the sun-spot maximum count as perhaps the greatest non-event of 1990?

*Fred Ness GD3ESV*

## NON-US

I write in response to you letter from G6UDX about americanisms (June). Mr Oldford might have taken his argument a little further. Even in the US, the RS-232 serial interface is now more properly called EIA-232 (EIA is Electrical Engineering Association). But in any case, the Americans should -- like those of us in Europe -- be using the CCITT's V.24 designation: the CCITT is a part of the United States Nations organisation, and its writ runs more or less worldwide.

My impression is that most manufacturers over here now prefer V.24, thanks to 1992 and frantic standards-making activity; but getting amateurs to do the same will probably be about as hard as persuading computer folk to write "disc" without using a k.

*Richard Lambley G8LAM,*
*Editor Mobile and Cellular Magazine.*

## NO RADCOM . . .

I wholeheartedly agree with GM4BAE (*Last Word*, July) about selective membership. I know of at least 20 people who would be members of the RSGB but cannot afford £25, and do not want *RadCom* anyway. This is echoed in the Telford Club when looking for operators for RSGB contests - willing hands but cannot help. So you are actively killing contests off. Come on RSGB; listen to members and get in the real world.

*A English G1OAP*

*[To follow that argument to its logical conclusion, Mr English, will we need lower subs for those not using the QSL Bureau, or those not using 50MHz, or those who never ring us up? In the real world, bills still have to be paid. I wonder if other members would agree to an increase to compensate for those unwilling to pay a sub which is still under 50p a week? - Ed]*

## . . . OR BUREAU ONLY

GM4BAE has a point with which I agree, though not for his reasons exactly.

Some time ago, I resigned from the RSGB over an important issue. More recently, I found direct QSLing to be impractible in some cases, and I had to rejoin. So long as the service was provided on a voluntary basis by G3DRN (to whom utmost good wishes) it seemed fair enough that I should also be a full member. But since the Bureau is now a monopoly service provided by the office of a body which I could otherwise dispense with, and with which I am quite out of sympathy, it would seem fairer that the Bureau should be a commercial service available to all.

Of course that will not happen, because I bet there are too many more "captive" members.

*Alex L Dick GM0IRZ*

*[For the record, the QSL Bureau was a full time job and Ted Allen and his wife were paid employees of the Society. Only the location of the Bureau has changed, not its basis; it is staffed by employees and volunteers. Do other members feel the Bureau should be commercially available to non-members? RSGB policy decisions are taken by the elected Council so any members with strong views concerning either of the above letters should contact their Zonal Council Member - Ed]*

## QUANTITY OR QUALITY

Mr Kirk, G3JDK, makes some rather scathing remarks in July's *RadCom* on the lack of discipline in amateur radio today. I also condemn the anti-social actions of some amateurs but feel, like soccer louts, these people are in the minority.

The multi-choice RAE exam is just as high a standard as the old written exam, as it covers the whole range of the subject on one paper. The morse test in the hands of the RSGB is also run strictly to the letter. I doubt if many would take the trouble to go to these lengths and then deliberately embark on such activities as described by Mr Kirk.

If our hobby is to survive, surely we need to encourage more members. As for quantity taking over from quality, our licence states that the station is used in the self training of the licensee in radio communication. Quality is not acquired overnight.

*J Eborall G0JUQ*
*Chairman Stratford-upon-Avon ARS*

## MAGNETIC LOOP MOTOR

The article by I1ARZ in *RadCom* February 1989 mentioned the availability of a suitable geared DC motor manufactured by Buhler of W.Germany. However, the address given for the UK agents is not quite correct. It should be: Crailcrest Electrical Products, 3 Franklyn Suite, The Priory, Haywards Heath, W.Sussex, RH16 3LS. It should be noted that the model of motor quoted in the article, coded 1.61.013.310.6 is the only model available in small quantities. However, the company is willing to supply single units price £20.80 inc VAT and postage. The motor gives a turning speed of 1.3 turns per minute at 6V and 0.5T/M at 3V; it is reversible by changing the supply polarity and is equipped with interference suppression.

*E Allen G3JHP.*

## CW FOR THE DEAF

Re:G7EPT's letter (*Last Word*, June). With the growing use of computers in the Radio hobby it is now possible for even the severely hearing impaired to stay on the air (C.W. RTTY etc). How then can a B licence holder, who can only use the above form of communication, gain an A licence. As we all know the most important part of reading C.W. is being able to hear it!

Until a few years ago this situation would not have existed, but with the aid of the computer it is now something that an answer must be found for. Other disabled groups are looked after, why not the deaf? The Blind are given a spoken R.A.E exam so why not a written test, instead of C.W. for the hearing impaired?

*Iain W Tidey G1AML*

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.

## SHORT SKIP QRM

Following the editorial (*RadCom* April '90) on bad operating and some anti-contest feelings, I must draw attention to the problems of operating on a crowded band, namely 40 metres when short-skip conditions apply.

It appears some stations on asking "is this frequency in use?" do not listen and observe their S-meters carefully.

On 12 May, I heard Distillery Event station GB0OBD (N.Ireland) on 7070KHz close down on that frequency due to interference, which was caused by a net descending on 7071.5KHz, and a station calling CQ on 7069KHz. Both had asked if the frequency channel was clear - and QSOs then began.

Careful monitoring would indicate their calls be made on say 7073 and 7067kHz respectively. A station on 7069kHz enquired of the other "were the Distillery Stations were on the band?" !.

Remember, Amateur Radio is a hobby and a number of options are available - patience, start early. change band. change mode, close down

*M Darkin G3KTH*

## POETIC LICENCE

I'm sending the enclosed short poem, sent to me by my brother-in-law, who like myself is trying hard to pass the RAE examination. He has difficulty in reading the study book for any period of time, owing to poor eyesight, and to help him, his sister, Mrs Mary Potts, has been reading the books onto tapes for him.

When Mrs Potts had finished the task, she composed the following short poem, which I thought you might be interested in publishing in *Radio Communication*.

### TO A WOULD BE HAM

I have come to the end of reading
this book,
God only knows how long it took.
Circuits and sockets, harmonics and
amps,
I think its given me some vocal
cramps.
After all this knowledge has passed
through my head,
My poor old brain is feeling quite
dead.
So do your best Jim, when the exam
time comes,
And cross my fingers and stick up
my thumbs.
So learn all your sums and get them
all right,
Swot up the rules, and put up a good
fight.
The best of luck to pass the exam,
And then you will be a fully fledged
Radio Ham.

*KV Evans. RS93072*



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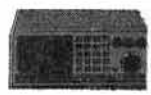

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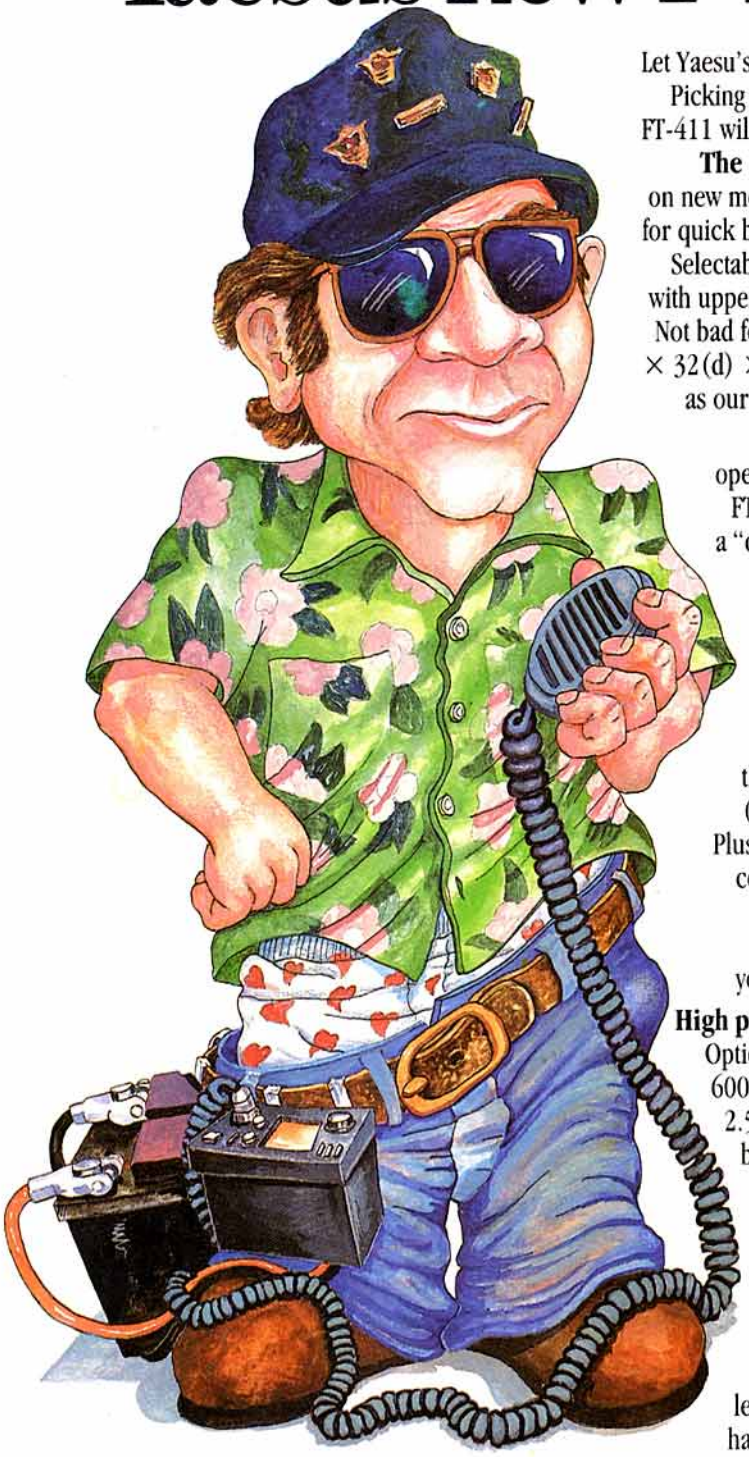

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