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5th World Telecommunication Exhibition
Geneva 20-27 October 1987

Journal of the Radio Society of Great Britain



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Exhibition is being supported in many
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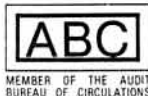
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£215

Prices include NiCad, charger & VAT

£252

two great handhelds from KENWOOD.

Without a doubt the two new 2 metre FM hand-helds from KENWOOD now represent the best value for money in amateur radio equipment today.

For the amateur who wants a simple high quality transceiver from a reputable manufacturer at a rock bottom price but still wants high output power for shack use, the TH205E is the answer. And for the operator who is prepared to pay a little more to gain additional features, the TH215E is the obvious choice. As well as the new rigs for 2 metres, KENWOOD have produced 70 centimetre versions, these are the TH405E and TH415E.

	TH205E	TH215E
Frequency range	144 to 146 MHz for both receivers	
Power output	Depending on operating voltage up to 5 watts (with standard PB2 battery pack 2.5 watts)	
Operating voltage	Battery terminal 6.3 to 15 volts DC Top panel jack 7.2 to 16 volts DC	
Memory channels	3 with quick recall	10 with quick recall
Frequency stepping	5 kHz	5, 10, 15, 20 or 25 kHz
Battery saver	Built-in battery saver extends operating life	
Scan	Simple band scan	Band, memory and programmable scan
Size	67(2.64) W x 173(6.81) H x 37(1.46) D mm (in.)	
Weight	520 g (1.15 lb) with PB2 and aerial	



high power, dual band TW4100E

Using the latest in technology, the designers of the TW4100E dual band FM mobile transceiver have achieved increased performance and, at the same time, made operation even easier. The operator can pre-set the transceiver according to the band plan and his preferences. Options available are shift (+, - or duplex), frequency stepping (5, 10, 12.5, 20, 25 or 50 kHz) and repeater shift (600 KHz, 1.6, 5, and 7.6 MHz).

With the KENWOOD TW4100E, not only do you have the normal simplex and repeater modes but crossband duplex as well. If you work another amateur who can also simultaneously transmit on one band and listen on the other, and many stations do have this facility, then a telephone style conversation is possible. Anyone who has not experienced duplex operating will soon come to prefer the natural conversation style that is possible.

With the high level of traffic on today's roads, it is essential that a mobile transceiver is easy to operate. KENWOOD engineers have simplified the rig's operation by providing ten memories, each of

which will hold information on frequency, simplex or repeater operation and whether or not the tone burst is on or off. By pushing a single button all this information can be transferred to the VFO. Of course the original information is still held in memory for future use. You therefore have ten independent VFOs. KENWOOD's attention to detail is shown by the following additional facility. If having transferred a repeater frequency to the VFO, you move onto an adjacent simplex channel, you can, by the push of two buttons, cancel the tone burst and reset the shift from repeater to simplex. Of course, two more presses of the same buttons restore the facilities.

Linear amplifiers are not needed with the KENWOOD TW4100E! Power output from the transceiver is 45 watts on two metres and 35 watts on seventy centimetres, more than enough to cope with difficult terrain.

The TW4100E has another facility not mentioned in the handbook. Not mentioned because unless you are a RAYNET member on an approved

operation or engaged on a real emergency, to use the equipment in such a way is outside the compass of the licence as we presently know it.

The facility is that the TW4100E will act as a private crossband repeater. This means that you can park your car in a decent location and wander off into an RF black spot. Armed with a small low power handheld, you can talk back to the TW4100E which, since you left it, has been constantly checking the two pre-set crossband frequencies. Your transmission is received and simultaneously transmitted by the TW4100E on the other band. When a station replies, the message is again simultaneously retransmitted to you. Of course you need to have another amateur in your car to oversee the operation and it must be a recognised RAYNET use. In repeater mode the KENWOOD TW4100E has automatic time-out after approximately three minutes.

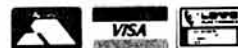
The TW4100E has provision for DCL (digital channel link) and DCS (digital code squelch) when the optional MU1 board is fitted.

TW4100E ... £699.00 inc vat, carriage £7.00.

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Chesterfield Road, Matlock, Derbyshire DE4 5LE

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the KENWOOD **TS530SP** HF transceiver, a sensible rig.

The **TRIO TS530SP HF transceiver** is similar to the TS830S in that it also uses a pair of 6146B valves in its PA stage. The transceiver has been designed for the amateur who has no need for the additional facilities that are part of the TS830S but who still requires a high level of performance from his equipment.

The **TRIO TS530SP** covers the amateur bands from 160 through to 10 metres. Modes of operation are USB, LSB and CW.

Operating from 240 volts AC the transceiver has its own internal power supply.

IF shift is built into the **TS530SP** to allow the IF passband to be moved around the received signal and away from interfering signals and sideband splatter. Even greater selectivity is achieved when an optional YK88SN (1.8 kHz), YK88C (500 Hz) or YK88CN (270 Hz) filter is installed.

A tuneable notch filter is built into the audio circuit of the **TS530SP**.

The speech processor in the **TS530SP** combines an audio compression amplifier with a change of ALC time constant for extra audio punch and increased average SSB output.

To cope with pulse type noise (such as ignition), the transceiver has a noise blanker.

Both **RIT** and **XIT** (receiver as well as transmitter incremental tuning) are included to aid operating, XIT being a distinct advantage when calling a station that is listening "off frequency".

TS530SP HF transceiver £927.51 inc vat, carriage £7.00.

TS830S (Big brother) £1098.00 inc vat, carriage £7.00.

**TS530SP - PRICE REDUCED TO £748
SAVE £179**

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Send only £1 to cover postage and packing and we will send you, by return, a **FREE** copy of the new full colour **KENWOOD** catalogue which lists the features and specification of every model and accessory currently available. We will also include, **FREE OF CHARGE**, a copy of our general catalogue which, along with items to enhance your operating, contains much useful information. Finally, to cheer you up, we will add the latest edition of our price list.



TS940S ... **Top of the range**, the **TS940S** has every operating feature that the discerning HF operator needs. Amateur bands from 160 to 10 metres plus a general coverage receiver tuning from 150 kHz to 30 MHz. Modes of operation are USB, LSB, CW, AM, FSK and FM. Forty memory channels, each effectively a separate VFO and easy keyboard frequency entry make operation and ownership of the **TRIO TS940S** a pleasure.
TS940S ... £1995.00 inc vat, carriage £7.00.



TS930S ... **Much has been said** and written about the **TS930S** and it now has a place high in the affection of radio amateurs. Modes of operation are USB, LSB, CW, AM and FSK. Providing full coverage of the amateur bands from 160 to 10 metres and including a general coverage receiver tuning from 150 kHz to 30 MHz, the **TRIO TS930S** is the ideal rig for today's crowded bands.
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TS440S ... **A step forward** in compact HF equipment, the **TS440S** covers the amateur bands from 160 to 10 metres and is also a general coverage receiver tuning from 100 kHz to 30 MHz. It has keyboard frequency entry, full and semi break-in on CW, one hundred memories and provision for fitting an internal ATU. Modes of operation are USB, LSB, AM, FM and AFSK.
TS440S ... £1138.81 inc vat, carriage £7.00.



TS430S ... **A compact HF transceiver** ... operation, yet having ... radio comm...
bands from 160 to 10 metres ...
MHz. Modes of one ...
TS430S ...

**TS430S - PRICE REDUCED TO £748
SAVE £226**

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RADIO COMMUNICATION October 1987



1300HC frequency counter.

Small enough to fit into a shirt pocket, the 1300HC frequency counter brings easy and accurate frequency measurement well within everyone's reach.

The 1300HC uses a full 8 digit display, and measures to 1300 MHz, thus being ideal for amateur as well as all mobile radio bands including cellular.

The unit contains its own rechargeable NiCd battery pack which is charged from an external supply. The frequency counter can also be powered from any 9 to 12 volt dc supply, which charges the batteries as well.

The 1300HC has excellent sensitivity, and when used with the optional telescopic whip, easily measures transmitter frequencies of mobile or handheld transceivers, even low powered "bug" devices. When used in conjunction with a simple "dip oscillator", the 1300HC makes checking tuned circuit or aerial resonance an easy task.

The high performance of the 1300HC frequency counter makes it an indispensable tool for every amateur, engineer or technician. Its small size makes it suitable for either shack or "on the move" use.

Specification
 Range 1-300 MHz
 Resolution 100Hz at 2.5 sec. gate
 1 kHz at 250 mS. gate
 Display 8 digit 0.3" LED
 MHz decimal point
 Leading zero blanking
 Gate times Fast 250 mS
 Slow 2.5 S
 Sensitivity (typical) 1-10 MHz .. 10-150 mV rms
 10-1000 MHz .. 3-50 mV rms
 1-1.3 GHz .. 10-150 mV rms
 Accuracy (typical) +1 - 1ppm, + / - 1 count LSD
 Aging 0.1 ppm/month (typical)
 Gate indication Red LED during sampling
 Input connector B.N.C.
 Input power 9-12 Vdc at 150 mA
 Power connector Concentric. Centre positive.
 Case Brushed anodised aluminium
 Size 3.9H x 3.5W x 1D (inches)
 Weight 255 g
 Power supply Internal NiCd pack. (supplied),
 or external dc source (option)
 1300HC Handheld frequency counter
 £135.00 inc vat, carr. £2.00
Options
 PS12 AC mains power supply
 £8.50 inc vat, carr. £2.00
 BNC6 Telescopic whip
 £7.46 inc vat, carr. £0.50
 CC12 Padded carrying case
 £9.90 inc vat, carr. £1.00



packet radio from KANTRONICS

KPC2 ... This KANTRONICS designed AX25 version 2 TNC features a built-in VHF and HF modem, full duplex operation and multiple connect facilities. The serial RS232 port, combined with the enhanced generic command structure allows operation with any computer.

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NS660P

NS448

CN460M

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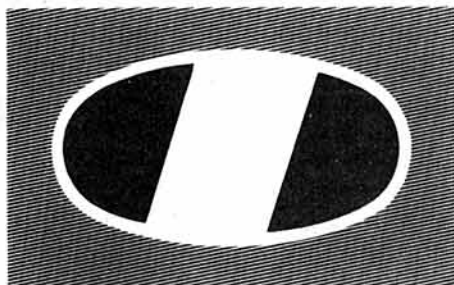
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ICOM UK Ltd
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17 July 1987

We would both just like to thank you very much for the fantastic support that you have given us throughout the course of our trans-atlantic project.

It was only with the help of people such as yourself that the project turned out to be such a huge success.

Once again many many thanks for all your help with our Trans-atlantic Balloon project.

Best Wishes

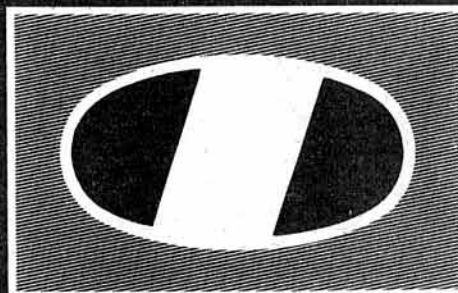

RICHARD BRANSON


PER LINDSTRAND

Virgin Atlantic Flyer
First hot-air balloon crossing of the Atlantic

From Sugarloaf, USA, 08.10 GMT 2nd July, 1987
to Linnahady, Northern Ireland, 15.51 GMT 3rd July, 1987
3075 statute miles (4947 kms) in 31 hours and 41 minutes.

Yes, ICOM radio communication equipment was literally on top of the world early in July this year as part of Richard Branson and Per Lindstrand's record-breaking trans-atlantic hot-air balloon crossing. Shown here is the letter from the Virgin Atlantic Flyer's crew thanking ICOM (UK) for their generous support.



ICOM

ON TOP OF THE WORLD

Yet again Virgin chose to use ICOM radio communication equipment for the Atlantic Flyer's balloon crossing after successful operation on the previous years' powerboat Blue Riband attempts.

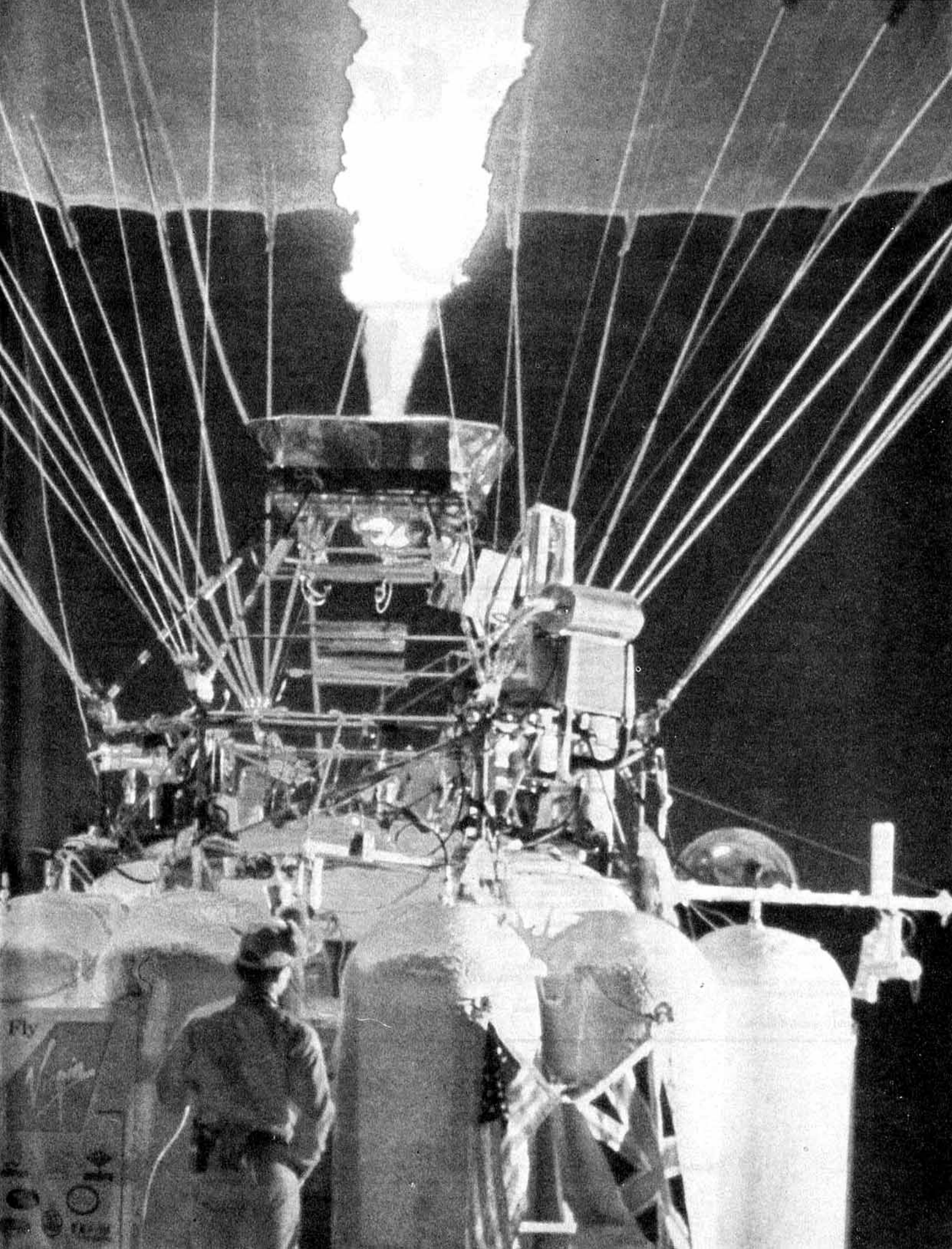
Firstly the most suitable rigs had to be chosen from the extensive ICOM range and then installed in the confines of the Virgin balloon capsule. A receiving station at the GPO tower in London was set up to monitor calls and plot the balloon's progress. When the big day came it was a huge relief after the weeks of postponement and then suddenly ICOM was 27,000 feet above the world.

Virgin realise that ICOM design and manufacture radio equipment that is efficient, reliable and to the high standard essential in this kind of operation. ICOM equipment is available in base-station, mobile and hand-held formats operating on all Amateur frequencies from HF to microwave.

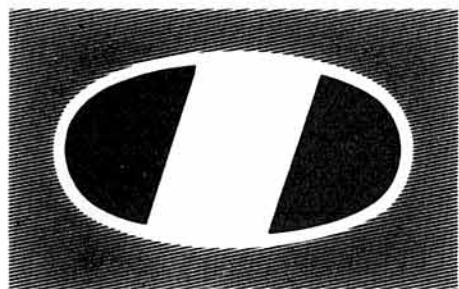
If you are thinking of starting or expanding your station you will find an ICOM model to suit your requirements, if it's good enough for the Virgin Atlantic Flyer you can be sure it's good enough for you. Once again ICOM are proud to have teamed up with Virgin and salute the brave and happily successful new world record.

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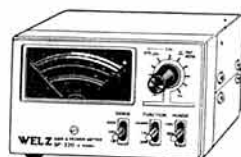
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£22 off list price! whilst stocks last

WELZ-DIAMOND D130 DISCONE 25-1300MHz

The new D130 from Diamond offers complete coverage from 25-1300MHz. No other antenna can offer this value for money! And an added bonus is that it can be used for transmit on all amateur bands between 50 and 1300MHz. (You cannot use 50MHz vertical polarization in the UK). Constructed of stainless steel and alloy, it comes complete with mast clamps and 50ft of coaxial cable

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NEW

FABULOUS SONY AIR-7

108-136MHz; 144-174MHz; 76-108MHz; + LW/MW/SW

The new Sony Air-7 is a superb new monitor with a performance and presentation that outperforms the competition. The PLL circuitry, LCD readout and 40 memories (10 on each band) make a most versatile package. Such features as priority channel, channel lockout, and delay are all included and the sensitivity puts most of the competition to shame! It also includes the broadcast bands both VHF and LW/MW and covers such things as NDB beacons as well as part of the marine band to 2194MHz. We are impressed and so will you be when you try it!



SONY 2001D

150kHz-30MHz
76-108MHz
108-136MHz
32 memories
AM/SSB/FM BROADCAST

New from Sony is the 2001D general coverage portable receiver. It gives superb performance on the short wave bands using PLL circuitry and has separate filters for SSB and AM. A novel system of synchronous exalted-carrier provides a dramatic reduction in interference when receiving AM broadcast stations. Features include LCD readout, clock, scanning, timer, RF gain control, comprehensive memories and a host of features that make it an incredible performer. It equals or betters many base station receivers we sell and the SSB performance with switchable upper and lower sideband is a joy to use.

3 BEST SELLING BOOKS

NEW 1987 EDITION (1.6MHz-30MHz) UK LISTENERS CONFIDENTIAL FREQUENCY LIST

A completely updated version of our famous frequency list that covers everything between 1.6MHz and 30MHz. You won't find better value anywhere! Includes broadcast, marine, press, civil and military aircraft, embassy, naval and army, land based links, space frequencies etc. Full mode details are given eg. AM/USB/RTTY + baud rates/FAX. The marine and aviation section has been considerably expanded with many details supplied by our readers. If you have read our previous issues you will want to get this latest copy! If you have never seen this publication before then you should really invest in a copy. Tremendous value at a bargain price. Order the new 1987 edition today. £5.95 plus 95p p&p

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For the airband enthusiast we have completely rewritten this book into a comprehensive volume of both civil and military frequency allocations in the band 118-400MHz. Every known frequency has been listed from the smallest grass field to the largest airports in the UK. Clearly presented in large format, you will find everything neatly listed and easy to find. We've added full airways listings and company frequencies plus helipads, offshore rigs, air to air and much more. There is also some interesting editorial with hints and tips plus technical information. A very useful desktop reference book that should be on your bookshelf. Look for the full colour front cover of the Red Arrows! Send today and get your copy of this handy reference manual. £5.95 plus 95p p&p

COMPLETE GUIDE TO VHF/UHF FREQUENCIES 26-2250 MHz

This book was written at the request of the many enthusiasts who wanted more details about frequency allocations in the VHF/UHF part of the radio spectrum. Over 4000 copies sold in 4 months has to be a recommendation in itself! From 26 to 2250MHz, every service is listed with simplex and duplex splits, all in frequency order. It covers all the main user services in the UK including PMR, BT telephones, Fire, Ambulance, Police, Amateur, Aviation, Space etc. Readers should be aware that many of these frequencies cannot be legally monitored in the UK. Don't waste money on those expensive American listings, this one has been written in the UK for the UK user. Put a copy on your bookshelf today! £4.95 plus 70p p&p

JUST PUBLISHED

THE SECRET OF LEARNING MORSE CODE BY MARK FRANCIS

A brand new book covering a subject that causes many people problems. The author, Mark Francis, breathes new life into the subject and provides fresh hope for all those that are having difficulties with Morse or thought the code was beyond them. This book has been long overdue. It treats the subject of learning the code in a simple, but comprehensive manner. The recommended methods ensure that anyone can learn Morse code in the minimum of time. The title is well chosen and really does explode some of the pitfalls and myths surrounding the learning of Morse. The book forms a complete course with many practice passages for both sending and receiving. It also goes beyond the initial learning stages and takes you through your first QSO's, covering abbreviations, procedures etc. Running to almost 100 pages with plenty of illustrations, this book looks set to fill a big gap in the market.

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LOOK AT THIS "POUND CRUSHING" BARGAIN!

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25 WATTS

£269 FREE DELIVERY
ALINCO ALR-22E



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WELZ AC200 ATU



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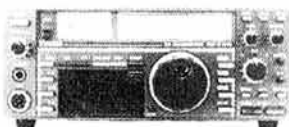
This new ATU from Welz forms the basis of a complete matching system for the HF bands. It will handle up to 200W PEP and will match any coax fed antenna in the bands 80 to 10m. True RF power measurement is possible together with VSWR and the unit may be instantly switched out of circuit. Until the end of April we are also offering a free coaxial switch so that you may permanently connect two antenna systems to the unit. That's value!



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FT767GX MK2/RWC

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FRG 9600

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NEW PRODUCTS

INTERNATIONAL MODEL 877R AIR-BAND RECEIVERS

This new tuneable receiver covers 52-174 Mhz as well as CB in three bands and is a cost-effective alternative to handheld scanners. The receiver is fitted with a Helical antenna and has good performance for a radio with this coverage. It is ideal for monitoring Air Band, the two metre and PMR/Marine bands as well as Band 2 FM Broadcast. A squelch control is also provided. Two versions are currently available.

Model 877R for use with Dry cells £39.50
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DEALERS CALL FOR TRADE PRICES P&P £2.50



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ANTENNAS & ACCESSORIES

ICOM AH7000 SUPER DISCONE 25-1300MHz INC POST £79.00
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 GSRV 1/2 SIZE HF MULTIBAND HE ANTENNA (INC POST) £15.00
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MOD KITS

RWC MOD KITS, ANNOUNCEMENT

We apologize to customers waiting for various mod kits, supplies of crystals and components are inconsistent and demand for kits varies, so there is occasionally a delay before we can send your kit of parts, please be patient. Rome was NOT built in a DAY! Kits still available:
 SANYO LC7137 SYNTHESIZER CB-10MTRS, LCL/DNT CB-10MTRS, FT75/GX MK1 FAST TUNING MOD, STORNO COM713 PMR-2MTR KIT, PYE A200 E-BAND 50MHz KIT, call for technical details, prices and delivery.

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The world's *only* 6 mode intelligent Terminal Unit. Gives excellent performance on PACKET, AMTOR, RTTY, ASCII, CW and FACSIMILE. Transmit, Receive on all modes with tuning indicator and modem circuitry which automatically configures itself for the mode in use. Facsimile printer cable included. Our latest terminal software for the IBM-PC to operate the PK-232 has to be seen to be believed. FAX upgrade kit available for early model PK-232's. Price: £269.95 p&p £4.00



PK-87
£169.50 p&p £3.50

Whilst many manufacturers continue to sell clones of the TNC2, A.E.A. has improved on the TNC2 program with several new software features. The Host mode of the new PK-87 Packet Controller can be utilized to improve terminal program operation. Four new commands in the PK-87 allow you to restrict the use of your station for both connects and as a digipeater. The Mailbox monitoring command allows monitoring without displaying the call sign headers. While the PK-87 can be used for HF operation, AEA recommends the optional PM-1 packet modem for low band use. In addition to standard Data Carrier Detect, Push to talk, Status, and Connect indicators, the PK-87 has front panel LEDs for operational mode (Converse, Transparent, Command) and multiple connects.



PK-90

A commercial specification, wide temperature range packet radio TNC with the following features: 100% Software Controllable, SMR/Trunked radio operation, Remote Control by radio, Encryption, Macro keys, Password Access, Host control language, Modem bypass connector, 2400 radio baud version, Extended temperature range, Protocolless option. Price: £465.25 p&p £3.50



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For superbly detailed weather maps from any SSB receiver. Drives any Epson FX-80 compatible dot matrix printer. Double screened, low noise printer cable now supplied as standard. Switchable RTTY receive capability standard. Mobile mounting bracket standard. Marine installation kit and application note available. Price: £329.95 p&p £3.50

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A TIMELY REMINDER IN A LETTER FROM THE PAST:

From W2JUP, Farmingville, NY
12/11/83-2030EST

There is a lot of misunderstanding regarding any comparisons between AMTOR and PACKET techniques. Here are my thoughts on the subject.

The only factor common to these two RTTY methods is that they both contain inherent error-detection and error-correction. In no way. Are they intended to be compared in terms of any relative merit. They are intended to provide totally different solutions to totally different problems. As follows:

1. AMTOR, derived from the commercial 'SITOR' practice, is designed to get message traffic thru under the worst case conditions, typical of those found on H.F. radio. This is because 'SITOR' was developed by the Netherlands Post and Telegraph administration with Philips Eindhoven, specifically to permit integrating high-seas vessels into the existing international. Telex network on H.F. radio. The international telex network specifies that the error rates in that network may not exceed 3 character errors in 100,000 characters. Thus, the use of the Moore 'ARQ' code, derived from and easily translated to and from the Baudot code, which is mandatory in the telex network. Thus also, the fact that only 32 character combinations can be used, as in any normal Baudot traffic. This way, only usual upper-case letters, normal numerics and standard typewriter-type punctuation are available.
2. In AMTOR/SITOR, the error detection is based on the validation of polarity ratios (mark-to-space) being constant in all the characters handled. The total character-block sequence used in this check may not exceed 3 characters. There is no use of 'Parity' or checksums. The receiving station gets three valid characters and sends the control signal to continue with more. The system will time out at some point, and then if standard, will automatically try to reestablish sync with the distant end. Thus, under worst-case conditions on H.F. the traffic will be moved. Even during the pauses between dots and dashes of an interfering CW signal. If there is any minimum path at all, traffic will be moved. There is some statistical evidence that false characters will be validated, something like 1 character in 80,000, a very small probability.
3. PACKET, on the other hand, is designed to move any form of data in any network environment, and is totally transparent to the data code and data rate employed by the end user. The network system (equipment) is responsible for converting the user data into whatever the network requires.
4. The error detection is based on the use of a general polynomial mathematical expression, which in effect, adds up the ASCII values of each transmitted user data character, together with the values of all of the data characters in the sync (flag) field, the control field, the address field and the entire user data field, and then that acquired value is placed in the frame check sequence field following the user data field. The receiving station's system does the same general polynomial calculation of the same flag, control, address and user data fields, derives the frame-check value, and then compares the values of the received data to the value already in the received frame check sequence field. If they agree, the receiving station sends an 'acknowledge' packet and the sending station continues.
5. PACKET is designed to operate over a standard voice-grade circuit, that is, a circuit equivalent to a voice-quality telephone line, typical of what you have on a reasonable VHF/UHF FM link, or as we can get on 10 metres with good propagation. It is not meant to be used in environments full of noise, selective fading, sideband phase reversals, static, Woodpeckers, etc.
6. The PACKET network sets the maximum number of unacknowledged packets that can fly on the network at the same time. The AX.25 protocol permits a maximum of 15 retries of an unacknowledged packet before issued the "Disconnect" command. Because the receiving station has, in effect, to validate perhaps up to several hundred data characters in the block (packet frames), the pure mathematical probabilities of rejecting the packet frame are an order of magnitude higher than in AMTOR/SITOR. The question of recognition of an erroneous data character is not really a valid question. If the packet frame check sequence is validated, the chances of having a wrong data character inside that frame are beyond my power to calculate at this point.
7. Rather than receipt of a wrong character, I am more concerned with the loss of an entire packet, which can and does happen. If the link times out due to excessive retries, and many new 'reconnects' are needed, the changes are very high that data will be lost. The unacknowledged packets simply vaporize into the great beyond, gone forever.

So, as the PK-232 offers all modes, why not use the one best suited for the purpose. In marginal signal conditions, especially on H.F., that means AMTOR.

Active Antennas



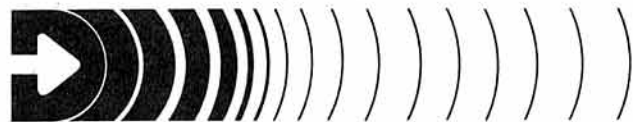
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Insertion Loss: 0.19 dB at 900 Mhz
Connectors: Green Par 'N' Type

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RF Power: 400W P.E.P.

Insertion Loss: 0.15 dB at 144 Mhz

Connectors: SO239

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WITH HARMONIC FILTER

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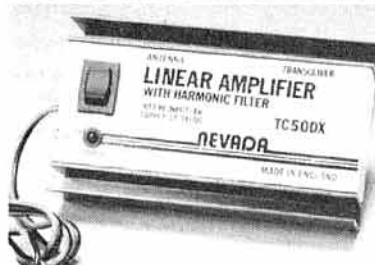
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Freq: 50-52 Mhz

Power Gain: Approx 8dB

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WITH HARMONIC FILTER

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Input Power: 1-4 Watts

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TH205E	2M Handheld Transceiver	215.26	(4.00)
TH215E	2M Handheld with Keypad Entry	252.13	(4.00)
PB1	Nicad Pack 12v 800mAh	37.22	(2.00)
PB2	Nicad Pack 8.4v 500mAh	34.22	(2.00)
PB3	Nicad Pack 7.2v 800mAh	38.82	(2.00)
PB4	Nicad Pack 7.2v 1600mAh	63.19	(2.00)
B75	Dry Battery Case	11.86	(1.50)
BC7	Rapid Charger	97.42	(3.00)
SC12	Case for (PB2 3)	13.82	(1.50)
SC13	Case for (PB1 4)	14.49	(1.50)
PGV2	DC Power Cable for TH205E 215E	3.95	(1.50)
SMC30	Speaker Mic for TH21E 41E 2600 3600E	28.31	(2.00)
HMC1	Headset Unit with VOK for TH21E 41E 2600 3600E	32.81	(2.00)
RA2	Rubber Flexible Antenna for TR2400 2500 2600E	9.87	(1.50)
RA3	Telescopic Whip Antenna for TR2400 2500 2600E	13.17	(1.50)
TM221E	2M FM Mobile Transceiver 45W	317.30	(5.00)
TM212E	70cms FM Mobile Transceiver 35W	352.84	(5.00)
TH405E	70cms Handheld Transceiver	288.09	(4.00)
TH415E	70cms Handheld with Keypad Entry	298.85	(4.00)
TR851E	70cms All Mode Transceiver	699.00	(5.00)
TW4100E	VHF UHF FM Mobile Transceiver	699.00	(5.00)

Yaesu

FT70SR	70cm H Held	319.00	(—)
MMB10	Mobile Bracket FT209 709	10.00	(1.50)
NC9C	Charger	11.50	(1.50)
PA3	Car Adaptor Charger	21.85	(2.00)
MH1B8	Hand 600 8pin mic	21.00	(1.50)
MB1B8	Desk 600 8pin mic	79.00	(3.00)
MF1A28	Boom mobile mic	25.00	(2.00)
MH12A28	Speaker Microphone	27.00	(2.00)
YH77	Lightweight phones	19.99	(2.00)
YH55	Padded phones	19.99	(2.00)
YH51	L weight Mobile II set Boom mic	19.99	(1.50)
YH2	L weight Mobile H set Boom mic	19.99	(1.50)
SB1	PTT Switch Box 208 708	22.00	(1.50)
SB2	PTT Switch Box 290 790	22.00	(1.50)
SB10	PTT Switch Box 270 2700	22.00	(1.50)

NEW

FT737GX2	NEW HF general coverage transceiver	969.00	(5.00)
FT221RH	2M FM mobile transceiver	399.00	(5.00)
FT767GX	HF Gen. Coverage trans. with optional VHF/UHF 6M modules	1550.00	(—)
FE7 767 2	2m module for FT767	169.00	(3.00)
FE7 767 7(B)	70cms module for FT767	215.00	(3.00)
FE7 767 6	6m module for FT767	169.00	(3.00)
FL7000	Solid State linear with built in auto ATU	1000.00	(—)
FT727R	Dual Band handheld transceiver 144-146MHz	425.00	(3.00)
FT290RMK II	2M multimode portable mobile base	429.00	(3.00)
FT23R	2M mini handheld with LCD display 5W	223.50	(2.00)
FT73R	70cms mini handheld with LCD display 5W	243.50	(2.00)
FT690RMK II	6M multimode portable/mobile base transceiver	£399.00	(5.00)

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Trio VC10 VHF converter for R2000 118-174MHz	161.54	(3.00)
Trio R5000 NEW HF general coverage receiver	875.00	(7.00)
Trio VC20 VHF converter for R5000 108-174MHz	167.21	(3.00)
Yaesu FR8800 HF general coverage receiver	639.00	(7.00)
Yaesu FR8800 VHF converter for FR8800 118-175MHz	100.00	(3.00)
Icom R71E HF general coverage receiver	825.00	(7.00)
Icom RC11 remote control unit for ICR71E	62.00	(2.00)
AR2002 VHF/UHF scanner 25-550MHz and 800 1300MHz	487.00	(5.00)
Icom R7000 VHF/UHF scanner, all modes 25-200MHz	957.00	(7.00)
Icom RC12 remote control unit for R7000	62.00	(2.00)
Yaesu FR6900 VHF/UHF scanner 6M 950MHz	509.00	(5.00)
Yaesu P44C Power supply for FR6900	21.00	(2.50)

NEW

Regency MX4200 Portable scanner covers:	328.00	(5.00)
60-89MHz, 118-136MHz, 144-174MHz, 380-495MHz and 800 950MHz		
HF125 HF general coverage receiver 30KHz-30MHz	375.00	(5.00)
(Made in Britain)		
RS32 synthesised airband receiver 110-139 995MHz	224.05	(4.00)
RS37S Air band portable. Tunable 118-136MHz	69.51	(2.50)

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IC761 all mode general coverage transceiver. 32 mems. 100W, including internal ATU and PSU	2459.00	(10.00)
IC751A SSB, CW, FM, AM, RTTY general coverage trans.	1465.00	(10.00)
IC735 HF general coverage transceiver	949.00	(10.00)
IC505 50MHz SSB, CW, FM (optional), portable. 3/10W	459.00	(5.00)
IC Micro 2. 2M FM mini hand portable. 10 mems. LCD. 1W	239.00	(5.00)
ICD2E FM hand portable. Keypad entry. 3W	265.00	(5.00)
IC28E 2M FM mobile. 21 mems. 25W	359.00	(5.00)
IC2900 2M multimode mobile. Scanning. 5 mems. 25W	542.00	(5.00)
IC275E 2M multimode base station. Inc. PSU. 25W	1039.00	(10.00)
IC Micro 4. 70cms FM mini hand portable. 10 mems. LCD. 1.5W	279.00	(5.00)
ICD4E 70cms FM hand portable. Keypad entry. 3W.	299.00	(5.00)
IC48E 70cms FM mobile. 21 mems. 25W	449.00	(5.00)
IC490E 70cms Multimode mobile. Scanning. 5 mems. 10W	617.00	(5.00)
IC3200E 2M/70cms FM mobile. Scanning. 10 mems. 25W	556.00	(5.00)
IC900 Multiband FM transceiver. Requires optional band units	469.00	(5.00)
ICUX19 28MHz band unit. 10W	P.O.A.	
ICUX59 50MHz band unit. 10W	239.00	(5.00)
ICUX29 144MHz band unit. 25W	229.00	(5.00)
ICUX29H 144MHz band unit. 45W	249.00	(5.00)
ICUX49 430MHz band unit. 25W	269.00	(5.00)
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Power Supplies

DRAE	4 amp	48.30	(3.00)
	6 amp	71.55	(3.00)
	12 amp	95.20	(3.00)
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BNOS	6 amp	75.00	(3.00)
	12 amp	125.00	(3.00)
	25 amp	185.00	(4.00)
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Aerial Rotators

DAIWA MR750E	Heavy Duty rotator. Can have up to 4 motors	254.10	(4.00)
KR400	Med H duty	139.95	(3.50)
KR500	6 core Elevation	149.95	(3.50)
KR400RC	5 core Medium Duty	169.95	(3.50)
KR600RC	6 core Heavy Duty	219.00	(3.50)
KC038	Lower mast clamps	17.45	(2.00)
KS065	Rotary Bearing	26.00	(2.50)
AR1002	Lightweight VHF Rotator	52.95	(3.50)

Switches

Sigma	2 way S0239	20.20	(1.75)
Sigma	2 way 'n' Skts	22.95	(1.75)
Welz CH20A	2 way S0239	30.75	(1.75)
Welz CH20N	2 way 'n' Skts	54.00	(1.75)
Drae	3 way S0239	17.00	(1.75)
Drae	3 way 'n' Skts	21.95	(1.75)

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BT1	Squeeze Key. Chrome base	76.95	(2.00)
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HK707	Straight key	22.25	(2.50)
MK704	Squeeze paddle	20.00	(2.50)
MK705	Squeeze paddle on Marble Base	32.20	(3.00)

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(cont.)

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Accessories

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Welz AC200 ATU	3.5MHz to 30MHz. 200W	159.95	(5.00)
Mizuho KX3	SWL ATU	67.30	(4.00)
MICS			
Adonis AM503G	Base mic + speech processor	69.00	(3.00)
Adonis AM303G	Base mic. Up/down scanning	53.00	(3.00)
HSMX2	Mobile mic with up/down scanning	38.80	(3.00)
SWR/POWER METERS			
SP10X VSWR meter	1.8-150MHz. 200W	39.95	(2.50)
SP12Z VSWR meter	1.6-60MHz. 2Kw	79.95	(3.00)
SP220 VSWR meter	1.8-200MHz. 200W	67.95	(3.00)
SP225 VSWR meter	1.8-200MHz. 200W	99.95	(3.00)
SP420 VSWR meter	140-525MHz. 200W	59.95	(3.00)
SP425 VSWR meter	140-525MHz. 150W	119.95	(3.00)
SP620 VSWR meter	1.8-525MHz. 200W	109.95	(3.00)
Kenwood SW100A	VSWR meter. 1.8-150MHz	49.50	(2.50)
Kenwood SW100B	VSWR meter. 140-450MHz	49.50	(2.50)
Kenwood SW200A	VSWR meter/PEP meter. 1.8-150MHz	107.95	(3.00)
Kenwood SW200B	VSWR/PEP meter. 140-450MHz	107.95	(3.00)
Kenwood SW2000	VSWR/PEP meter. 1.8-54MHz. 2kW	117.17	(3.00)
Kenwood SWC1	Optional coupler for SW200/2000	29.62	(2.00)
Kenwood SWC2	Optional coupler for SW200/2000	29.62	(2.00)
Kenwood SWC3	2kW HF coupler for SW2000	34.89	(2.00)
Kenwood SWC4	23cms coupler for SW200A/B and SW2000	46.08	(2.00)
Daiwa CN410M	3.5-150MHz cross needle VSWR meter	61.72	(2.50)
Daiwa CN460M	140-450MHz cross needle VSWR meter	65.40	(2.50)
Daiwa NS660P	1.8-150MHz SWR/PEP/RMS meter	115.00	(3.00)
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2E	2M 3 wave	14.75	(3.00)
320E	2M 3 wave	3.50	(1.50)
430E	2M 3 wave 3.4dB gain	27.75	(3.00)
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70N2DX	High Gain 2M 70cms mobile	37.75	(3.00)
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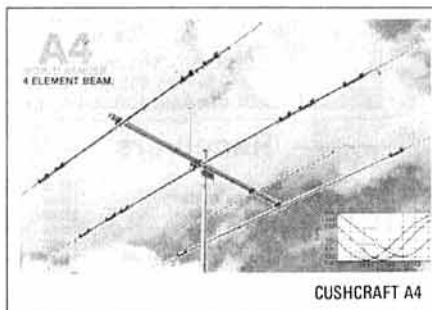
10-3CD	3el 10M	115.04
10-4CD	4el 10M	131.48
15-3CD	3el 15M	139.70
15-4CD	4el 15M	147.92
20-3CD	3el 20M	238.31
20-4CD	4el 20M	328.71
40-2CD	2el 40M	349.95

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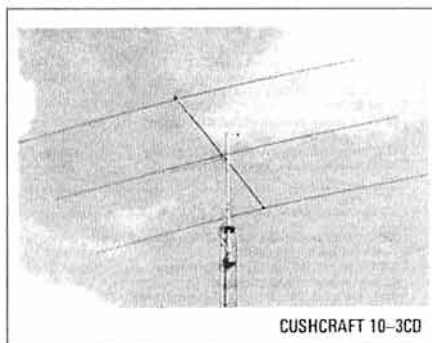
AP8	8 Band 25ft high	164.35
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124WB	4el 2M w/Band Beam	36.98
ARX450B	435-450MHz Vertical	42.73
ARX2B	134-164MHz Vertical	42.95



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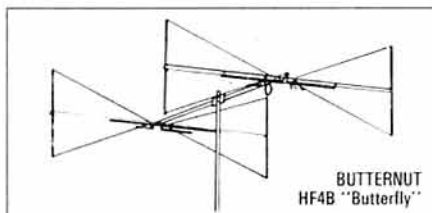
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MFJ901B	200W Versatuner	63.07
MFJ1601B	Random Wire Tuner	42.02
MFJ1701	6-way Antenna Switch 2KW SSB	30.72
MFJ910	Mobile Antenna Matcher	20.42

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MFJ1274	Packet Radio Terminal (with tuning indicator)	203.73
MFJ1224	RTTY/ASC11/AMTOR/CW computer interface Vic 20, TRS80, Apple, CBM 64	111.82
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CODE	MODEL	GAIN	COST inc. VAT	P&P rate
432.5B	5 Ele	9.2dBd	£19.49	B
432-19T/ATV	19 Ele	14.2dBd	£40.94	A
432-17X	17 Ele Crossed	13.4dBd	£56.55	A
432-17T	17 Ele Long	15.0dBd	£45.08	A
2M				
144.5	5 Ele	9.2dBd	£22.48	A
144.7T	7 Ele	10.0dBd	£27.77	A
144.8T	8 Ele Long	11.0dBd	£35.95	A
144.14T	14 Ele	13.0dBd	£53.72	A
144.19T	19 Ele	14.2dBd	£64.26	A
144-6X	6 Ele Crossed	10.2dBd	£45.71	A
144-GP	Ground Plane	Unity	£16.57	B
4M				
70d	3 Ele	7.1dBd	£34.64	C
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CODE	MODEL	GAIN	COST inc. VAT	P&P rate
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50/5	5 Ele	9.2dBd	£59.90	A
CK50	50-2-50/3 Conversion kit		£11.50	B
POWER SPLITTERS				
70cm	2 Way		£23.46	B
	4 Way		£27.60	B
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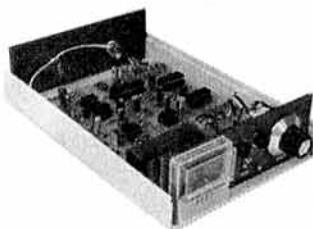
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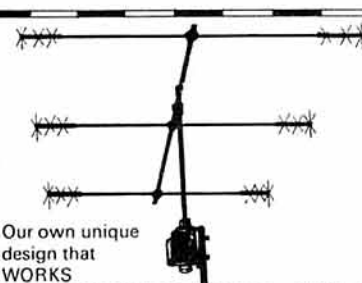
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G4 HCL in HRT
April '87

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Forward Gain dbd	3.8 to 4.8	5.5 to 7.5	7 to 9
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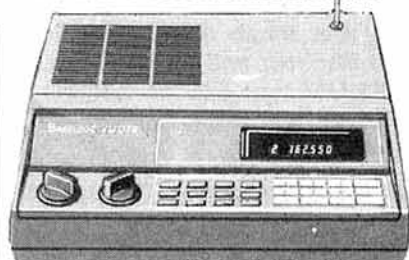
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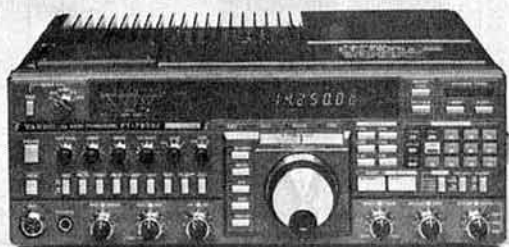
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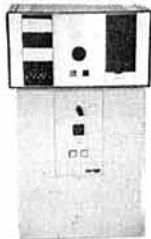
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EVERY CHANNEL IS WORTH MONEY?

EARLIER this year the Department of Trade & Industry published a voluminous report, running to 182 closely-printed pages and several comprehensive appendices, entitled "Deregulation of the radio spectrum in the UK". This report had been commissioned by the DTI and produced on its behalf by Communications Studies & Planning International (CSP International). If you have £9.50 to spare you can purchase a copy from Her Majesty's Stationery Office.

Why was such a report commissioned? The 1983 Merriman Committee had recommended that the DTI commission a feasibility study on the possible benefits from introducing market forces and the price mechanism (to borrow the economists' form of words) into spectrum management. Certainly the present government could be expected to be interested in applying its "market-driven economy" viewpoint to the somewhat delicate and complex area of the radio frequency spectrum.

Amateur radio is, of course, mentioned in the CSP report. Of all the sentences which one might pick out as perhaps exemplifying what could be called the "management consultant" approach, here is one of the better ones: *It is our opinion that the quantity of spectrum set aside for amateur use is larger than economic considerations would dictate, although this judgment is difficult to prove quantitatively.* Well, yes. Probably the quantity of parkland and open space set aside in the UK for the pleasure and recreation of the public is larger than economic considerations would dictate, although this judgment is hardly the point. CSP International seems to display almost no real understanding of the nature and value of amateur radio, quite apart from the fact that a large number of amateur bands are full to the point of overcrowding. The majority of its report is, in our view, long on weighty economic theory (quite a lot of which has been discredited in recent years anyway) and woefully short on technical expertise, insight and general all-round realism.

As a matter of fact, one CSP researcher spent one hour at RSGB Headquarters. Naturally we answered all the questions and presented a very positive case for amateur radio; we do that sort of thing rather well at HQ. Because of the limited time which CSP was prepared to spend on matters relating to the amateur and amateur satellite services, the Society offered to check a draft of that part of its report dealing with those things and correct any errors of fact or gross misunderstandings. It is a matter of record that CSP did not ask for the Society's comments, despite the fact that we asked, in writing, to see the draft prior to publication. Most professional organisations we have come across in recent years have been delighted to enlist our assistance in helping them get their facts straight. CSP's facts could certainly have been a lot straighter, and they seem to have dismissed all the positive advantages of amateur radio which cannot be measured in terms of hard cash.

The main theme of this report seems to be that the radio spectrum should be carved up into small sections and given to various bodies such as spectrum management licensees (smls), frequency planning organisations (fpos), major users and public telecommunications operators (ptos). It appears that any one fpo might manage a slice of spectrum containing a variety of different services; it would be conceivable (although admittedly only as a waking nightmare) that the Society would find itself negotiating with 10 or 20 separate fpos, as opposed to one DTI. For obvious reasons we'd prefer the latter—and can you imagine the horrific cost of such an exercise?

The popular view that "if the economics can be made to work, everything will be all right" may have its place in the City, and we would even agree that it is reasonable that the government should consider carrying this philosophy into spectrum management. However, the real world is an infinitely different place from the neatly compartmentalised and sanitised world dealt with by CSP International. It appears from the response of other organisations that the Society is not alone in finding the CSP report superficial and lacking insight into many aspects of radio spectrum management. Indeed, remarkably little thought—to name one aspect which comes to mind—appears to have been given to such matters as co-ordination between civil and military users of the spectrum. Some of the conclusions about security arrived at by CSP must have brought smiles to many in the defence community, let alone CSP's views on the legal and enforcement aspects of spectrum management.

We rarely say this, but on this occasion—with a fanfare of trumpets—"Come back Radiocommunication Division of the DTI, all is forgiven".

David Evans, G3OUF

Members' Mailbag

THE EDITOR,
RADIO COMMUNICATION,
LAMBDA HOUSE,
CRANBORNE ROAD,
POTTERS BAR, ENGLAND

The views expressed in published correspondence are not necessarily those of the RSGB, and readers are urged to verify independently any factual statements on which they may wish to rely as it cannot be guaranteed that such statements are correct.

WILL WONDERS NEVER CEASE?

Sir—A *Rad Com* equipment review has actually had the nerve to strongly hint that a piece of gear is an overpriced pile of junk (Yaesu FT767GX, July 1987).

And, what's more, they actually gave it to an experienced operator to use in a contest, where he found at least 14 things wrong with it, not least that it was useless near a strong local signal.

Keep it up, chaps!

Laurie Margolis, G3UML

Sir—I have just read Peter Hart's review of the Yaesu 767GX transceiver in your July issue and, being in the market for a new hi rig, the finding completely put me off purchase. However, having already viewed other manufacturers' equipment, I went to my local Yaesu dealer who let me examine, by myself, the 767GX for two hours.

I consider the review to be an unfair assessment of the rig and must assume the reviewer has a below-average example. I tried all the bad points mentioned, including tuning in weak stations with QRM and QRN, and I had no difficulty in bringing them in. The criticism levelled about fast tuning frequency is also unjustified, as one can punch in any frequency on the keypad. Even though the rig has 71 control buttons, the logical simplicity of having them make it no harder to tune than the old FT101s.

I am a middle-aged man of reasonable intelligence and had no difficulties in this field. One has, of course, to read thoroughly the manufacturer's handbook.

John Phillips, G3PXX

Successful contest operation makes great demands on equipment—demands not seen in casual operating. Additionally, although G3PXX wasn't looking for a 144MHz rig, the FT767GX performance on 144MHz was very poor. It did not meet the VHF Contests Code of Practice for spurious outputs (both as wideband noise and discrete spurs), and was totally anti-social even for day-to-day operation. Comments received from experienced 144MHz operators suggest that the review model was not untypical of this transceiver in this respect.

G3RZP, chairman, Technical & Publications Committee

OPERATING ON 50MHz

Sir—It is with regret that we feel we must write this letter, but there are a few points that we must air.

We have been operating 50MHz since 1 June and have taken care not to cause interference to all concerned. We have also taken steps to ensure that we are within the power limits. With the repeated warnings of the RSGB, it is a shame that others have not done the same, including some G3 and G2 calls.

The proof of this happened recently with an opening to Norway. All stations that were calling from IO91 square were told by the Norwegian: "The band is closing, poor signals, much QSB, will try again in one hour". A G3 station southwest of us, putting us in the middle, called at that time and was given 5 and 9 report while spluttering 20kHz either side. Too much power, would you not agree?

We have worked many countries since the start: USA, Canada, Norway, Sweden, Portugal, Spain etc, some crossband but all using power within the limits. If we are to keep this new and great band then it is up to all of us to play by the rules, especially the "A" licensees, who should be setting an example seeing that they have had the band for quite a while.

This brings us to our most important point and the real reason for writing. **Where has all the groundwave gone?** When we started there was much activity all over the band, no "CQ" call went unanswered but now call "CQ" on 50-200MHz and see what happens... nothing but silence. Get CT1WW to call and a pile-up will occur in seconds.

Please remember this is amateur radio, it is a hobby, it is for enthusiasts all over the world of any

age to talk to other enthusiasts with similar interests. If it has come to be that all it is for is to monitor for dx and, when it happens, to turn up the power to maximum, to call and make contact, only to exchange callsign and locator—note not even name in some cases—then it is time to turn it off and watch television.

Neil Lasher, G6HIU; Ray Newton, G6SQU;
David Farmer, G6TOB; D J Mason, G1LHL;
Robert Revan, G6CXY; J Pattemore, G4NHO

Sir—I am currently very active on 50, 70 and 144MHz, but I have been rather disturbed as to the RSGB's anti-calling frequency attitude which seems recently to have been adopted. I was appalled to see in the June *News Bulletin* that as regards 50-200MHz that "You don't have to move off it if you've called CQ and received a reply". This is terrible advice, just as is the case on 144MHz. I was recently IP from a very good site in NE Scotland on 50MHz and, due to stations who were sitting having a QSO on 50-200MHz, it was virtually impossible to make any QSOs to the south on groundwave. It is impossible to break into the QSO because of the low ERPs allowed on 50MHz, the distance of the Gs from us, and the strong signals between the locals. It is also obvious to me that 50-200MHz is almost always occupied due to the large number of meteor pings of brief snatches of long ragchews which seem to take place there. Calling on other frequencies is absolutely hopeless, as the chances of catching someone tuning that frequency at that instant is very small. Here in NE Scotland we are all agreed on a call and QSY procedure on 50-200MHz and we occupy it for the shortest time possible even here where 50MHz activity is relatively low. This includes GM3ZBE, GM8FFX, GM8FXX, GM3TSL, GM1BEA, GM6KJD, GM1FSU and myself all making sure that 50-200MHz is kept clear. If we can do this why cannot they do so in the south of England. There is plenty of space now on 50MHz, so why not QSY? If not, many long-distance QSOs are being missed and yet again some selfish Gs are ruining a band, for practically all GMs trying to make DX QSOs.

Sorry for the long speech, but I do feel very strongly about this, and I see no point in this selfish attitude. Is it just laziness? I would be more than pleased to see a member of the VHF Committee (who probably thought up the idea) defend it. (Perhaps this is an item for the "I Don't Agree..." page.) I along with many other GMs (and probably GI and GW too) think that "Call and QSY" routine should be carried out on 50, 70 and 144MHz calling frequencies without exception.

Allan G Duncan, GM4ZUK

It is absolutely vital that the ERP limits on 50MHz are observed extremely carefully. We've only heard one station who seemed to be consistently getting considerably better results in the pile-ups and he's been politely told to knock it off. As regards the letter from Mr Duncan, we'd be interested in hearing the views of other members before inviting the VHF Committee to offer some thoughts. It's very early days on 50MHz yet and we may well find as time goes by that some fine tuning of practice and procedure would be advantageous.

USA LICENCES

Sir—Readers may remember that on 28 March at the NEC, examinations were held for USA FCC licences. Many will know that the USA system operates on the principle of "incentive licensing", which means that the further you travel along the path of successful examination, the greater the amount of radio spectrum that will become available to you when operating within the USA.

Speaking as one who, sadly, does not possess a natural ability for things technical, but who has now trodden the path that leads to the USA Extra Class licence, I would like to thank the volunteer examiners who helped, cajoled and encouraged me to continue to my final objective. My special thanks to Larry Ledlow, G0COW; Jerry Bliss, G0CLY; Jeff McDonald, G0CJJ; Tom Tobiasen, G0FGD; Martin Atherton, G3ZAY; and Greg Lambert, G0/KK1J.

If any readers need or want to obtain a USA licence, remember that the examinations are available in this country. I'm sure that the RSGB can put you in touch with the appropriate people, but please feel free to write to me for information.

David Mears, G4ONI/IN2HFE

SILENCE ON 70MHz

Sir—Where are all the operators on our 70MHz band? I've heard nothing on fm at all! The only activity heard was during the contest on 4/5 July. After that, everything went dead again! Are we becoming a group of "square" seekers and nothing more?!

Since the 70MHz band was opened for Class B licensees, I thought that one would not be able to get a space vacant, but this is not the case! I hear the beacon, GB3BUX every day on an indoor horizontal dipole, and I'm always monitoring the band. I run a 70MHz transmitter 15W to a pair of 5763s (things called valves!) and can run am or fm, but my cw has gone rusty! I also have an indoor dipole antenna which can be rotated. There is now no excuse for lack of activity from South Wales. Now that Ch5 Wenvoe has closed, there is not QRM from its (dare one say?) spurs!

So come on, you blackbox operators, build yourselves a nice little converter for 70MHz; and there's lots of easy-to-build designs for a transmitter to be found in various books.

Brian D Williams, GW0GHF

Good point—we haven't heard many Class Bs on 70MHz yet either. Maybe they are all waiting for the winter "building season".

WAB INTRUSION

Sir—For over 50 years, top band has been my favourite theatre of activities, and in recent years I have operated from an alternative address in SW Scotland, in an isolated area where operating is or was a pleasure. In the last few years the intrusion of WAB has begun to spoil this pleasure. This organisation seems to be only interested in quick exchanges of numbers, letters, and who do you pay your rates to, followed by being asked to listen for the operator's friends who also want the same information, and then depart as quickly as possible. This is a waste of my time and is an unwarranted imposition.

I want a real QSO, not a lesson in slick operating and a test of my patience. There must be others in rare squares who suffer in the same way, and in my case I am obliged to refuse the information, so that I may get on with a reasonably-long QSO to somebody else.

May I suggest that the letters NWAB be put at the end of a CQ or a contact, so that any potential callers now exactly how they stand and do not waste their time and mine.

James T Platt, G2VO

Is Mr Platt alone in his WABphobia?

AMBASSADOR TELEPHONES

Sir—Reading through some back issues of *Radio Communication*, I noticed some information was given concerning breakthrough problems associated with BT's Ambassador telephones. Since I am contemplating the purchase of a cordless telephone, I would be most interested to know whether any members have experienced problems of any kind when using this type of equipment while an hf or vhf rig is being operated at the same QTH. Presumably, under certain circumstances not only could breakthrough occur on the telephone, but the telephone might cause interference to the amateur radio equipment.

Roger D Powell, G0AOZ

AN APPRECIATION

Sir—I advertised for sale an FRG7 receiver, a Clark pneumatic mast and a Commodore Vic-20 computer in your June issue. The response was nothing but phenomenal! I received nine telephone calls for the mast; eight for the receiver and two for the computer... naturally it was first come, first served.

Most calls were received on the telephone answering machine, so I could not personally thank those who called. May I do so via "Members' Mailbag", as the cost of telephoning them is a bit prohibitive.

I have been a member of the RSGB for 29 years and, believe it or not, it's the first time I've used "Members' Ads". I am indeed grateful for the obvious response, and also to the Society for the work they do for the amateur.

A D Bishop, G3MSV

EQUIPMENT REVIEW



Icom IC505



Yaesu Musen FT690R II

Portables for 50MHz

Peter Hart, G3SJJ*

Introduction

The recent extension of the licence privileges for the 50MHz band, in particular the release of the band to Class B licensees, has greatly increased the level of interest in this band. It is a particularly interesting band for local and dx working—full of surprises. In some three or four years' time, towards sunspot maximum, long-haul dx via F-layer propagation will be easily achievable using modest antennas and low transmit powers. Even now, still at the bottom of the sunspot cycle, transatlantic dx was worked during the recent summer months by many UK stations with the relatively low power levels permitted under current licence regulations.

There is, at the present time, a limited choice of equipment available for the band. The main Japanese manufacturers are principally interested in the high-volume markets. At this time in the sunspot cycle, sales of 50MHz equipment worldwide are low compared with hf or 144MHz equipment, particularly with the band largely unavailable in Europe.

When equipping for the 50MHz band, there are a number of possible approaches which may be followed. If an existing transceiver is currently in use which supports a built-in transceiver module for this band—such as the FT767GX or FT726R—fitting the relevant module is obviously the simplest and cheapest way of becoming operational. If an hf or 144MHz transceiver is available, an external transverter may be used. With a good transverter and transceiver this route can also yield the best performance at low cost. Possibly the best transverters were manufactured by Mutek, but these are no longer available [1]. Other manufacturers include Microwave Modules, RN Electronics and Spectrum Communications, and others who supply as assembled pcbs. Several transverter designs have appeared in this and other magazines, as well as in RSGB and ARRL handbooks, and this makes a good home-construction project.

The second approach is to buy a dedicated 50MHz transceiver. The choice here is really between the Yaesu FT690R (Mk2 version recently introduced) and Icom IC505. At the time of writing this review, Icom were shortly to announce the IC575 28/50MHz base station to complement the IC275/475 range, and would then discontinue the IC551. Other obsolete models include the Yaesu FT690R (Mk1), FT680 and Trio TR9300.

The third approach is to invest in a multiband hf/vhf transceiver which includes 50MHz. This approach will cost at least £1,000 but will obviously form part of a plan to equip for other bands in addition to 50MHz. Models include the Yaesu FT767GX, FT726R and the now obsolete Trio TS670. Trio/Kenwood do not currently manufacture any 50MHz equipment for sale in the UK.

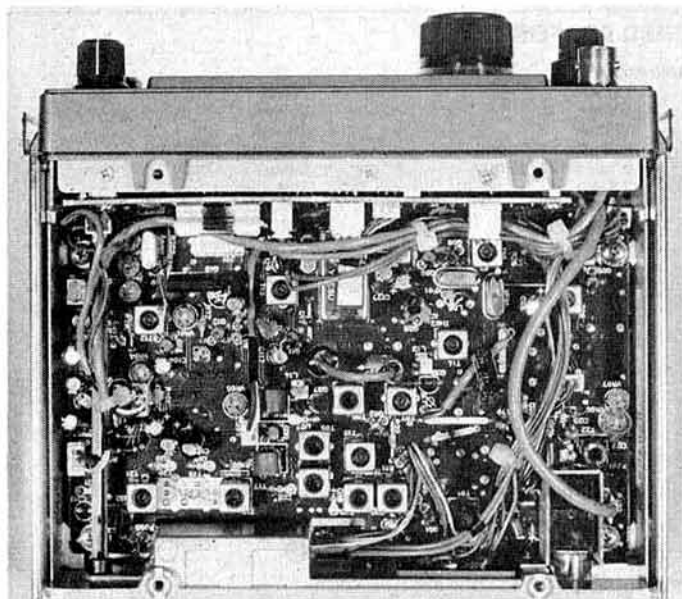
This review features the Icom IC505 and Yaesu FT690R (Mk2) shoulder-carried portable battery operated multimodes. Note that the recent extension to the licence conditions now permits portable operation.

Yaesu FT690R II

The new Mk2 version of the FT690R and the accompanying 144MHz version, the FT290R II, have recently been introduced to replace the popular Mk1 versions which have been available for several years. These new versions have been totally redesigned and comprise a transceiver unit into which can be clipped a battery pack for portable operation or an optional linear amplifier (FL6020) for mobile use. They cannot be used together. The battery pack requires nine C-size cells to be fitted, either dry cells or nicad rechargeable. The operating voltage range for the transceiver unit is 8–15.8V dc. Power from an external supply may also be used. When used as a portable, 2.5W output power is available through the front-panel-mounted antenna jack. When used for mobile operation, the battery pack is unclipped and replaced by the 10W linear amplifier unit which is similar in size to the battery pack. The antenna is automatically switched from the front panel to a connector at the rear. Power is required from an external source of 12–15.8V dc. A mobile mounting bracket is available as an accessory.

The frequency coverage is 50–54MHz using usb, lsb, cw or fm modes. The front panel size is similar to the Mk1 version but has been restyled with ergonomically improved controls and a larger liquid-crystal display. Frequency readout is to 100Hz resolution on ssb/cw or 1/10kHz on fm. Ten push-buttons select functions associated with frequency, memories, mode etc with “beep” confirmation of key presses. Rotary controls are used for tuning, clarifier, volume and squelch. Tuning is through a 25mm-diameter click-stop control with 50 clicks/revolution. Tuning step sizes are selectable, 25/100/2,500Hz on ssb/cw and 5/10/20kHz on fm with fast stepping in 100kHz increments on ssb/cw or 1MHz increments on fm. Two vfos, nine standard memories and a calling channel are incorporated. These also store mode and can be used for split-frequency working. A standard 1MHz repeater shift is also available. The calling channel memory is useful and allows instant recall of a prestored frequency (50.2MHz, for example). Both tuning of the vfos and selection of the memories may be via the rotary tuning knob or microphone up/down keys. Very comprehensive memory/vfo interworking is provided, including a variety of scanning modes for vfos and memory, skip scanning, periodic priority channel checking etc. One important omission from the handbook is that a memory frequency can be transferred to a vfo by pressing M followed by VFO. Most pushbuttons operate in a toggle mode; ie, push once for on, push again for off. The step size toggles three ways and mode four ways. Seven of the pushbuttons are dual purpose, with the alternative mode selected after pressing the function key. The function key and certain memory selection sequences time-out after 3s. Other built-in facilities include noise blanker, low power (300mW output), semi-break-in cw with sidetone, S-meter/power output metering and LEDs for on-air/low battery and busy/modulation level. External speaker and key jacks are provided on the side of the case. A loaded quarter-wavelength whip antenna is provided which plugs into the front panel and is 1m long when extended.

*42 Gravel Hill, Addington, Croydon CR0 5BD.



Top view of FT690RII with cover removed

The transceiver is solidly constructed using a diecast chassis, plastic front over-panel and metal case. The front panel measures 14.7 by 5.5cm, and the unit is 19cm deep with either the battery pack or linear amplifier. The circuitry is contained on three pcbs reputedly using the latest surface-mount technology. The chip components are mounted on the underside of the pcb which is not visible with the covers removed. A 55mm diameter speaker is mounted on the side of the case.

Icom IC505

The Icom IC505 is now a relatively old design. It is somewhat larger than the FT690R but does include both a built-in 10W power amplifier and a battery pack. With the power amplifier switched out, the IC505 delivers 3W nominal for normal use or 0.5W on low power. Two battery packs are available to give a nominal 12-14V supply. The standard battery pack supplied requires nine C-size dry cells. The optional rechargeable battery pack is fitted with 10 nicad cells. Alternatively an external 13.8V supply may be used, which is more or less essential when using the 10W pa. A retractable whip antenna is built-in which extends to a length of 1.5m (full quarter-wavelength). This is directly in parallel with the external antenna connector at the rear, and is in circuit even when retracted—which could give some problems.

The frequency coverage is 50-54MHz with usb, lsb and cw as standard, and fm as an optional extra. The review sample was fitted with fm. A

five-digit liquid crystal display gives readout to 100Hz resolution. A smooth rotating 45mm-diameter tuning knob (with lock) tunes in 100Hz or 1kHz steps on ssb/cw, and in 10kHz or 1kHz steps on fm at 50 steps/revolution of the tuning knob. The 100Hz minimum step size is a little large on ssb/cw, but an rit (clarifier) is included. A 1MHz step-up button enables rapid large changes in frequency. Twin vfos are used which may be operated split. Six memories are included, and a call feature as for the FT690R. This may in effect also be used as a seventh memory position. Scanning may be performed across the memories (incl call) or between two programmed frequencies with a dwell on channel occupied. Other built-in facilities include noise blanker, semi-break-in cw with sidetone, S-meter/power output/battery voltage metering and squelch. Phones/speaker and key jacks are provided on the front panel. The microphone used must incorporate a built-in preamp and can support up/down keys. The IC-HM7 is provided with the unit.

The IC505 is much larger than the FT690R, with a front panel size of 23 by 7.5cm and depth of 19cm. This enables a less cramped control layout to be adopted, in particular a larger tuning knob and meter. Internally a steel chassis is used with several conventional printed circuit boards. A plastic front over-panel is used, and plastic case. The built-in antenna fits inside a plastic extrusion on the end of the case. The overall appearance is a bit plasticky. A 65mm-diameter speaker is mounted on one side of the case. When dismantling the case, beware of the brackets and antenna spring earthing clip which drop out of position and are a nightmare to reposition.

Circuit description

Both transceivers use a remarkably similar rf architecture. Both receivers are single-conversion superhets on ssb/cw, with an i.f. of 13.99MHz and double-conversion on fm with i.f.s of 13.99MHz and 455kHz. Both transmitters are single-conversion on all modes with ssb and fm generated at 13.99MHz. The frequency synthesiser in both cases is a single mixed loop. The local oscillator injection is provided from a vco tuning 63.99-67.99MHz. This is mixed with a crystal oscillator down to a lower frequency (9.02-13.02MHz for the FT690R, or 5.07-9.07MHz for the IC505) and input to an lsi frequency synthesiser which alters the frequency in 10kHz steps. Smaller steps are introduced by shifting the frequency of the heterodyning crystal oscillator using an A/D converter over a total range of 10kHz. Control of the frequency synthesiser, keyboard, display, memories etc is provided by HD61391A41 microcontroller in the FT690R. This is battery backed by a lithium battery located in an inaccessible position behind the front panel. The IC505 used an MP5014 microcontroller with separate led driver and four AA cells for memory back-up. These are easily accessible and should be changed every year.

Receiver measurements

Little variation in receiver performance occurred over the supply voltage range 7-15V for the FT690R. For the IC505, shifts in frequency occurred below 10.4V. Performance measurements at 13.8V are given in the accompanying table with additional comments as follows:

Sensitivity

Both receivers were extremely sensitive on both ssb and fm. The sensitivities measured indicate a noise figure of 2-3dB.

S-meter calibration

The FT690R has a miniature S-meter with few markings. S1 to S5 spans 10dB, and S5 to S9 a further 10dB. The IC505 has a larger conventional meter but is very non-linear. S2 to S9 represents 9dB, S9 to S9+40 is 19dB, and S9+40 to S9+60 is 40dB. The high degree of passband ripple in the i.f. filter on the IC505 makes an absolute S-meter reading difficult to determine.

Spurious responses

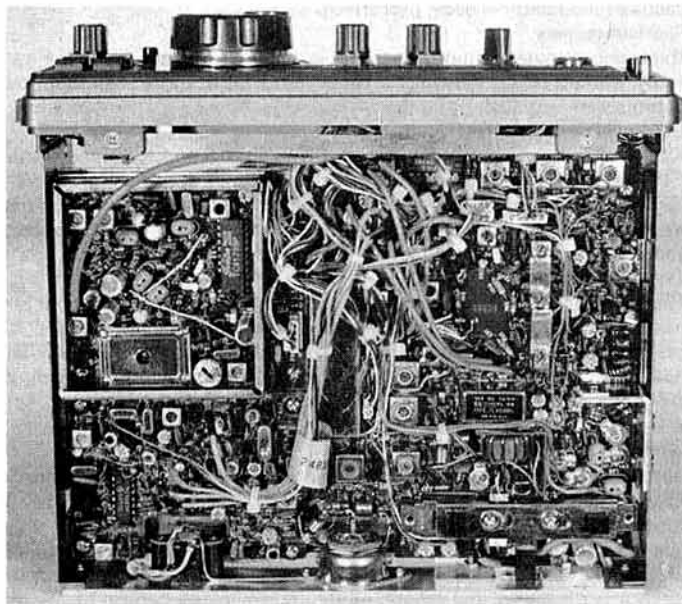
Both receivers were extremely clean as far as spurious responses were concerned.

AGC performance

The FT690R exhibited a considerable amount of overshoot on the agc attack characteristic. The FT690R showed a sharp threshold, with the audio output held to within 2dB for 100dB increase in signal level above the threshold. The IC505 had a very soft threshold. For an increase in signal from 10 to 90dB above the quoted threshold level, the audio output increased by 5dB. The decay times for both transceivers are a little fast for ssb.

Selectivity

The IC505 i.f. filter exhibited a considerable amount of inband ripple. In addition, this filter had a poor stopband characteristic. Although dipping to -75dB at about ± 6 kHz, the response rose again to around -65dB, not dropping below -70dB until 60kHz lf or 200kHz hf. Reciprocal mixing prevented measurement below 50dB for the FT690R, although 75dB was easily measured for the IC505. The FT690R has a poor skirt selectivity compared with bigger rigs. Selectivity on fm was not measured.



Top view of IC505 with cover removed

FT690R AND IC505 MEASURED PERFORMANCE

Receiver measurements

	FT690R	IC505
Supply current (min af)	105mA	200mA
— ssb/cw	95mA	200mA
— fm	0.08µV (— 129dBm)	0.09µV (— 128dBm)
SSB Sensitivity for 10dB s+n	0.1µV (— 127dBm)	0.22µV (— 120dBm)
FM Sensitivity 12dB SINAD, 3kHz pk dev	3.5µV	2µV approx
S9 level	93dB	92dB
IF rejection	96dB	112dB
Image rejection	0.28µV	0.7µV approx
AGC threshold	10ms approx	5ms
AGC attack time	300ms	400ms
AGC decay time	2.5kHz	2.2kHz
Selectivity on ssb/cw:	5.5kHz	3.7kHz
at — 6dB	9.5kHz	4.2kHz
at — 40dB	< 1dB	7dB
at — 50dB	62dB	See text
passband ripple	69dB	
Reciprocal mixing at offset	74dB	
3kHz	83dB	
5kHz	95dB	
10kHz	— 25dBm	See text
20kHz	— 14dBm	— 16dBm approx
100kHz	83dB	
Blocking	1.0W	81dB
Third-order intercept	< 1.5%	1.2W
Two-tone dynamic range		3%
Max audio into 8Ω before clipping		
Audio distortion up to clipping level		

Transmitter measurements

CW power output at 13.8V:	low power	0.6W	0.7W
	normal power	2.1W	3.0W
	with linear	12.5W	9.4W
Supply current, 13.8V cw:	low power	0.6A	0.45A
	normal power	0.93A	0.85A
	with linear	3.6A	2.1A
SSB Power output		See text	See text
Harmonic output 2nd, 3rd		— 54, — 55dB	— 50, — 54dB
Carrier suppression		50dB	40dB
Sideband suppression		60dB	See text
AF response at — 6dB	— usb	225–2,700Hz	540–2,990Hz
	— lsb	320–2,780Hz	140–2,305Hz
Peak deviation on fm		3kHz	4kHz
Mic input sensitivity for max ssb output		4mV	170mV
Transmit at distortion on ssb for full power		0.3%	20% approx

All measurements on ssb unless stated otherwise. All signal input voltages given as pd across antenna terminal.

Reciprocal mixing

The figures in the table are for 3dB increase in noise output. Reciprocal mixing could not be measured on the IC505 due to the poor stopband characteristic of the i.f. filter. However, the ease at which selectivity could be measured down to — 75dB suggests that reciprocal mixing is quite good on this transceiver. The figure for the FT690R is poor.

Blocking

Not measureable on the IC505 due to the i.f. filter.

Third-order intermodulation

This was difficult to measure on the IC505 due to the i.f. filter. Measurements are quoted at 20kHz tone spacing. The results are fairly typical for vhf transceivers but can be significantly bettered by hf transceivers with a good transverter.

Receiver audio

The IC505 exhibited about three per cent harmonic distortion at the clipping level of 1.2W output. This did not decrease much at lower outputs.

Transmitter measurements

CW power output

The figures given in the table were measured at 13.8V, and represent the output using an external supply or battery pack with nine fresh dry cells. The FT690R can also be powered from nine nicad cells which gives a supply of about 10.8V. At this voltage, transmit powers on the FT690R were about 15 per cent lower. The IC505 requires 10 nicad cells in place of nine dry cells to give about 12V. At this voltage, transmit powers on the IC505 were down about 20 per cent on the 13.8V figures. The FT690R exhibited reducing power output the longer the equipment was switched on, even if not previously operated on transmit. The figures in the table were measured about half an hour after switch-on. Powers were some 10 per cent higher at switch-on and about 10 per cent lower after 1h. FM and cw gave similar power levels.

Current consumption

The figures in the table were measured on cw or fm. On ssb, the average currents would be considerably less.

SSB power output and distortion

Under two-tone and speech conditions on ssb, the transmitter can be driven to about the same level as on fm. However, on both equipments the distortion is very poor at this level, typically — 15dB intermodulation products for the FT690R and — 20dB for the IC505. At lower levels, the distortion improves

only slightly. With no control over alc, drive or microphone gain on either equipment, it is difficult to hold the power output at a lower level. The FT690R delivered typically 1W p.e.p at — 20dB third-order products (see Fig 1) or 8W p.e.p with the FL6020 linear for the same distortion. The IC505 was somewhat better giving 2W p.e.p at — 25dB third-order products (see Fig 2), but the linear was very poor giving a constant — 20dB third-order products for power levels between 1.5 and 8W p.e.p. Overall, disappointingly poor results.

The IC505 carrier suppression varied considerably with modulation level from 70dB with no modulation down to 40dB with modulation. Sideband suppression was also difficult to measure as it was masked by high levels of audio distortion products. These two factors together suggest that the balanced modulator is being overdriven.

Spurious outputs

Harmonic outputs are quoted in the table. Inband spurs are shown in Figs 3 and 4, with the IC505 showing the better result. Other out-of-band spurious outputs were very low.

CW keying performance

Keying waveforms at 40wpm are shown in Figs 5 and 6. Keying in the FT690R is done via a port on the microprocessor, and this introduces a variable time delay and jitter on the keying characteristic—hence the blurred waveform in Fig 5. The rise and fall times for both equipments are too sharp and key clicks will be generated.

Transmitter audio

The af response of the IC505 on ssb is very ripply, as the sideband filter and receiver i.f. filter are common (see receiver selectivity). The usb and lsb passband responses suggest an inadequately-aligned carrier oscillator. The IC505 also shows a high level of audio distortion which reduces markedly at lower power levels (two per cent distortion at 1W p.e.p.).

On-the-air performance

Both equipments were used from home and from portable locations in England and Wales. The majority of stations worked (particularly Class B licensees) were also using the FT690R either Mk1 or Mk2 and a small number were using the IC505. The owners seemed generally very satisfied. Electrically there was little difference between the two equipments in the receiver performance and reports on the transmission obtained on the air. Both receivers were very sensitive but the IC505 appeared marginally better on audio punch and quality. This may seem in contradiction to the

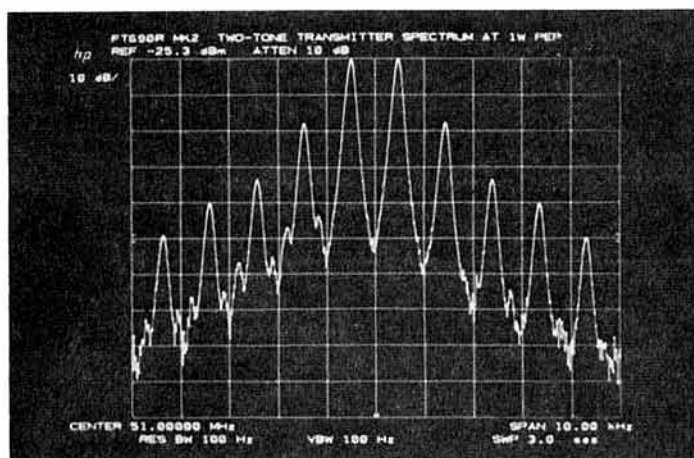


Fig 1. FT690R two-tone transmitter spectrum at 1W p.e.p. Vertical scale 10dB/division. Horizontal scale 1kHz/division

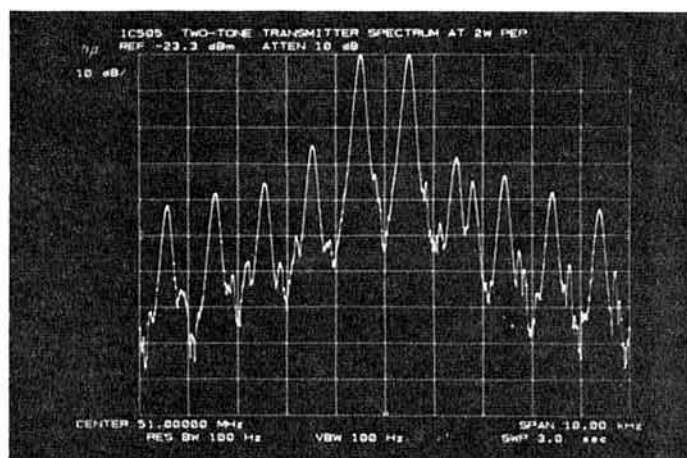


Fig 2. IC505 two-tone transmitter spectrum at 2W p.e.p. Vertical scale 10dB/division. Horizontal scale 1kHz/division

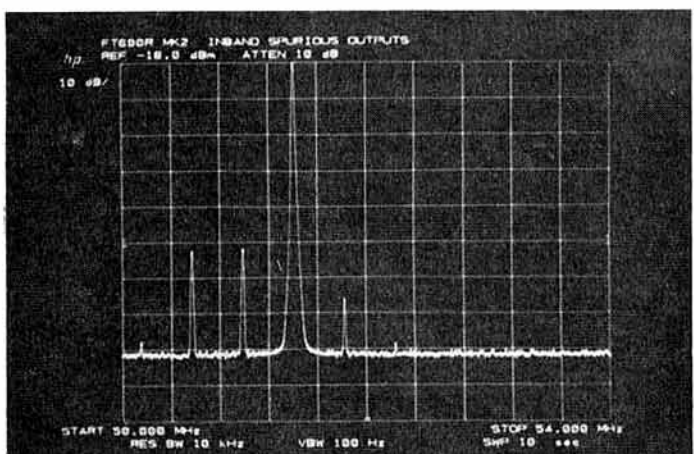


Fig 3. FT690R transmitter output spectrum. Horizontal span 50 to 54MHz. Vertical scale 10dB/division

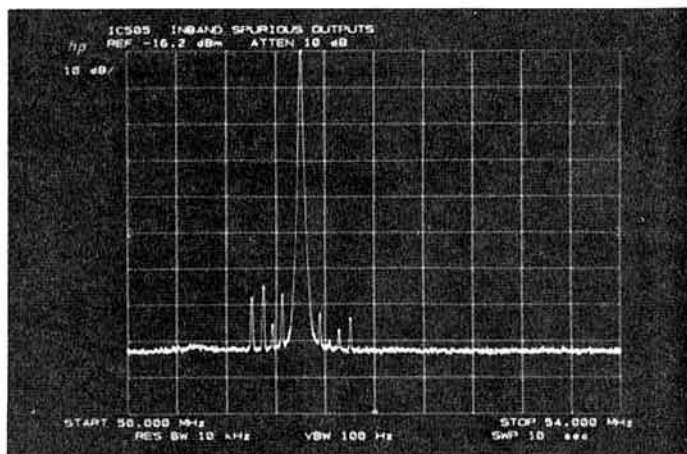


Fig 4. IC505 transmitter output spectrum. Horizontal span 50 to 54MHz. Vertical scale 10dB/division

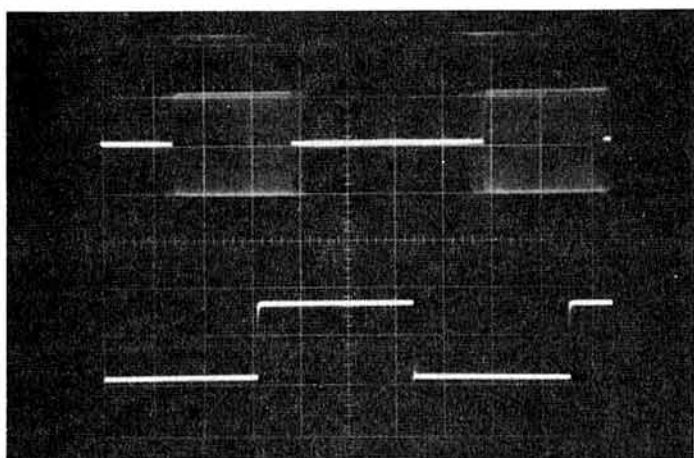


Fig 5. FT690R cw keying waveform (bottom) and rf envelope (top) at 40wpm. Horizontal scale 10ms/division

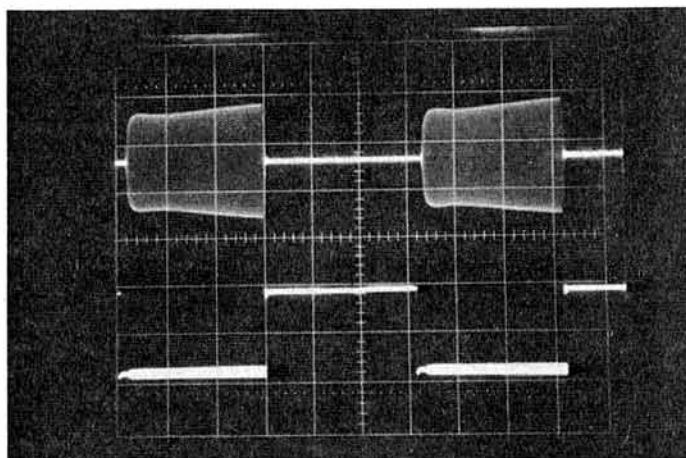


Fig 6. IC505 cw keying waveform (bottom) and rf envelope (top) at 40wpm. Horizontal scale 10ms/division

measurements but was possibly due to the larger speaker and case size of the IC505. The age characteristic of the IC505 was also preferred although the decay times of both were audibly too short.

On transmit, some reports preferred the FT690R while others preferred the IC505, with perhaps a slight bias towards the IC505. In reality this is more of a comparison between the IC-HM7 microphone supplied with the IC505 and the MH-10E8 microphone supplied with the FT690R. Generally the audio quality was well received although lacking a little in punch. Neither equipment incorporates a speech processor.

It was unfortunate that no really strong local signals were heard. Hence it was not possible to evaluate properly the strong signal characteristics of the receivers or obtain meaningful reports of transmitter splatter or key clicks. It would be interesting to see in reality whether the FT690R's poor reciprocal

mixing or IC505's poor stopband selectivity was the principal limitation to strong signal performance.

When considering the ergonomics it is also necessary to consider the application. For home-station or fixed-portable use in conjunction with an external power supply, the larger size of the IC505 is an advantage. The larger front panel, tuning knob and control layout are preferred, although there are less functions compared with the FT690R. For pedestrian portable applications, the FT690R has a considerable edge. The size is compact and the battery life on receive will be double that of the IC505. The smaller front-panel area inevitably results in some compromises, particularly the small size of the tuning knob. Tuning can be somewhat tedious with this control, and there is no positive identification of which step size has been selected. Considering the host of functions which are available through the

keypad, the ergonomics are probably as good as can be achieved in this size of equipment. Scanning on both receivers—not a function I use very often—is slow.

With no microphone gain control or drive control on either equipment, care must be taken to prevent overdrive if using a different microphone. This is even more important with an external linear as there is no a/c input.

Conclusions

Both the FT690R and IC505 are really aimed as portables for the 50MHz band. The lack of alternative base station equipment, except for the expensive multi-multi rigs, means that many are purchased for use primarily from home. In this situation a transverter used with an existing transceiver can give better results both electrically and ergonomically at a lower cost, assuming of course that a suitable transceiver is available.

Both items reviewed have a sensitive receiver but lack top quality i.f. filtering. This may not be too significant at the moment, but when the band becomes more crowded it may cause problems. The reciprocal mixing performance of the FT690R is, like many Yaesu items, somewhat marginal. The transmitter distortion performance of both is poor, and great care should be taken if an external linear is used as there is no a/c or drive control.

The battery drain of the IC505 is excessive and an external power source is more or less essential. With dry cells, running costs on receive alone will amount to about 50p/h. Unfortunately, the nicad pack is no longer

obtainable, and it is not possible to replace the dry cells with similarly sized nicad cells in the standard battery pack as there will be insufficient voltage. The FT690R with nicad cells is far more suitable for pedestrian portable operation. The internal antenna on the IC505 is constantly in circuit and this may cause problems with rf pickup. If always used with an external antenna it may be preferable to unbolt and disconnect the antenna housing and replace with an aluminium panel. Set mounted 50MHz antennas are cumbersome, although the loaded whip on the FT690R is just about manageable.

The FT690RII costs £399 with the FL6020 linear an additional £109. The IC505 costs £459, with the fm board an extra £49.

Acknowledgements

I would like to thank Icom (UK) Ltd (Thanet Electronics Ltd) of Herne Bay, and South Midlands Communication Ltd of Eastleigh for the loan of the equipment.

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A HANDSFREE MOBILE MICROPHONE

R S McMILLAN, GM8JUY*

Introduction

When rumours of impending changes to the *Highway Code* were first heard, I decided to investigate possible alternatives to a handheld microphone. Five possible alternatives were considered.

1. A proprietary mobile mic from an equipment manufacturer.
2. A commercial mobile mic.
3. A tie-clip mic.
4. A headset-type amateur mic.
5. A homebrew design.

The ideal unit had to be neat, easy to use, allow all present rig functions and be unobtrusive when not in use.

Option 1 was discounted on price. Two versions of option 2 were tried; one, an excellent gooseneck unit, came with vox, while the other required extensive wiring mods. A tie-clip unit was tried in various locations, but the output was always low and car background noise was a problem. The dangling cable was always in the way and could be damaged if overlooked when leaving the car. An amateur headset was tried but found to be too small, and thus insecure and uncomfortable. The only alternative was to design a homebrew unit of some type or other.

Component selection

It was decided to use simple, readily-obtainable components, so that the project could be completed quickly and easily, but this turned out to be far from easy! The first problem was to find a mic insert which gave the same level of output as the original mic. After trying several moving-coil inserts, which were either physically too large or too low in output, electret inserts were tried. These proved to have too low an output to match modern rigs without using a pre-amp or adjusting the gain pre-set inside the set. A suitable insert was eventually found, although this was a three-pin device requiring a separate dc supply line, and was obtained from Tait Components, Couper Street, Glasgow.

The gooseneck needed to be 11in or so in length, but as this item was only available in 8 or 13in lengths two versions were made; one using two 8in sections screwed together, and one using the 13in section. Both are equally satisfactory.

Construction

Since the mic insert is a three-terminal device, the mic cable needs to be twin-core shielded. Solder the cable to the pads on the back of the insert, taking care to avoid shorts. If an oscilloscope is available it is worth testing the insert/cable assembly at this time by connecting a 1.5V battery and the oscilloscope to the free end of the mic cable as shown in Fig 1. Once the insert is fitted to the gooseneck it is too late to repair a solder-short! Another point worth remembering is to write down the colour of the core which is to be the

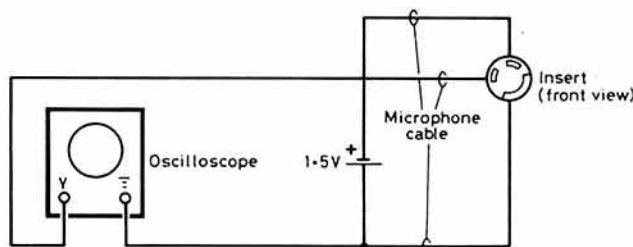


Fig 1. Insert and cable test set-up

audio and of that which is to be the dc supply line. Again, by the time you have fitted the insert into the gooseneck it is too late to discover that you cannot remember them!

Fig 2 shows the assembly of the gooseneck unit. Some gooseneck sections may require drilling to allow the mic cable to pass through. This can be done quite easily, since the gooseneck is usually made of brass. Care should be taken to protect the chrome finish of the gooseneck if holding it in a vice.

Wrap a layer of pvc tape round the insert as an insulator. This is required to prevent multi-point earth paths which could allow alternator and ignition interference problems. Thread the mic cable through the gooseneck from the female end. The insert, with its pvc tape insulation, should be glued into the female end of the gooseneck, using epoxy resin, such that the end of the insert is flush with the end of the gooseneck. Care must be taken to avoid getting glue on the face of the insert. Once the epoxy resin has hardened, usually overnight, clean off any excess glue with a sharp knife or file. Any small imperfections in the surface finish of the glue around the insert may be carefully filled in with more epoxy.

NB. It may be advantageous to keep the gooseneck upright, with the insert to the top, while the epoxy resin is hardening. This will allow any runs of glue to go down the inside of the gooseneck where they will not be seen.

The gooseneck is mounted onto the bracket using two suitable nuts. If nuts are not available, the threaded boss from a mic holding clip (from the same

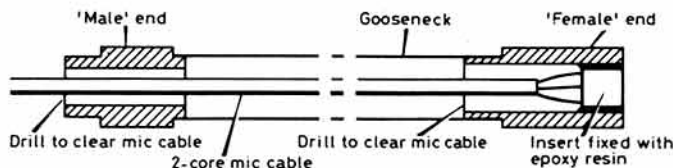


Fig 2. Gooseneck assembly

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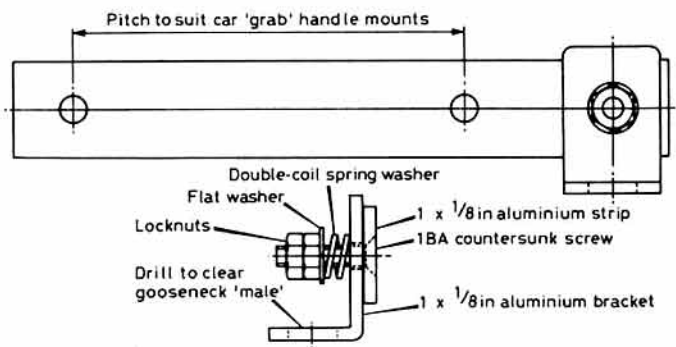


Fig 3. Mounting bracket

source as the gooseneck sections) may be easily sawn into two thin slices to provide nuts.

Mounting

I used a pivot bracket to mount the mic assembly onto the car. This allows the mic to be pushed up against the roof cloth when not in use, yet allows easy positioning of the mic when in use.

The bracket sections are made up of eighth-inch aluminium section, as shown in Fig 3. If this is not available, extruded aluminium curtain rail can be filed down and used. Another source is carpet plates which are usually of around this section. The right-angled bracket is made by bending the flat aluminium section in a vice or between two pieces of wood.

For safety, all corners must be rounded and all surfaces smooth. At all times it must be remembered that in an accident you may come into contact with the mic or the bracket!

The BA screw is countersunk into the flat section to prevent damage to the car roof cloth. If a small heavy spring is not available, a double-coil spring washer will do. Drill and dress the two sections and then assemble the tension arrangement as shown. Tighten down the inner nut until the spring is almost fully compressed, then tighten the second nut against the first. Cut off the excess screw length and dress off the screw against the outer nut.

I used a five-pin DIN plug and line socket to terminate the mic cable. This allows the cable to be fed into place with relative ease, and allows the control box to be removed if it should be required.

Positioning

I used the two mounting screws for the driver's grab handle above the door to mount the bracket. This was convenient for both its position and the fact that the mounting holes were there and unused. The self-tapping screws which held the blank plugs on to the unused mountings were long enough to hold the mic bracket. The mic cable was easily concealed behind the door facings, although in some cars it may be necessary to slacken the moulding-retaining screws to allow the mic cable to be slipped into the void behind the mouldings. At floor level the cable can be passed below the driver's seat or under the carpets to the control box location.

Control box

Only the circuit of the control box is shown, since the layout will be a matter of personal choice and will depend on the mounting location chosen. Mine is mounted on the centre console behind the gear lever where the transmit switch was within easy reach while not requiring the driver's hand to be removed from the gear lever. The basic control box circuit is shown in Fig 4.

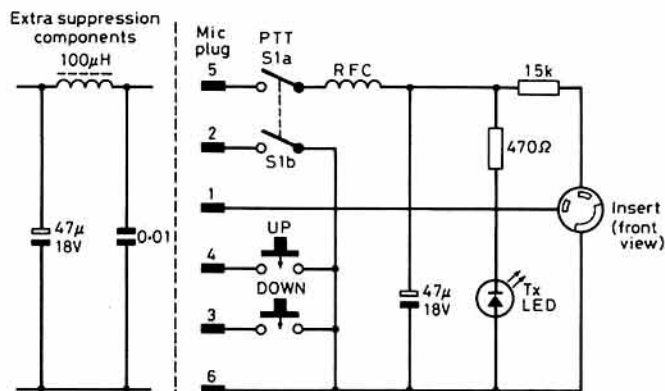


Fig 4. Control box circuit diagram

Components list

Aluminium flat bar 12 by 1 by $\frac{1}{16}$ in.
BA bolt, two nuts, flat washer and double-coil spring washer.
RF choke.
DPDT miniature toggle switch.
Two single-pole, push-to-make, button switches.
Green l.e.d and holder.
470 Ω 0.125W resistor.
15k Ω 0.125W resistor.
47 μ F 18V capacitor.
Five-pin DIN plug and line socket.
Diecast metal box (size as required).
Gooseneck 13in or two of 6in as required (Tait Components G215 or 2 \times G214).
Electret mic insert (Tait Components G143).
Twin-core shielded microphone cable.
Mic plug to suit transceiver.
Five-core shielded microphone cable.
Optional components: 100mH audio choke; 47 μ F 18V capacitor and 0.01 μ F disc ceramic capacitor.

When using the circuit shown, I received reports of alternator whine being transmitted on the audio, and this was cured by adding the components to the left of the dotted line. Those components already exist within most modern rigs, so it seemed silly to duplicate the work. Since a 12V supply is required to power the mic, it was decided to utilise a spare pin on the transceiver mic socket to provide the supply and to use the suppression components of the transceiver to give the extra suppression.

The control box was connected to the transceiver by a length of five-core shielded microphone cable and a suitable mic plug to match the transceiver socket.

Rig modifications

Modifications will vary from rig to rig. The Trio 7800 is shown as an example of how little is involved and how to identify the suppression components on the circuit diagram of a transceiver. Within the Trio 7800, and its successor the 7930, the incoming dc line is fed via the off/on switch to the suppression components as shown to the left of the dotted line in Fig 4. In the 7800 a short length of thin insulated wire can be soldered to pin CB of main board plug 2 and taken to the rear of the mic socket where it is soldered to pin 5. For the faint hearted who do not feel inclined to tamper with the inside of their transceiver, a separate 12V supply can be taken to the control box. In this case a 500mA fuse must be fitted in the line or in the box. The extra suppression parts can be built into the control box.

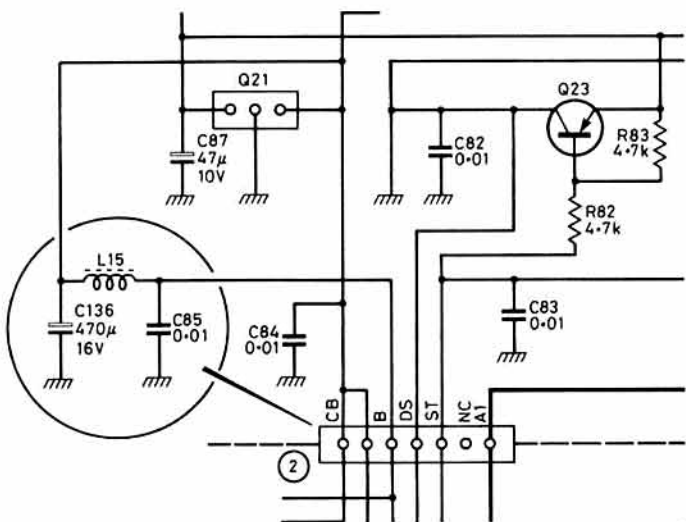


Fig 5. Detail of TR7800 circuit diagram showing modifications

Operation

If you are used to a hand mic, it takes a little time to get used to handsfree operation. With the mic as described it can be left up against the roof cloth when not in use and pulled down beside the face when operating. It is not necessary to have the mic in front of the mouth when in use. Equally good results are achieved with the mic alongside the face. This also keeps the mic and gooseneck out of the field of vision when looking forward.

My company car is used by other personnel each day, and it is interesting that it was only when I was seen using the mic that others even realised it was there. It had, in fact, been there for two months!

Good luck, and safe mobile operation!

AN INVISIBLE DX ANTENNA FOR 14MHz

Del Arthur, G0DLN*

SINCE my schooldays I have had a keen interest in amateur radio but, sadly, it was nearly 40 years later, at a time of sunspot starvation, that my hf licence finally landed on the door-mat. The waiting 707 was quickly up on the bench, an inverted-L materialised twist tree and chimney, and with the aid of a borrowed atu the station was fired up for the first time. For a month or two I was delighted with the results. I was working all round Europe on all bands with the occasional bit of cream from further afield. SSB contacts were made with North America, but it was obvious that my 100W was not making the trip in good style. The horizontal part of my antenna was broadside to the USA but being a full-wave in length its lateral lobes were pitiful. The top was shortened to form a half-wave, but it still lacked punch and a re-think was called for.

This is where the trouble started. I happen to live in what estate agents call a desirable residential environment, and we have several neighbours who can fairly be described as snooty. Some of this must have rubbed off on me, because I frankly admit that if a pylon appeared next door, topped with a bizarre collection of sagging pipes, my house would drop ten grand pronto. It would be hypocritical as well as expensive to pretend otherwise. Quads, deltas and anything with traps in would be regarded as quite obscene at my QTH. Even a meek dipole with its gruesome dangling bits would not invite applause, so end-feeding was mandatory for anything erected outside. I tried out loft antennas and furtive little whips on fake tv poles but, unfortunately, while the secrecy factor of such devices is high, they just can't compete with giant spiders in the sky.

Don't lose heart. Invisibility is possible. It's all down to configuration and wire diameter.

Les Moxon's informative book brings us the good news that 0.15mm wire is unseen at 15ft. One can assume that 0.3mm will be likewise at 30ft—minimum height for good work on 14MHz. Mine is slightly thicker, but it takes a bit of spotting at 30ft. Another bit of good news about a snooty QTH is that the majority of owner-occupiers are likely to be of pre-1930 vintage. This is most useful, as keenness of eye falls off rapidly in middle age. (Del's First Law states: I^2R losses are inversely proportional to the age of your neighbours.)

Well, I had a 30ft tree some 22m away from a convenient chimney: an ideal distance, I thought, for two half-waves in phase. But how to get them in phase? A central phasing coil would be visible and cause sagging, likewise a transmission line stub with its spreaders would also give the game away. I puzzled long and hard until one fine night in the spring of 1986 pencil flew across paper and the idea was born. It seemed too simple. As the clock struck midnight, I checked my calculations. All seemed OK. Then, galvanised by quite un-characteristic fervour, I leaped with much alacrity, out into the night air. Hasty measurements were made and mysterious knots were tied. A few minutes later I was calling "CQ 20" and was immediately rewarded with WB1GFH telling me I was ten over nine in Boston. Since then, and following several modifications, my dx bag is overflowing despite very restricted operating time.

The basic outline of the full-size Mk 1 version is shown in Fig 1. This can be cobbled together in 5min, but I now regard it only as an experimental "test bed" for the Mk2 version which has greatly enhanced characteristics. The Mk2 is the same antenna, but is end-fed with coaxial cable via a simple matching unit; being end-fed, the cable is more or less invisible against the walls and chimney.

As shown in Fig 1, the two sections AB and CD are full-size half-wave radiators each in phase with the other, thus walloping out a strong broadside lobe. Phase inversion is accomplished by the hanging loop BFC, which

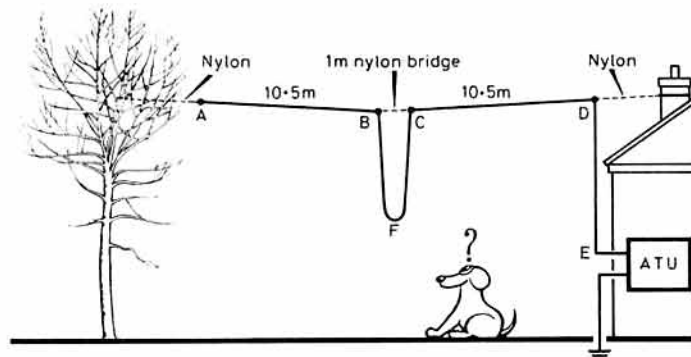


Fig 1. This is the full-size Mk1 version. Points B and C are joined together with fishing line or nylon cord. This bridge should be at least 1m long. The length of wire in the hanging loop is about 11m. Insulators can be dispensed with for invisibility

behaves like a quarter-wave stub. Radiation from this section is cancelled due to opposition of current flow in each vertical leg. There will be some vertical radiation from the section DE. With this type of antenna, chances are that the feedpoint impedance will be high, and this has the advantage of working well with an indifferent earth system. However, these antennas can bite you if provoked, and you are advised to use adequate insulation at the entry point to the house.

Don't be depressed if your garden span is less than 22m. This antenna is easy to shrink and still produce good gain. However, too much squeezing will lower the radiation resistance, which is bad news when using very thin wire. The example in Fig 2 condenses the antenna into a span of only 18m with hardly any loss. The far end has a 1m bend-over, and the length of wire in the phasing loop is now 13m. The two voltage points formerly at B and C in Fig 1 are now 1m down from the top of each leg in Fig 2. The former voltage point at D in Fig 1 is now 1m down the feed end of Fig 2. The effect of all this is to retain the current antinodes where combined they will do most damage to the F-layer. If your garden span is even smaller, I suggest you study the graphics of current distribution on page 9 of *HF Antennas For All Locations* by Les Moxon, which you may well find quite encouraging. Don't try to save space by reducing the length of the nylon cord bridge, because on a windy day the hanging wires will brush together and cause problems.

I will now describe some tricks which can be beneficial, especially on shortened versions. These should be done before progressing to the Mk2 version. Tape a field-strength meter onto the longest wooden pole you can find. Set your rig to transmit a watt or two of carrier. Now follow the hanging loop around with the meter, trying to keep it parallel to the wire. You should get a high reading near the top of each leg, and the needle should fall gradually as you get nearer to point F. In a perfect world you would find a nice clear voltage null at the bottom. In the real world, however, that naughty null may be lurking part way up one side of the loop. Work out which way the wire needs to go relative to the null. Undo the knots fixing the cord to points B and C, and tie again 1m or so left or right as required. Now test again. On short versions it is also advisable to check the nulls on the horizontals, as there is less margin for error here. As mentioned before, my first effort was knocked up at the dead of night, without even a tape measure. I used the old rule of thumb: tip of outstretched fingers to hooter equals one yard. Add the odd knee plus a bit for luck and you have converted it to metres. When daylight came, I went null hunting and found that mine was only about 2ft adrift.

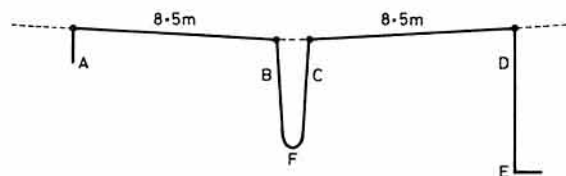


Fig 2. This is the shortened version of Mk1, to fit into a span of only 18m. The length of wire in the loop is now about 13m. Voltage points have moved into the positions shown. Current antinodes are still in the middle of the horizontals. Further shortening is easy

Del Arthur was born in SE London in 1933. When a 13-year-old, he noticed a length of copper wire hanging out of a top floor window of his school building one lunch time. Bursting with curiosity, he bounded up the stairs to find the other end attached to a motionless, headphone-clad boy peering into a box of coils and bits of brass. This first encounter with a crystal set led to a lifelong interest in radio, but other aspects of human activity got in the way of dots and dashes until 1985.

He works hf, mostly in the late evening but can be heard Sunday mornings on 3.5MHz, usually operating with a home-brew hollow-state transverter driven by a cb rig. He is interested in electronic music and is also an enthusiastic 18-handicap golfer.



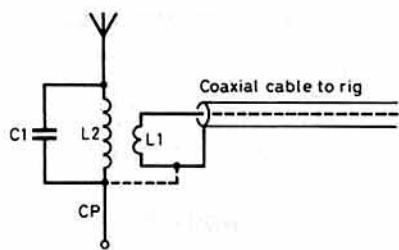


Fig 3. The Mk2 version uses this matching circuit which is built inside a suitable container. End feeding by coaxial cable is used here

The Mk1 version was in use for a few weeks, but due to the proximity of DE to the house there was some tvi. Also I had nagging doubts about possible losses due to DE, which in my case was extra long and angled. Meanwhile, back at the drawing board, more midnight oil was burned and, many experiments later, found me hauling a plastic aspirin container up to point D, its innards connected to a length of coaxial cable. VSWR was very low over the whole band. Tests with a field-strength meter at the far end indicated a substantial gain over Mk1. I can also report an improved s/n ratio when listening for those quiet stations, and tvi had disappeared.

Inside the plastic container is the matching circuit (Fig 3). L2 is 15 close-wound turns of 0.5mm pvc-insulated wire on a 1.25in diameter plastic pill tube. Length of this winding is about 0.75in. Heavier wire should be used for high power. L1 is 4t of 1mm insulated wire wound over the middle of L2. Don't rush out to buy wire for this job, as junk box wire will be OK up to 100W or so. CP is a short counterpoise wire, 1 or 2m long. C1 is a 9in piece of RG58U coaxial cable rolled up and stuffed inside the container with the inductor.

For the initial tune-up leave out the counterpoise wire but connect up the cold ends of both windings (dotted line in Fig 3). Use a small variable capacitor for C1 and adjust for minimum swr using only 2 or 3W at this stage. Hopefully you will find, as I did, that almost unity swr is easily attained across the whole band. This can be done with the near end of the antenna let down to eye level. When tuned OK, raise the antenna to its full height, check the swr again and re-tune if necessary. The next step is to replace the variable capacitor with the appropriate length of coaxial capacitor. RG58U has a self-capacitance of approximately 30pF/ft. By scrutinising the position of the vanes you should be able to assess the approx value of C required. Cut a piece of coaxial cable slightly longer than required, and connect the inner to the top of L2 and the outer to the bottom. Trim small bits off the end until the low swr is regained.

Phew!, almost finished now.

In its present state the antenna will perform OK, but lack of a counterpoise can result in unwanted currents leaping about on the coaxial outer. It is recommended that you rf earth the outer at the point of entry and/or the transmitter itself. Certain random lengths of feeder could lead to rf burns from the rig if medium/high power is used. The final job is to remove the dotted-line wire and connect the counterpoise wire as shown. A final check on the swr is called for before firing your maximum power into the unsuspecting ionosphere.

In the case of shortened (or stretched) versions, the turns ratio described above may result in a mismatch. No big problem here. Just vary the secondary plus or minus a couple of turns until you can tune OK with the variable capacitor. Eye-level tuning of short versions will result in large lumps of the loop lounging on the lawn. This will give misleading swr readings, so hook the loop onto a bush or maybe a wooden step-ladder for initial tests.

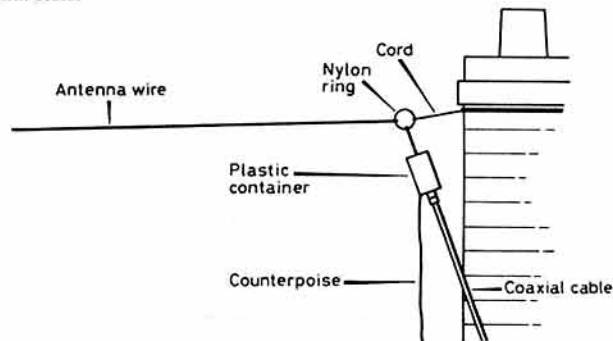


Fig 4. The simplest way to deploy the counterpoise is to let it hang down like this. Wind will cause the swr to vary, but only very slightly. At some QTHs it will be possible to hide the whole thing round the blind side of the chimney stack. The halyard is not shown for clarity

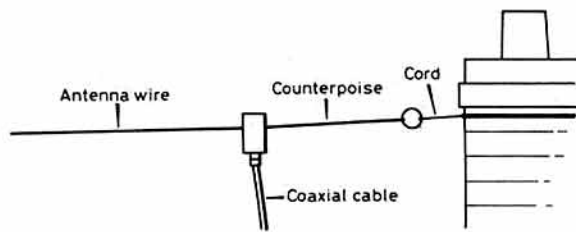


Fig 5. This counterpoise is the theoretical superior to Fig 4, but it does not maintain a low profile and causes sagging. In simple field-strength tests, no difference can be found between the two methods

Though designed for 14MHz, the full-size version gives a good account of itself on 3.5MHz where the current maximum occurs around point C, thus flinging around some mixed polarisation from a high position. Of course an atu must be used on 3.5MHz with the coaxial inner and outer strapped together, and the dotted-line connection retained. The existing coaxial-fed matcher can be used on 21 and 28MHz, but you will need to lower the value of C1 to get best results on these bands.

If you are lucky enough to have more garden span than mine, other interesting possibilities arise. A span of about 27m could be used to form $2 \times \frac{1}{2}$ waves. Simply reduce the length of wire in the phasing loop to about 6m, keeping the same overall wire length of 32m in the air. This promises a gain of 3dBd. The broadside lobe will divide itself like an amoeba if you extend beyond this point.

This article was aimed at those with environmental problems, but I also feel this is a worthwhile antenna for any ham or swl who can't afford a full-size rotary beam. These chaps can benefit by using thicker wire not only for its electrical properties, but it also saves the time spent on reviving the strangled pigeons each morning.

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BOOK REVIEW

HF Communications—a systems approach, by Nicholas Maslin. First edition 1987. Published by Pitman Publishing. 248 + VIII pages (245 by 183mm). Softcovers. £15.95.

For better or worse, amateur radio has become largely systems-orientated "black box" radio. A systems engineer is basically somebody who knows how to evaluate, choose and assemble the major components of a system as well as understanding the operational problems and constraints without necessarily being directly concerned with basic design or development.

This new and up-to-date book by Dr Maslin is primarily intended for professional communications engineers, as a reference text for students, and "for the non-specialist readers who wish to broaden their understanding of the physical principles, limitations and constraints upon hf communications systems". Mathematics is used only sparsely where needed to clarify or illustrate key issues.

There is thus a good deal in the book to interest those radio amateurs (and there are many of them) who are also professionals, and much that would enlighten those who pursue radio as a hobby unconnected with their work. The author underlines the resurgence of professional, particularly defence, interest in hf since the realisation of the vulnerability of satellite communications as a result of the development of anti-satellite techniques capable of completely disrupting such communications at the outbreak of a major conflict whether by missile attack, electronic jamming, or nuclear electromagnetic pulse.

This new lease of life for hf has been further enhanced by its marriage to computer technology which, the author believes, "offers tremendous potential to improve its performance and reliability". A major aim, it is made clear, is to minimise reliance on the once essential "highly skilled communications specialists and operators who had considerable understanding of the transmission medium. It was only through sheer skill and years of experience that an operator could avoid poor-quality channels and identify the optimum frequency for a given path and time". It was of course precisely the acquisition of such human skills that made the hobby of amateur radio so attractive, though Dr Maslin is clearly all in favour of substituting machine-intelligence for human know-how.

Notable advances that have led to the de-skilling of the craft of radio operating are listed as: improved vacuum tubes and antennas; ssb for more spectrum efficiency; automatically-tuned transmitters; propagation prediction methods; high-speed multitone data modems; frequency synthesizers to replace crystals; the introduction of solidstate circuits. Surprisingly, the book has little if anything, to say about packet radio, or computerized do-it-yourself predictions such as minimuf. The diagram showing frequency allocations omits the 10, 18 and 24MHz amateur bands.

The low-efficiency of many electrically-small antennas, as on aircraft, is emphasized by the comment that radiation efficiencies approaching -50dB at 2MHz have been measured. This represents only 10mW radiated from a transmitter output of 100W!

For the amateur-amateur this is not a book to replace the established handbooks, but still well-worth borrowing from your local library. For the would-be systems engineer it would be a good buy.

Contents: 1, HF radio: past and present (12pp). 2, System considerations (21pp). 3, Ground wave propagation (22pp). 4, Sky wave propagation (31pp). 5, Noise and interference (16pp). 6, System performance assessment (26pp). 7, Air-ground communications (20pp). 8, Frequency management (20pp). 9, Data communications (41pp). 10, Impact of modern technology (25pp). Plus six pages of references and a good eight-page index.

G3VA

Technical Topics

Pat Hawker, G3VA

FOR AMATEUR RADIO to survive meaningfully into the 21st century, it is surely not enough just to recruit youngsters showing a passing interest in the concept of being able to talk or type to like-minded individuals at a distance; we must be able to show that there are still good reasons for becoming interested over a long period in the technology and the human skills of radio operating without relying solely on machine intelligence. For one thing is certain: the future will see the disappearance of the last vestiges of the idea that there is something special and elitist about using electromagnetic waves as a communications medium.

Universal radio

Already telecommunications people are thinking beyond the concepts of mobile cellular radio and the cordless telephone to an era of "universal digital portable radio communications" (see for example the 42-page article by Donald C Cox of Bell Communications Research in *Proc IEEE*, April 1987) in which 900MHz, 10mW handheld digital transceivers are seen as forming the final 1,000ft "connection" into the public telephone system. On the same lines, British Telecom are soon to introduce their CT2 digital 900MHz cordless telephones, and cordless PABXs have already been marketed. Everybody will use compact handheld transceivers and inevitably the pressures on vhf and uhf spectrum will continue to grow, with the possibility, currently being considered, of deregulation of the radio spectrum whereby users will "buy" channels from new profit-making "frequency planning organisations".

At the same time, the hf spectrum, which at one time looked like being largely written off by professional communicators in favour of satellite systems, is undergoing a major revival, particularly by the Services, both for jam-resistant communications and for high-power monostatic and bistatic over-the-horizon radar. For hf communications, much thought is being directed at designing fully-automated systems capable of providing reliable links over hundreds or thousands of miles yet "as simple to operate as a car radio telephone" to quote a presentation by Dr J N Hopkinson of Plessey at the 1987 URSI National Colloquium at Sheffield University.

The Plessey work is aimed at further de-skilling hf operation on the grounds that experienced hf radio operators are a vanishing race and that: "The successful operation of a present-day (professional) hf link demands a considerable degree of operator skill and experience if not to say black art. Ships' radio operators require several years of intense training, followed by many years of actual experience before they can become proficient... the thrust of the research at Plessey Roke Manor has been to employ the increasing availability of low-cost computing power to extend the facility to unskilled users. The computer first provides its preferred frequencies from pre-programmed knowledge of the sunspot conditions, time of day, location

of the desired recipient station etc. It then controls the communications receiver to operate as a sensor to test its predictions. By doing so, the frequencies can be iterated so that a free channel close to the optimum can be located. The computer then initiates and controls the communications process, identifying and linking up with its opposite number."

An automated system of this type has been operating 24 hours per day five days per week between Roke Manor and Caswell, near Northampton, with a menu of 80 spot frequencies between 2 and 25MHz, and has achieved an average throughput of 32,800 characters per hour with better than 36kch/h for 49.1 per cent of the time and less than 12kch/h for only 11.8 per cent of the time. The skill is entirely that of the systems designer.

This is fair enough for military and civil professional purposes but is hardly the way which some of us would wish to see hf amateur radio developing: it is precisely the need to develop operating skills, with that dash of the "black art", that makes the hobby one of lasting interest. No human challenge—no hobby!

Des Vance, G13XZM has gone on record (*Members' Mailbag*, July 1987) as advocating a concerted move to encourage the use of *simple* gear, regardless of power. Because he feels that the oft used "kiss" does not lend itself to such a movement, he has come up with the acronym "TRUMPS" standing for "Transmitters and Receivers Using Minimum Parts". He would like to see TRUMPS receiving the sort of promotional effort that is devoted to QRP, rtty, data communications etc.

Transistorised bloopers: a novel approach

As part of his interest in simplicity, G13XZM has built several simple regenerative blooper-type receivers but with solidstate devices rather than valves, using a FET as an infinite impedance detector in conjunction with a bipolar Q-multiplier. Results have been encouraging enough to pass along some of his circuit arrangements. He writes: "I reasoned that by separating the detector and reaction duties neither need compromise the other. Reaction (regeneration) smooth beyond belief is achieved. With the feedback transistor loosely coupled to the tuned circuit as in vfo practice the good selectivity associated with an infinite impedance detector is further improved and stability is certainly better. Fig 1 shows some typical arrangements.

"The first such receiver I built was for a young swl and covered 9 to 16MHz (three broadcast bands and 14MHz). With a 10m 'throwout' antenna it brought in all the dx he could want. More recently my son built an mf (medium wave) version as his first constructional project, using a frame antenna. Selectivity was such that on weaker stations there was an obvious loss of treble as sidebands were cut as the reaction control was advanced. When he was finished with it, I took turns off the frame antenna to see how far up in frequency it would work, also reducing the value of the associated

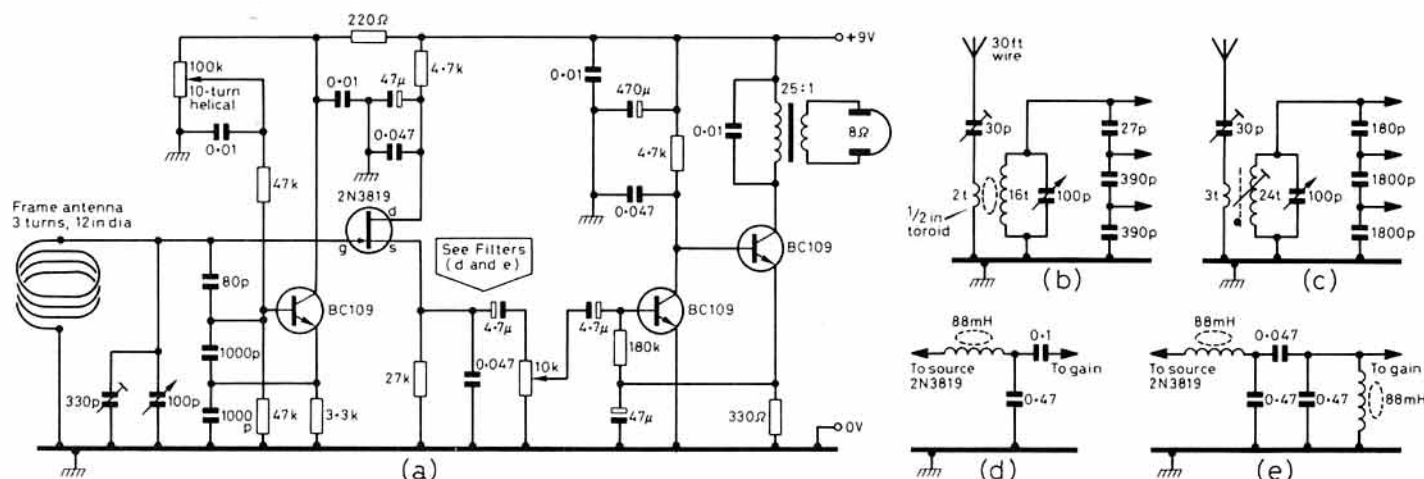


Fig 1. G13XZM's solid-state regenerative "blooper" receivers. (a) 3-5MHz version with frame antenna mounted about 12in above chassis with miniature coaxial-cable "downlead". (b) Input circuit for 9 to 16MHz version. (c) Conventional input circuit for 3-5MHz receiver using wire antenna (coil 26swg close-wound on 0.5-in slug-tuned former). (d) Audio filter that replaces the 4.7μF capacitor shown in (a). (e) CW filter for 14MHz "Mark 2" version.

capacitors. On 3.5MHz in daytime it made a perfectly servicable swl receiver. Even on 7MHz, with a two-turn frame antenna, ssb was clearly resolved despite the presence of the high-power broadcast stations, although at this frequency, the use of a frame antenna affects frequency stability due to body capacitance etc. I am currently constructing a Mk 2 version for 14MHz with an rf stage to provide antenna isolation and gain control."

G13XZM admits that at nighttime with a frame antenna the sensitivity of the 3.5MHz receiver is not sufficient for resolving weak ssb, but this can be overcome by using a coil tuned input circuit with a conventional antenna when it has adequate sensitivity and receives ssb with a pleasing clarity.

Is there sporadic-F propagation?

An extremely interesting result of the availability to UK amateurs of the 50MHz allocation has been the transatlantic contacts made each year since 1985 in June/July despite the sunspot minimum. It is quite clear that these contacts have been made at times related to the summer peak of sporadic-E conditions, but over distances considerably greater than could be expected from a single reflection from the E-region of the ionosphere (about 90 to 130km above earth). One possibility might be some form of layer entrapment or chordal hop but there is little evidence for this. Some amateurs have attributed these contacts to "double-hop sporadic-E" but in view of the restricted areas of intense ionisation associated with sporadic-E the chances of working stations in various parts of the USA on the same day by such paths seems inherently unlikely, at least as an annual occurrence.

To me it seems far more likely that the explanation is to be found in the possibility (for which there is some evidence) that there can be sporadic-F sheets of intense ionisation brought about by the same mechanism as sporadic-E. The F region of the ionosphere spans heights from 130km to over 500km (F1 130 to 200km, F2 above 200km).

TT February 1985, pp112-2 noted the generally accepted explanation of how sporadic-E occurs, as described by Dr E B Dorling in a letter to *Wireless World* in April 1978, as follows: "Sporadic-E was first seen to occur in the way it does, that is as very thin intense layers of ionisation, by a British Skylark rocket flown from Woomera, Australia, in 1958. By 1966 an association between these layers and sharp reversals in wind direction at high altitude had become recognised. Wind measurements in the very rarified atmosphere up to 150km or so revealed that a surprising pattern of wind reversals with height can occur; what is more the measurements showed that the pattern often descends slowly over a period of hours, with, for example, a sharp wind shear first appearing *above 150km height* (italics added), then moving downwards to below 100km before fading. The cause of this rather unexpected wind structure appears to be the propagation of atmospheric waves horizontally over great distances.

"The sharp wind shears are at the root of the sporadic-E layers, though in rather a complicated way. The winds, tenuous though they are at such heights, act to move the ions and electrons in the ionosphere in such a way as to displace the plasma vertically. Where strong wind shears of the appropriate sense exist, the plasma is squeezed into a thin concentrated layer, being moved downwards from above, upwards from below. As the wind pattern descends, the layer descends into an ever denser atmosphere, until finally at a height of about 100km it is brought to a halt . . .

"Sporadic-E then owes its transient character to interactions between atmospheric waves, the ionospheric E layer, and magnetic and electric fields. All but the magnetic field are constantly changing, so that the right conditions for layer formation occur—well, sporadically . . . Were the sporadic-E layers to be composed simply of ionised atmospheric gases, they wouldn't persist. They are, in fact, composed of *ionised metallic atoms*, mainly magnesium, silicon and iron, probably the remains of burned-up meteorites. The descending wind shears sweep up the metallic ions and bring them down as sporadic-E layers out of the thermosphere into the lower regions where atmospheric turbulence then churns them away into oblivion. sporadic-E layers seem to be the product of Nature's vacuum cleaning!"

Sporadic-E, in being composed of metallic atoms (ions), thus differs inherently from the normal D, E, F1 and F2 ionospheric gaseous layers. At the recent URSI national colloquium, Dr L Kersley and Dr P J S Williams described some of the current work that is being carried out at the University College of Wales—Aberystwyth on sporadic-E propagation. The aims of this research are to be able to predict the strength of backscatter at the lower end of the vhf spectrum (46 and 93MHz) and further investigation of the mechanisms whereby these interesting irregularities are generated in the E region. My ears pricked up when a fleeting reference was made to the fact that some evidence has been found of *particle reflection* from patches of ionisation in the F region correlated to sporadic-E propagation. Such sporadic-F patches would account very neatly for the annual June/July 50MHz transatlantic contacts and for some of the other anomalous propagation between about 20 and 100MHz.

The useful 4-65A valve

Percy Greenwood, G2BUJ, draws attention to the Eimac 4-65A valve (European equivalent QY3-65). He finds this a useful valve for home-built high-power linears for use at hf or up to 144MHz. With 2,000V on the anode and 400V on the screen-grid he obtains a measured 300W p.e.p on all hf bands from a single valve.

The 4-65A, introduced in the mid-'fifties by Eimac, is a small radiation-cooled, radial-beam power-tetrode with a maximum anode-dissipation of 65W. Short, heavy internal leads and low inter-electrode capacitances (grid/anode 0.08pF, input 8pF, output 2.1pF) contribute, according to the data sheet, to stable, efficient operation at high frequencies. It is suitable for use at maximum ratings up to 150MHz, 15 times higher than the older 813.

The valve is an interesting example of the post-war range of power tetrodes, though later largely superseded for professional applications by the ceramic forced-air cooled devices such as the 4CX250 series. Capable of withstanding anode voltages up to 3kV in some applications, it can deliver relatively high power output at much lower anode voltages. The thoriated tungsten filament is rated at 6.0V, 3.5A, and care should be taken to ensure that the voltage measured at the heater pins really is close to 6.0V. It has five base pins (seven-pin type socket) fitting National HX-29 or Johnson 122-101 sockets (Fig 2). The quick-heating features of these thoriated tungsten filaments may otherwise not prove conducive to long-life. Table 1 shows typical characteristics.

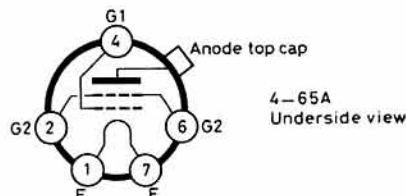


Fig 2. Base diagram of the high-power 4-65A rf power tetrode that can provide 300W p.e.p as an ssb linear, and can run at full ratings up to 150MHz

Table 1. Typical operating data for 4-65A valves

	For Class C cw, lsk or fm telephony			
DC anode voltage (V)	1,000	1,500	2,000	3,000
DC screen voltage (V)	250	250	250	250
DC grid voltage (V)	-80	-85	-90	-100
DC anode current (mA)	150	150	140	115
DC screen current (mA)*	40	40	40	22
DC grid current (mA)*	17	18	11	10
Drive input power (W)*	3.0	3.2	2.1	1.7
Screen dissipation (W)*	10	10	10	5.5
Anode power input (W)	120	180	240	275
Anode dissipation (W)	30	40	45	45
Output power (W)	90	140	195	230

*Approximate values

	For Class AB2 ssb linear amplifiers		
DC anode voltage (V)	1,500	2,000	2,500
DC screen voltage (V)	300	400	500
DC grid voltage (V)*	-55	-80	-105
Zero-sig anode current (mA)	35	25	20
Zero-sig screen current (mA)	35	25	20
Max-sig anode current (mA)	200	270	230
Max-sig screen current (mA)†	45	65	45
Max-sig peak rf grid voltage (V)	150	190	165
Max-sig dc grid current (mA)†	15	20	8
Max-sig driving power (W)†	2.3	3.8	1.3
Max-sig anode power input (W)	300	540	575
Max-sig anode dissipation (W)	105	190	225
Average anode dissipation (W)	60	65	65
Max-sig useful output (W p.e.p)	150	300	325

*Adjust to stated zero-signal anode current

†Approximate values

Owing to the intermittent nature of the speech waveform, average dissipation is much less than max-signal dissipation. However, if the amplifier is to be tested with a sine-wave signal source (or if a high degree of speech compression and peak limiting is to be used—G3VA), arrangements must be made to lower the duty cycle to ensure average anode dissipation does not exceed 65W.

At maximum anode-dissipation the anode operates (correctly) at a cherry red colour. As G2BUJ puts it: "The colour of the anode through the side screen makes it look good!" New, branded 4-65A valves are still available, though not particularly cheap: a current advertiser in *Electronics & Wireless World* quotes £65, though this is less than some comparable types. For anyone unfamiliar with valve characteristics and rf power amplification, a study of Table 1 will show clearly the differences between anode dissipation and the rf output on cw/fm (Class C) and p.e.p output on *unprocessed* speech on ssb (Class AB2).

Coaxial stub filters reduce rfi from 50MHz transmitters

TT (September 1985) devoted several pages to discussing some of the many reasons why the 50MHz band represents a valuable acquisition and the wide variety of propagation modes and antennas that can be used. But attention was also drawn to two potentially difficult problems. 50MHz remains in use for European television channels E-2, E-2A and East European R-1, and also in Eire, with little or no likelihood that European countries other than the UK will ever abandon vhf television (there is even talk of a new UK vhf channel though possibly not in the old Band 1 part of the spectrum). The second problem is bci and the consequent need to ensure that any 50 to 52MHz transmitters have extremely low harmonic output. The second harmonic falls entirely within the broadcast Band 2 which will eventually extend from 88 to 108MHz. The section 100 to 102MHz currently continues to be used by the public emergency services, but will later be used for a fifth national vhf/fm service. The section 102 to 104MHz is part of the segment forming the "upper local radio sub-band"; there are already a number of BBC and ILR transmitters in this band, and your next-door neighbour may be listening to one of these only a party-wall away from your 50MHz transmitter!

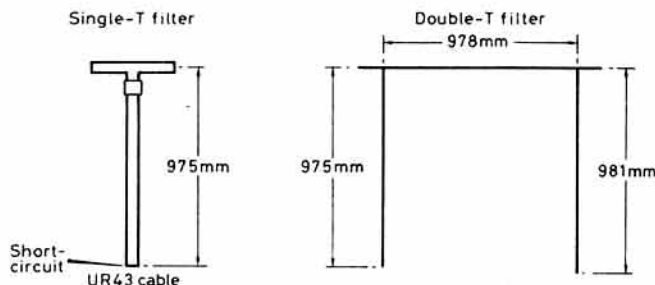


Fig 3. Single and double 100MHz quarter-wave coaxial stub filters for use with 50MHz transmitters to suppress harmonic interference to Band 2 broadcast or emergency mobile services. Dimensions suitable for cables with a velocity factor of 0.67

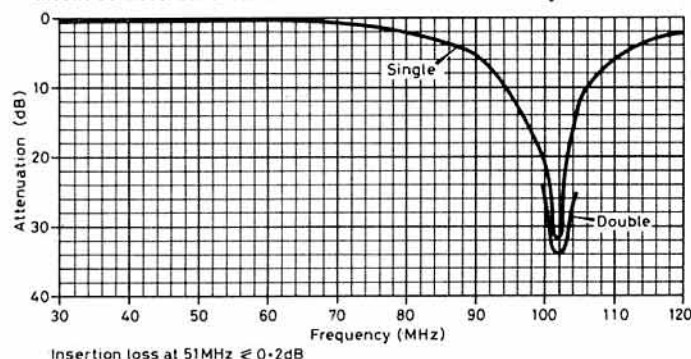


Fig 4. Measured attenuation characteristics of the 100MHz stub filters. The double filter is stagger-tuned to increase notch bandwidth rather than to increase attenuation

Paul Boyd, G4TUZ, writes: "With the likely upsurge in 50MHz activity following the extension of the band and with Class B operators already moving in, the problem of second harmonic suppression is once again with us. Some measurements I have made recently using shorted quarter-wave coaxial cable stub filters (Fig 3) may be of interest, especially as many newer amateurs seem to have difficulty in believing just how effective they can be. As may be seen from Fig 4, I find a single quarter-wave stub provides up to about 31dB rejection of the second harmonic, with a similar level achieved at the fourth and subsequent even harmonics. The stubs used UR44 cable fitted to BNC plugs and 'T' pieces. Additional rejection or a wider notch can be achieved using two stubs. These can be stagger-tuned and separated by a quarter-wavelength. The dimensions indicated are for total distance from the centre of the 'T' piece to the shorted end of the cable, and should be valid for any cable with a velocity factor of 0.67. The 'T' piece is an integral part of the stub and must always be present when the stub is used. For anyone

contemplating 50MHz operation this must surely be one of the cheapest and most effective ways of preventing or reducing interference to the broadcast Band 2. The measurements were made using the set-up shown in Fig 5."

The construction, adjustment and use of single and double open and shorted coaxial cable stub filters have been discussed on several occasions in *TT*, and details appear in *ART* (currently out of print but with a new edition planned).

Pocket power

W H Jarvis, G8APX, writes: "The largest (and most expensive) nicad pack for a range of handheld transceivers allows barely 20min transmitting on high power. A pack of dry cells lasts longer but works out far more expensive. A remarkably simple and cheap solution is a new 12V, 1.1Ah, lead-acid battery sold under the brand name of 'Dryfit' and currently available from many retailers at around £12.

"I attach a metre of twin flex with a 'power jack' ready to plug straight into the handheld. This way the separate extra battery can easily go into my pocket during /P operation. The easiest way of keeping the Dryfit accumulator charged and ready for immediate use is to keep it wired in parallel with your car battery: Fig 6. I have a 3W 'festoon' lamp in series. You can see a glimmer while driving, confirming the Dryfit unit is charging. When starting the car the festoon lamp lights, showing that the accumulator is trying to help power the starter motor. And if you drop the flylead, so that it short-circuits to earth, the bulb comes on full brightness as a warning.

"These sealed Dryfit batteries are claimed to be maintenance free, do not leak in any position, and never need 'topping up' with distilled water."

While on the subject of handheld transceivers, and noting that there are now units providing up to about 5W rf on 430MHz to stubby "rubber-duck" antennas that tend to be held only a matter of inches from the user's eyes, a reminder seems needed about the sensitivity of the eyes to rf fields. A few years ago, the USA firm of Motorola investigated this problem using simulated tissue and came to the conclusion that on vhf a potential hazard exists when the power output rises to about 7W; 5W output on uhf, with the field concentrated by the miniature antenna, must be getting rather near to the hazard threshold. Safe enough perhaps if you recognise the need for care, but getting a little too close for comfort of mind!

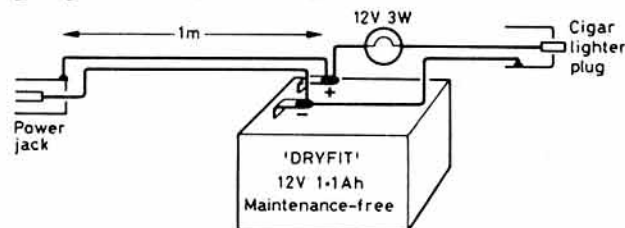


Fig 6. How G8APX keeps his sealed 12V 1.1Ah "Dryfit" lead-acid battery charged ready for use with his handheld transceiver

An alternative type of rechargeable cell to lead-acid and nickel-cadmium is emerging with the marketing of the first commercially-available, high-energy rechargeable lithium cells by Moli Energy Ltd, 3958 Myrtle Street, Burnaby, British Columbia, V5C 4G6, Canada. An article in *QST* June 1987 sings their praises (the authors are linked with Moli Energy Ltd) with a *QST* sub-heading suggesting that "properly applied Moli Energy's rechargeable lithium cell is superior to its nicad counterparts (for handheld transceivers)". I have stressed "properly applied" since one of the problems surrounding the application of lithium batteries (which have, for example, a much longer shelf life than nicad, more energy per unit of weight etc), both disposable and rechargeable, is the risk of explosion unless there is effective current limiting etc. Even small lithium cells used as non-volatile memory systems have been known to explode and damage equipment and, potentially, the user.

A Moli rechargeable lithium battery pack suitable for a handheld transceiver is not cheap; *QST* gives a figure of \$99 for a pack.

Traveller's radio

Five years ago I wrote a two-part article for *Wireless World* in which I ascribed the beginnings of portable hf communications equipment largely to the wartime development of clandestine mains-operated transmitter-receivers compact enough to be carried, with all necessary accessories, in an attaché case or suitcase. These in turn had drawn, in most countries, on ideas tried out by radio amateurs in the 'twenties and 'thirties.

For instance, I noted that in the mid-'thirties, Ted Cook, ZS6BT but then ZT6AQ, had travelled around South Africa with a 30W hf transmitter (double-triode 6A6 driving an LS5, later B12, power amplifier) built into a Burndept portable-radio receiver case about 18 by 18 by 8in, with an 0-v-2 receiver (ie regenerative detector and two af stages for those who have never used this once-universal short-hand) in a second, similar case. As described at

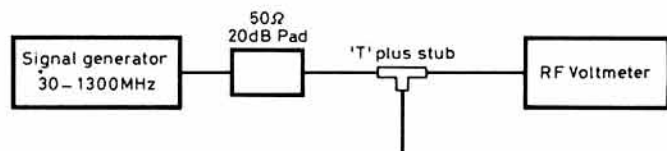


Fig 5. Measurement set-up used by G4TUZ to produce the response curves shown in Fig 9

the time in *The T & R Bulletin* (January 1937, p305) he contacted many amateurs over long distances from temporary locations, including his seventh-floor flat in the centre of Johannesburg. One of his main problems was to avoid causing "key clicks" to an estimated 400 broadcast receivers within a radius of 1,000ft of his makeshift antenna; a problem that later affected clandestine operations in western Europe!

A modern high-performance solidstate "CW Travelradio" capable of providing a useful 12 to 15W rf output between 14.0 and 14.1MHz has been described by Rick Littlefield, K1BQT, in *Ham Radio Magazine* (June 1987). This is far more compact and of much higher performance than ZS6BT's pioneering efforts, with the transceiver unit a compact 1.5 by 4.5 by 6in and weighing only 1.5lb, making it possible, as K1BQT puts it, to "pack a private expedition in a very small bag". Unlike the usual QRP rig, this includes a high-performance superhet receiver (9MHz i.f) with crystal filter rather than direct-conversion, and has an MRF479 transistor as a broadband Class C power amplifier (Fig 7) which with 0.7W drive provides up to about 15W rf output on 14MHz, sufficient power to give good dx results with simple antennas.

K1BQT indicates that he runs this rig from a 13.8V psu capable of providing 2.5A intermittently, but does not indicate the size or weight of this unit. In practice, for transmitters of more than about 3W output, whether solidstate or valve, it is virtually always the psu or battery that constitutes the heaviest part of a portable rig, despite such improvements as toroidal mains transformers etc. To the best of my knowledge one of the lightest transmitter-receivers capable of more than 10W output, weighing only about 1.5kg complete with psu, remains the Danish wartime "Telebogen" clandestine set designed by L Duus Hansen, OZ7DU, as noted in *TT* October 1985, p786.

In an accompanying article (*HR* June 1987) K1BQT describes the 0.5λ dipole with an overall span of 21ft 4in, inductively loaded in the centre of each section with air-spaced coils of 4.85μH, that he uses with his "CW Travelradio". He provides some useful advice on achieving good performance from simple antennas at temporary sites, as follows:

- (1) Look for a high and open location. Get above the rooftop if you can but keep directivity and take-off angle in mind.
- (2) Keep the antenna at least 5 or 6ft from the building surface. Proximity to electrical wiring, foil insulation and structural metal can detune it. Bending elements outwards may help to decouple the ends from a metal structure.
- (3) When you side-mount to a building, try to locate the antenna on the side facing the desired direction of transmission. Better to use the structure as a reflector than as a shield.
- (4) If there are horizontal wires close by, vertical polarisation works better (conversely, in or near trees or vertical metal structures, use horizontal polarisation or slope the antenna downwards towards the desired direction —G3VA). When using vertical polarisation for a dipole make sure the bottom end is at least 6ft above ground. Also make sure the antenna is clear of people and pets. Even QRP signals can develop enough rf potential at element tips to cause painful burns and injury.

The rccb—an IEE safety warning

Back in 1981, in the course of some discussions and explanations of the role of the residual current contact breaker (rccb), then usually still known as an elcb (earth leakage circuit breaker), *TT* included a note of warning from Llyr Gruffydd, GW4CFC, that this device is not the complete answer to all mains-safety problems. He felt its value was limited partly because it offers

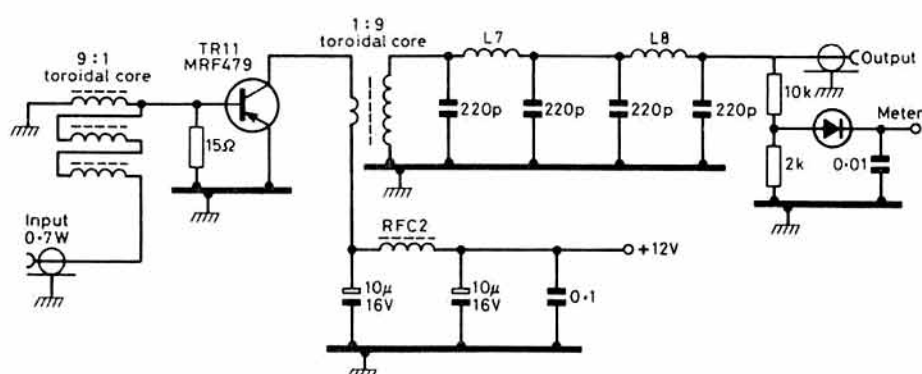


Fig 7. K1BQT's 12W output stage for his 14MHz "CW Travelradio"

radio amateurs no protection against shocks from the secondary side of a double-wound mains transformer, but especially because introducing an rccb into a shack can lead to a false feeling of immunity to shock. This conclusion was based on his experiences of a laboratory with many water taps and much electricity. He had found that installing rccbs, rather than adding to staff safety, induced a state of euphoric carelessness among at least some of the occupants.

Again, in *Members' Mailbag* (November 1984, p 953), H Du V Ashcroft, G4CCM, also expressed misgivings on reports that seemed to imply ample safety in the use of 30mA rccbs in radio shacks and at field day sites. G4CCM's letter was criticised on a number of grounds by several correspondents, so I suspect that he felt some satisfaction in finding in *IEE News* (June 1987, p8) an item emphasising that while the additional protection of an rccb is desirable for all domestic installations, proper care in the use of electricity is the only true safeguard. The writer noted concern over the use by the trade of various names for these devices such as "safety trip" and "safety switch", then adding:

"While fully recognising the important part played by these devices in contributing to electrical safety, those who hold a balanced view are increasingly concerned at some claims which appear to suggest that these devices provide complete safety from electric shock. No device can do this—the aim is always that the shock experienced will not lead to serious physiological effects. The danger arising from such claims is that people may believe that, by using such devices, they can 'take chances'—that there is no need to be concerned about worn or damaged flexible cords and that they can put off to another day the replacement of suspect plugs or other equipment."

Mains safety and imported transceivers

Derek Thom, G3NKS, has uncovered two mains-input hazards in his Ten-Tec "Corsair", or, more specifically, in the Model 260 power supply unit. First, the mains input cable enters the rear of the cabinet and "live" (phase, line L) wire is taken straight to the fuse holder mounted adjacent to the entry point. In his unit the wire is connected to the cap end of the fuse holder; hence, when the cap is removed along with the captive fuse, the live cap contact ring is exposed and could easily be touched accidentally.

Second, the "live" (L) wire is routed from the fuse-holder (tip or end connection) to the Corsair transceiver cabinet via connectors and a multiway cable where it connects to the "power on/off" switch mounted on the front panel (part of the rf gain control). The L wire returns from this switch to the psu via the same multiway cable, where it connects to the "power on/off" switch mounted on the psu: see Fig 8. Thus switching "off" at the psu does not remove the mains supply routed to and from the transceiver cabinet. In his view one might reasonably expect that after switching off at the psu, all voltages would be removed from the transceiver cabinet. Clearly this does not happen, and an unwary operator could easily come into contact with mains voltages when working on the transceiver with the covers removed (especially as there are unprotected, ie unsleeved/unshrouded, terminals at mains potential within the transceiver cabinet).

He adds: "I have overcome both hazards by changing over the connections to the fuse holder, so that the incoming live conductor goes to the tip or end connection, and by linking out of the circuit the live conductors to/from the transceiver cabinet (this is no loss because the 'power on/off' switch on the transceiver cabinet seems to me to be redundant)".

Since the above notes were written, Rowley Shears, G8KW, managing director of KW Ten Tec Ltd, has written to G3NKS as follows:

"Your Corsair Mk I must have been quite an early one. We became aware of the mains wiring arrangements, and this has been rectified in a similar way to the action you have taken. We have been receiving Corsairs from Ten-Tec with the parts which are exposed to stray fingers covered with protective sleeves. In the psus which are supplied from Ten-Tec USA stock, we have to change the wiring from 115V to 230/240V so we decided to go one further: in

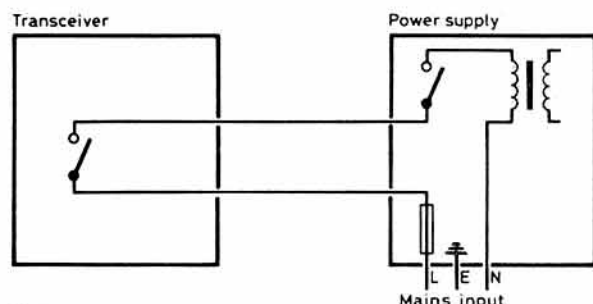


Fig 8. The mains-input arrangement that G3NKS found on his "Corsair" transceiver and which he considers hazardous.

addition to putting the fuse holder wiring to rights, we replace the mains cable to conform to EEC standards.

"When we first made enquiries about this problem, we were told that in the USA, 115V is generally thought not to be lethal (this is why it was chosen in the very early days of domestic electricity) and even to this day no provision is made for marking one supply leg "live" and the other "neutral".

"In my own Corsair installation I use only the on/off switch in the transceiver because my psu is under the table and not easily accessible. Also, the 'field' from the psu transformers affect my Shure 444 microphone if they are close together on the table. It is, we know, common practice for amateurs to have the psu under the table to keep the top clear for log-book, microphone, morse key etc."

It seems worth checking on any imported equipment (ie virtually 100 per cent of transceivers) to check whether the mains wiring etc conforms to British and European standards.

Tune-up protection

With solid-state power amplifiers, it is well-recognised that most rf power devices will not sustain, even temporarily, a serious mismatch or no-load conditions at anywhere near full ratings. Most rigs therefore incorporate protection circuits which automatically reduce power output when the output load has a vswr of more than about 2:1. Even so, many amateurs retain, with some reason, a fear of connecting up long-wire and voltage-fed antennas that require the correct adjustment of an antenna matching unit in order to avoid an extreme mismatch; nor is the adjustment of an atu made easier by the action of the transmitter protection circuit.

Fred Piesse, VK3BYW ("A tune-up protection device", *Amateur Radio* (VK) May 1987, pp6-7) became convinced of the need for tune-up protection some years ago when he lost the final rf transistors of his early-model IC701 transceiver while attempting to match a random length of antenna wire at a camping site. Later he replaced this model with an IC751 but his fear of tune-up damage returned when he read in the instruction book: "As the output is quite high, avoid connecting the antenna connector to open lines and do not transmit under mismatched conditions. Otherwise the final stage could be overloaded and cause a malfunction of the unit" and "The final transistors used in the IC-751 are of good design and are protected to a reasonable extent by circuits incorporated in the set. . . . When in doubt about antenna systems, use the lowest power settings to achieve meaningful readings. Use a good tuner or transmatch when necessary. Always use caution and exercise judgement when testing rf power generators."

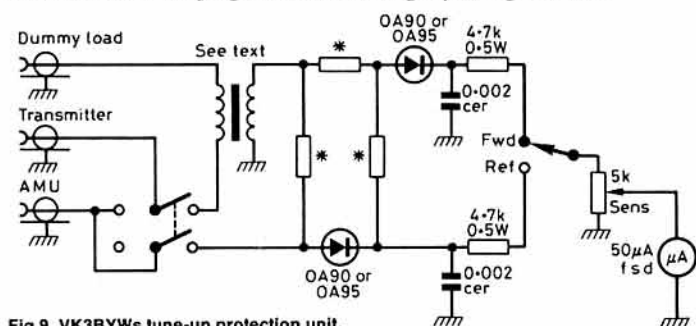


Fig 9. VK3BYW's tune-up protection unit.

This need to exercise caution is not specific to the IC-751 and sums up the present state-of-the-art: reliable operation of solidstate devices is to be expected when you use antennas that present a reasonable match, but does not encourage those who like to experiment with a variety of antennas. To set his fears at rest, VK3BYW has developed a simple but ingenious unit. This places a matched dummy load across the output of his transmitter during tune-up but at the same time provides a small amount of rf to actuate a QRP-type swr bridge to determine when his antenna is reasonably well matched. Once this has been achieved output power is cut temporarily, the dummy load and swr bridge are switched out of circuit and any final adjustments made. If for any reason the antenna cannot be matched quickly, damage to the transmitter will not occur with it operating into a matched dummy load. Nor will the in-built transmitter protection circuits make it difficult to adjust the antenna matching unit. Other band users will be thankful for the absence of strong signals during tune-up. It is also usable with valve transmitters as the atu can be adjusted independently of the transmitter controls.

The broadband rf transformer is wound on a half-inch (12mm) diameter toroid (Amidon T50-6) with primary two turns of 20swg enamel-covered wire, secondary ten turns of 24swg. This is mounted on a small piece of matrix board through which the pigtails can be threaded and coated with epoxy resin to keep the windings in place. Keep rf leads short.

Table 2—Calibration of tune-up protection unit with 50µA f.s.d. meter

Scale reading	VSWR value	Scale reading	VSWR value
0	1.0	12.96	1.7
2.38	1.1	14.28	1.8
4.55	1.2	15.5	1.9
6.52	1.3	16.67	2.0
8.33	1.4	21.4	2.5
10.0	1.5	25	3.0
11.54	1.6		

Note: For swr values exceeding three use formula: $vswr = (50 + X)/(50 - X)$ where X is the reverse scale reading.

Accuracy of the swr meter depends on a good match of the 50Ω resistors. VK3BYW used two 100Ω resistors in parallel selected with the aid of a good ohmmeter. Calibration of the meter is not linear see Table 2. VK3BYW used a detachable dummy load to save carrying his heavy station unit when operating mobile and houses his unit in a home-made box measuring 160 by 90 by 75 mm (wdh) finished in Auto-Spray touch-up paint. He considers it easy build, low in cost and dispels any fear of damage to his equipment. Where the swr bridge is used only for initial tune-up, accuracy of calibration is probably unimportant.

More on the simple capacitance meter

The July *TT* (page 498) showed a simple capacitance meter culled from an item by Gabriel Rivat, F6DQM, in *Radio-REF*. Unfortunately Fig 5 omitted the essential connections to the range-switch rotors and gave only a brief description of the background to this attractive, low-cost device. Thanks to Dave Plumridge, G3KMG, who sent me a copy of the earlier article by Courtney Hall, WA5SNZ, in *Ham Radio* November 1978 on which F6DQM based his design this in turn led me back to WA5SNZ's original version (*Ham Radio* April 1975) which used a not readily available programmable unijunction transistor plus transistor inverter-amplifier as the trigger source. There was nothing particularly critical about this form of trigger source and WA5SNZ in 1978 simply substituted the 555 device.

In Fig 5 (*TT* July p498) the top rotor of the range switch should be connected to the higher of the two test terminals (ie the one connected to pins 6, 7 of IC2). The lower rotor (switching the zero adjustment resistors) goes to the junction of the 380Ω resistor and the 1mA meter.

The 1975 version using a type AT6028 "put" as the trigger source used only a single, panel-mounted zero adjustment control which required setting each time the range switch was set to a different range before the capacitor to be measured was connected to the test terminals. The need for the zero adjustment (particularly for lower capacitance ranges) arises from the input capacitance of pins 6 and 7 of the 555 and stray capacitance amounting to about 25pF. This results in an output pulse even when there is no capacitor connected to the test terminals. Without a zero adjustment to null out the voltage from this pulse, the meter would read, on a 100pF range, about 25 per cent of full scale even with no capacitor connected.

The basis of this type of unit is that the average dc value of a pulse waveform has a direct linear relationship to the duty cycle (ratio of off-time to pulse-time) of the waveform. The system functions roughly as follows:

The trigger source is simply a free-running pulse generator which has a constant frequency, about 500Hz, and produces a narrow negative output pulse. Each time a trigger pulse occurs, the one-shot multivibrator (IC2) initiates an output pulse whose width is determined by the capacitor-under-test. The larger the value of the capacitor, the wider the pulse. Since a dc meter reads the average value of the pulse waveform, the meter may be calibrated directly to read capacitance. Care must be taken, however, that the pulse width does not exceed the time between trigger pulses and the frequency of the trigger source must be high enough to prevent jitter of the meter needle. The pulses must be of constant-voltage and this is achieved by using a regulated psu (12V regulated to 5V) delivering up to 60mA. Because of the relatively high power consumption and the need for constant-voltage pulses, a battery supply is not advisable. If field operation is needed use alkaline batteries. In the 1978 version, WA5SNZ used three 500Ω zero-adjustment pre-set potentiometers with one resistor covering the three larger value ranges of his five-range unit, adjusting these before connecting any capacitors (his ranges were 100pF, 1,000pF, 0.01, 0.1 and 1µF) calibrated by connecting a single known 100pF capacitor on the 100pF range and adjusting the gain (calibration) control for full-scale deflection. It should not be necessary to calibrate each range individually. WA5SNZ warns that when the capacitor being measured is too large for the range-switch setting the circuit may be driven out of its linear range of operation. Under these conditions, the meter may read less than full-scale even though the actual capacitor value is more than the full-scale reading. To avoid such erroneous readings, test an unknown capacitor on the 1µF (F6DQM 3µF) range first, then move the range switch to lower settings until a usable reading is obtained. Keep the original calibration capacitor handy for occasional calibration checks. □

NEWS BULLETIN

ZEN and the Art of VHF DXing *... or how to get the best out of good conditions*

The Great British Bank Holiday Weekend (29-31 August) produced the usual so-so weather but it also produced super conditions on 144 and 430 MHz. There was very widespread propagation from the UK and Eire into Scandinavia, North Germany, East Germany, Czechoslovakia, Poland, Austria and Switzerland, and at least one East Coast station worked into Yugoslavia and Hungary on 430 MHz. As if that wasn't enough, there were auroras on the 25th, 27th and 31st of August and some very tasty Scandinavian and USSR-type DX was worked on 144 MHz. There was also a good opening down to Italy and Switzerland on the 12th - at the peak of the Perseids, just to make life more interesting.

G8VR's column will no doubt list all the super stuff heard and worked, but we thought that - especially as we stagger towards autumn and hopefully some good VHF and UHF propagation - we might have a little look at what to do when you suddenly start hearing interesting foreign-sounding stations coming out of your receiver as opposed to the usual white noise. For many new and not-so-new radio amateurs, these openings tend to come as a bit of a surprise and we thought we'd throw a few suggestions on how to make the best of them into the ring. Most have been distilled from various points made by the Society's VHF Committee over the years, together with input from various dedicated VHF and UHF operators.

But I hate 144 MHz DX!

Just to start with, let's assume that you're one of those who use the SSB and/or CW end of 144 or 430 MHz for local nattering and who haven't the slightest interest in working DX. Fine - it's a free country, and we've spent more time gassing on 144 MHz about everything under the sun than most. The only thing we would say is that a very

high proportion of those who use these bands are also interested in chasing DX on them, and when propagation opens up the 144 MHz band in particular sounds more like 14 MHz short-skip.

DX working on SSB tends to take place between the bottom of the SSB bandplan allocation at 144.150 MHz and something like 144.350 or 144.400 MHz, and the space between those frequencies during a mega-opening tends to get very rapidly filled up. If you want just a local chat in the course of an opening, great - but there are probably a good hundred other amateurs able to copy you who'd very much appreciate your moving above about 144.400 MHz to have it. We've heard far too many instances in which someone politely asks a station having a local QSO on, say, 144.260 MHz if he would mind moving because there's a weak DX station just underneath him; instead of seeing the point and doing a quick QSY, however, the usual response is to tell the polite questioner not very politely to shove off. What then inevitably happens is that everyone calls the DX and the local QSO gets demolished anyway! Please, please, have a bit of awareness of conditions and be prepared to move up above 144.400 for local SSB contacts. It's rather silly to say "well, we've been here for half an hour and I don't see why we should move" -

- a) because it's anti-social and unintelligent
- b) the odds are that your QSO will shortly get zapped.

Q: By what?

A: By 400W into two times 17-eles half a mile away.

Q: When?

A: When your local DX-er suddenly finds out that there's some choice DX half a kilohertz from where you're comparing notes about how the garden suffered from the lousy summer weather.

Don't get us wrong - we've had many wonderful conversations about such matters on 144 and 430 MHz and greatly enjoy them, but when conditions are good - and we're really only talking about 20-odd days each year - please be prepared to have them somewhere different from your favourite frequency.

Same goes for the CW end. Many, including ourselves, love CW ragchews on 144 MHz, but when the band is open we make a point of having them above about 144.100 MHz - where no DX ever seems to go. In the Bank Holiday opening there were heaps of mega-DX stations - OK portables and Y2 stations, together with the odd OE and SP - all blazing away on the key between the bottom of the band and about 144.085, but there was total silence between there and the beginning of the SSB/CW sector at 144.15 MHz. You could have fitted loads of CW ragchews into that part of the band and left the lower end for the DX QSOs.

Incidentally, if you've just spent twenty minutes on, say, 144.240 MHz being called by all sorts of DX and your mate then calls you to compare notes and brag about the square he worked that you didn't hear, it'd also be kind if you both move high up the band to do so. Arguably your mate ought to know better, of course, than to call you in the middle of a DX pile-up but if you're such close friends that you forgive him for it, please at least consider a quick move HF to discuss the matter of who's worked what and whether SP3DRT is in J081 or J091. That way, others may also be able to work the DX you've already got in the logbook.

The other no-no during an opening is to use the calling frequency in the same way as you would during flat conditions. The reason is simple - despite years of trying to persuade them otherwise, a few of our Continental cousins (who also count as good DX at VHF and UHF) persist in operating either on the

calling frequency or a few kilohertz away from it when conditions are good. For instance, during the opening on the 12th an Italian station in a very choice square sat on 144.305 MHz for about three hours solid despite all attempts to get him to QSY - and it happens every time. We suspect that some overseas stations simply can't believe how busy 144 MHz is in Europe and fondly believe that 144.300 MHz is a nice quiet frequency.

Now we all know that they shouldn't and wish they wouldn't, but the fact remains that they do. So please think about this before you go on 144.300 MHz and call CQ, or announce that "....this is G4*** listening for G6***, are you about Sid?". Better still, make a stern resolve not to go anywhere near 144.300 MHz during an opening except to listen for any DX and maybe to work it. Please don't say to yourself, "well, I don't care about all this DX lark, I just want to see if Sid's about or any of the lads so I'm going to call CQ like I usually do" - many new and some not-so-new licensees do this and it's selfish and unthinking. It's also selfish and unthinking for DX stations to operate continuously on or near the calling frequency, granted, but that's no reason for us to be silly as well.

HOW NOT TO WORK DX ON TROPO:

Q: "Zen master, tell me how can I be absolutely certain of NOT working VHF/UHF DX?"

A: "By calling CQ DX"

Unless you're a mega-station living on top of Snowdon and with 400W to a vast array - i.e. unless you're unlike the vast majority of us who enjoy chasing the DX on 144 and 430 MHz - the best way to work DX is to get your money's worth out of your receiver.

In one word - LISTEN!

Here's a brutal fact.

If your 144 or 430 MHz station is of the average urban variety, running somewhat less than the legal limit to a single antenna from a not particularly outstanding site in a not particularly rare locator square, picking a frequency and calling "CQ DX" in the general direction of the good propagation is pretty well guaranteed to be a dead waste of time and electricity. All you are achieving is causing QRM, which isn't why you have an amateur licence. Also, whilst you're making interminable calls the well-sited DX who might otherwise hear you is almost certainly a few kilohertz up the

band working a string of stations like yours. If you have an average station of the sort outlined above, be honest with yourself and count the number of times a tasty DX station has come back to a CQ call. We'd bet the cost of a new 4CX250B that the answer will be pretty close to none.

To make matters worse, the odds are also that there will be a weak DX station half a kilohertz from the frequency on which you're doing your thing, which you can't hear but which a better-sited station five miles away could copy at S4 if only you'd shut up. He will proceed to curse you fairly comprehensively and you'll go down on his "lid list". This may or may not worry you, but either way it's poor operating.

It's very tempting to assume that, because you've heard, say, one loud German or French station on the band, there must be dozens of others who'd be equally loud if only you could raise them therefore the best thing to do must be to call CQ. Not so, alas. The big guns who would be just as strong as the guy running the pile-up are probably tuning around looking for rare squares - which means that even if they hear a G station calling CQ DX they're unlikely to come back to it. For every loud German station, say, who's working a pile-up of G stations there are probably twenty or thirty other German stations around who could start a similar pile-up if they so chose. But they won't; they're carefully using their receivers and listening very hard for maybe the last square or two that they need in Britain or Eire. Never mind a new '250B - we'd bet a couple of 4CX1500As, bases and chimneys and a few pints thrown in as well that if you're in a common UK locator square like IO91, JO01 or whatever and you're an average station calling CQ DX, your chances of being called by anything remotely resembling DX are zero tending towards none.

If you're a bit further afield, say in the West Midlands, Manchester, Liverpool or whatever, we'd guess that your chances are considerably enhanced - i.e. you might get one call every ten openings from a newly-licensed PA0. Dwellers in rarer squares, of course, may do better. If propagation is good and you happen to be the only active G station in IN69, for instance, you could probably call CQ DX with Dobbs power to a dipole and start a fairly ferocious pile-up in thirty seconds flat.

However, if you are Joe Average in a common square - and unfortunately most of us are - your best bet is NEVER to call CQ when

conditions are good. Listen, listen and then listen some more, with the headphones on. Check out every interesting-sounding signal you hear and don't move on until you're satisfied that it's either a) someone in a square you don't need or b) not DX. Also, take a careful listen to what well-sited stations in your vicinity are hearing and working. This will give you some idea of how propagation is going and what chance you have of working DX.

HOW TO WORK TROPO DX:

Q: "Zen master, tell me how to work tropo DX".

A: "By not working it".

Having read the earlier bit, you could be forgiven for thinking that the only way for the average VHF/UHF station to work DX in an opening is to get stuck into the pile-ups and rely on brilliant operating and the QSB (or the Force) being with you at the right time to make it (or alternatively to ask your mate up the hill with mucho ERP to ask the DX to listen for you - it's worth a try). In a way that's true, but it's also important not to fall into the "pile-up trap". This is to assume that because DL6*** in a square you need is S9+ at your residence and a quick scan around the band suggests that there aren't any other loud and workable German stations about, you've got no option but to join the howling mob and hope you raise him. Result, maybe you work him and maybe you don't but either way you spend 45 minutes trying.

The thing to bear in mind is that many amateurs - even seasoned HF DX-chasers, and some of their pile-ups make the average VHF/UHF affair look like Sunday afternoon tea-with-the-vicar sessions - suffer from a little syndrome known as "pile-up fixation". They grit their teeth, determined to work the guy however long it takes and keep pounding away even though it might be a square they've already worked six times and got confirmed twice. Well, fine if that's what turns you on - all good primitive competitive stuff, get that latent aggression out in the open, good old OE Sigmund had it all sussed a hundred years ago. The sneaky devious operator, however, leaves them to it and goes looking around - and the odds are that he'll hear other stations calling CQ from squares he also needs.

Here's one example from the Bank Holiday epic. OK1KRA in JO70 was amazingly strong at one stage on the Sunday evening on about 144.310 MHz and the pile-up was moderately monumental - it sounded rather as

though every 144 MHz G station south of Hadrian's Wall was calling him at the same time. On a cursory listen round, 'KRA was the only Czech station on. However, what did we find about thirty seconds after starting a careful look up the band? OK10A in the same square on 144.210 calling CQ, about S5 or 6. Bang - one call (running 25W, incidentally, because we'd forgotten to switch the linear on, call yourself a DX operator?) and he was in the log. About five kHz up the band we found Y25UL in a square we needed just signing with a station not too far away. He was only about S4 but eminently workable - one quick call as soon as he said "QRZ?" and the deed was done. There wasn't much competition since most of the locals were still locked in mortal combat with each other over OK1KRA, who was still S9 plus any amount of dB.

The upshot was that about twenty minutes later, whilst the howling wolf-pack was still at it elsewhere in the band, we had five new squares in the logbook! Incidentally, you'll also find this effect very pronounced when 50 MHz opens up to the States. The loudest signal on the band is almost invariably WA10UB, and there's always a thundering herd after him thirty seconds after he appears. It's very tempting to join in the fun, but we'd strongly suspect that you'll work three or four Stateside stations who are also calling CQ elsewhere in the band if you go looking for them. They might be only S5 instead of 'OUB's S9+++ but so what?

All right. Suppose that one evening when you're watching something on the box the phone rings and your mate says "144 MHz is open and I've just worked HB9CRN". What do you do?

Basically, go into the shack, switch on and then proceed to make your receiver wonder what hit it. You've probably spent a lot of time and money on your antenna and receiver - well, recoup some of that investment by listening hard and long. Whatever you do, DON'T go tuning the band like a madman and shouting your head off for the first DX station you hear - or even worse, grabbing an allegedly clear frequency and firing off a string of CQ DX calls. The odds are that the frequency isn't at all clear if conditions are good - and anyhow, as we've seen, the chances of anyone coming back to them are about as good as the chances of getting 400W on 430 MHz out of push-pull BC108s. Listening for DX is an art, and probably the best way to learn it is to watch a keen DX-chaser doing it. He or she will

tune the band carefully, pausing at signals which sound interesting and maybe swinging the antenna this way and that to maximise their strength. All the time the real DX listener is building up a mental picture of which directions sound promising, how good conditions are, what stations are on the band and how well G8***, the local DX king with 225 squares under his belt, is doing.

Just for fun, let's imagine the conversation you might be having with yourself as you look round the band (what, you mean I'm the only one who mutters to himself when conditions are good? Better see someone about that....). Let's suppose you're a station somewhere in the south of England: your internal dialogue might go something like this:

"So G1*** worked G4KUX at S9+ twenty minutes ago did he, lucky so-and-so, I need that square... nice of him to give me a bell though. Why don't I move out of this hole-in-the-ground QTH and live on top of a Welsh hill, might work some real DX that way... might also go bankrupt... never did fancy septic tanks anyway. OK, switch on, where did I leave the antenna pointing?... let's see. GB3VHF beacon's up a little, not much... let's look up the beacon band a bit.... what's that off the back of the beam? Good grief, it's GB3ANG, don't normally hear that at all, let's swing the beam round that way.... oh yes, it's about S6, conditions must be incredible to the north. What about that beacon in North Germany, what's its callsign... where's the Call Book?... oh yes DLOPR on decimal nine-one. Can't hear that... no, not there. Must be good to Scotland though if 'ANG is as loud as that. Let's have a look round the SSB end"

"That's GODAZ in Worcester; he's a bit stronger than usual, which way's he beaming? Who's he working? GMOEXN, where's he? Hold on, he's put it over..... can't hear him..... no, he's gone.... where's the Call Book? Caithness, can't get much further north than that, must be Yankee Sierra square, that'd be a new one. Must keep an ear open for him. Let's press on - oh, here's G3FPK in Surrey, he's a wise old bird, always knows when tropo's around, gets out like crazy to the north... who's he calling? GM4DMA/A. That rings a bell - wait a sec, it's that chap on the oil rig in AS square! Wonder whether I can hear him? Yes there he is, about S3.... ouch, my poor

front-end's getting a battering, just listen to the pile-up. Have to come back to that one, make a note of the frequency".

"What next? Ah, a GM: "....CQ DX, CQ DX, this is GM4IPK in Yankee Papa square, beaming south and standing by". That's Andy, worked him in the aurora last year - he runs 400 watts to four antennas, he wouldn't be calling CQ DX unless something's up. Wonder whether he thinks I080 is DX, probably not. Hold on: ".....HB9CRQ from GM4IPK, hello Dan, you're 5 and 7, go ahead". OK, Andy's got propagation to Switzerland, wonder whether I have - let's swing the beam.... can't hear HB9CRQ, damn, must be a local duct Andy's got hold of. Better not call him if I hear him on, he must be chasing OEs or something and I've got the square confirmed anyway. Check the beacon whilst the antenna's looking this way.... what is it, HB9HB?... that's right... no, can't hear it either. Oh well, keep looking on SSB.... can't hear any DX at all from the south-east, back to north..... try Angus beacon again, yes, still strong, a bit stronger now come to think of it".

"That sounds like a Scots accent, who is it? GM1MRY portable, Kilsyth Hills - oh yes, just outside Glasgow. Running a 290R plus 25W amplifier. He's about S6.... well, I certainly wouldn't hear him normally. That must be I076, could do with that one. Hmm, it's the other guy's frequency, never mind, maybe catch him later. Check GM4DMA/A again, still about S3 but listen to that pile-up.... is he calling anyone?...."GM4DMA/A from G4OAE, you're 5 and 9, very strong Lawrence, over". OAE - that's Dave in Reading, he's a meteor scatter king, things must be good if he's on tropo. He's certainly hearing DMA better than I am.... oh well, maybe it'll get better"

"Hmmm: looks like some propagation to the north but not that good from here at the moment. Let's see who we can work. There's a weak GM calling CQ - oh damn that G4*** calling CQ on top of him, what's the point, he's got a worse site than mine and that's saying something.... nasty wide signal too, why doesn't he learn to drive his linear?... bet no-one goes back to him.... no, there's the GM still calling CQ. Who is it? Ah, GM1MRY portable again.... he's in the clear, let's give him a blast.... no, he's down in QSB again, let him

keep. Conditions aren't all that stable by the look of it, might need to pick a good time to call people tonight. Hello, here's another one, he's much stronger..."CQ, this is GMOEXN in 1088 calling CQ and listening". Call him, quick: "GMOEXN, this is Golf Nine Zulu Zulu Zulu, G9ZZZ in Yankee Kilo square, over"....."

"Great, another new one. How about GM4DMA/A? Hmm, he's about S4.... people around London seem to be giving him S9+ all the time, guess they've got better propagation to him. Suppose I could try a few calls, could get lucky.... wish I lived on top of a hill.... mind you, even that doesn't help if the force isn't with you.... looks like it isn't with me to AS square tonight. Oh well, never mind, if the mob in Zulu Lima's concentrating on working DMA that'll leave a bit of piece and quiet for me....."

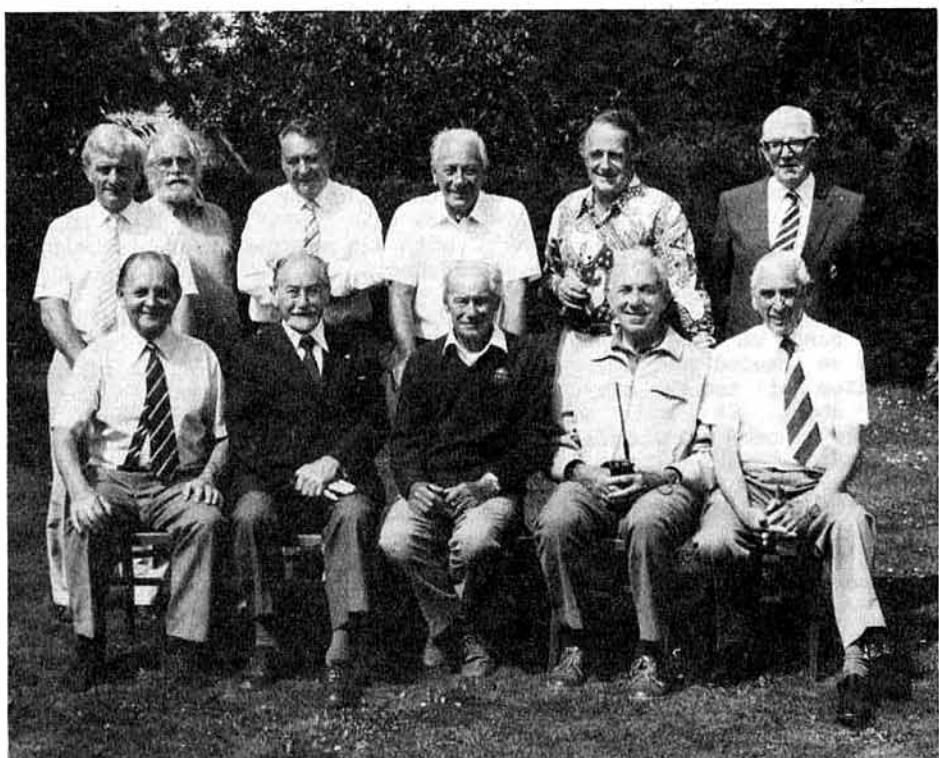
And so on - our hero spends a happy evening working some new Scottish squares, although he never quite hears GM4DMA/A well enough to have a shot at cracking the pile-up! The point is that instead of calling CQ DX and achieving precisely nothing, he listens a lot and catches GMOEXN just as the latter's calling CQ and probably just when propagation between them is good. Quite a lot of duct-type openings are like this; five minutes later and the DX has disappeared, probably never to come back. In the course of the evening our man repeats the dose and ends up with some choice squares in his log.

Anyway, we hope that's of some use to those, especially the newly-licensed, who wonder what on earth's going on when the VHF and UHF bands open up. Final thought - if you hear someone fifty miles away in a square or county you happen to need working a string of Czechoslovakian portables, DON'T call him when he says "QRZ DX" unless you have repressed tendencies towards the masochistic or suicidal....

Have fun!

RSGB PRESIDENT 1988:

The Society is pleased to announce that Sir Richard Davies, KCVO, CBE, G2XM, has consented to be the RSGB's President during its 75th Anniversary Year, 1988. As an active amateur, Sir Richard enjoys many of the facets of our hobby and looks forward to his year in office.



Celebrating his 'belated' Golden Anniversary on the air, Arthur Blackman G5AB/G5FF (first licensed in 1933) entertained a group of well known amateurs at his Cotswold home on 31 July. Around 500 years of amateur radio activity was represented by those present at the gathering, which was blessed with ideal weather. Louis Varney, G5RV recounted some of his travels and anecdotes of amateur radio, whilst G3BFC and G4PCU provided the inner workings relating to the propagation of radio information and G2HGG showed off his 'fishing rod' antenna with no small amount of interest. As the products of the Loire and Medoc regions were assessed, the group became more loquacious and many ad hoc discussions took place. Arthur would like to extend his thanks to all those who travelled such long distances to attend a very happy afternoon.

In the photo are: (Back Row L-R) G4UPG, BRS ? , G4PCU, G2HGG, G3BFC, G6DZ (Front L-R) G5EM, G5RV, Arthur G5FF, G6AG, G8BU.

CROSSBAND LADDER

Callsign	Countries	Best DX	Pos
G2ADR	23	*	1
GW1SSQ	19	1957km	2
G0GZI	14	*	3
G1SEP	13	*	4=
G4IDE	13	*	4=
G4TLY	13	*	4=
G1KDF	12	*	7=
G4SJC	12	*	7=
G4INL	11	*	9
G1CWP	9	*	10=
G8DKF	9	*	10=
G4GDY	8	*	12=
GM4ULP	8	*	12=
G8PYP	7	1866km	14
GW3WSU	6	*	15
G1AHM	2	*	16=
G4IDF	2	*	16=

We've had a few more entries for the 'Crossband Ladder' item this month - do keep them coming in and don't forget that the ladder is cumulative, so you'll have to keep informed if you manage to work any additional countries.

Only two stations so far have sent details of the best DX (in kilometres) so we still have the situation of ties for some positions. To avoid this, please let us have the following information on the back of a postcard:

Callsign/Name
Number of countries worked
(crossband from 50 MHz to any other band)
Best DX (in kilometres)

Send the cards to David Gough, G6EFQ, News & Information Department at RSGB HQ. If you prefer to use the Mailbox facilities, that's fine.

PS: Bev West, GW1SSQ - currently 2nd in the ladder - asks if anyone can beat his "worst DX" crossband contact. This was over a distance of - wait for it - 2.98 km with GW4UWR. In fairness, we should mention that both stations were well and truly QRP.



JOTA SPECIAL STATIONS LIST:

This year's Jamboree On The Air takes place over the weekend of 17/18 October and applications for special event call signs for JOTA closed on 13 September. However, anyone who would like a list of the special event stations should send a large stamped addressed envelope, marked "JOTA LIST", to the Membership Services Department at RSGB HQ. Please do this as soon as possible so that you can receive the list before the event.

The illustration above shows the "Radio Scouting" badge design adopted for this year's event.

WHEN IN ROME (or anywhere else):

We've all heard the expression "when in Rome, do as the Romans do" and it's particularly apt when considering operation in foreign countries under reciprocal or visitors' licences. Recently we've come across the odd case of UK amateurs operating on 50 MHz when visiting European countries which have no allocation on this band. We must stress that when you operate in another country you can use only those bands allocated in that country and you must abide by the rules and regulations issued by its licensing authority. If you are considering applying for a reciprocal licence, you are advised to contact the national society in the country concerned for details of the current licence regulations.

The RSGB has information on its database containing the addresses of the national societies, the licensing authorities and other relevant details in over 150 countries. Reciprocal agreements exist between the UK and about 40 other countries but some of the remaining countries issue visitors' licences. This information, together with an application form where available, is sent to members on request. Please remember that applications for reciprocal or visitors' licences should be made as far in advance as possible and at least 6-8 weeks minimum time is required for processing in some countries during peak holiday periods. You're likely to be disappointed if you leave it until the last minute; when you book your holiday remember to apply for your reciprocal licence!



MORSE TESTS

The following list shows the dates and locations of all the available test centres from mid-November to early January, as we went to press. Because of space limitations, we cannot print a complete list of all the test centres notified to us, but these can be found on the application form itself. If you want to take a test and any of the centres shown is within striking distance, send for an application form immediately. Completed applications will be dealt with strictly on a first-come first-served basis.

Morse tests will be carried out in groups of three and will be of half an hour's duration. Details of the test, the venue and how to get there will be sent to you as soon as your application has been processed and your place confirmed.

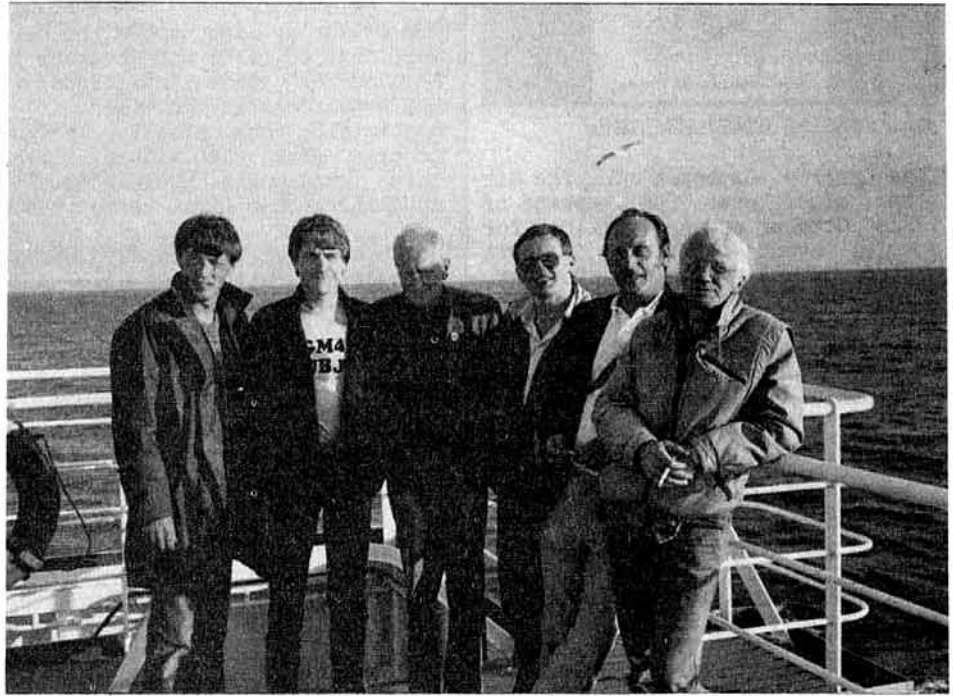
COUNTY	TOWN OR LOCATION	DATE
Shropshire	Telford	16/11/87
Strathclyde	Glasgow	16/11/87
South Glamorgan	Penarth	17/11/87
Isle of Man	Onchan, Douglas	17/11/87
Merseyside	Huyton, Liverpool	17/11/87
South Yorkshire	Stocksbridge	19/11/87
Bedfordshire	Luton	19/11/87
Dorset	Dorchester	21/11/87
Norfolk	Norwich	21/11/87
Lincolnshire	Grantham	21/11/87
Hertfordshire	North Watford	27/11/87
West Glamorgan	Port Talbot	27/11/87
West Midlands	Coventry	28/11/87
Lancashire	Fleetwood	28/11/87
Buckinghamshire	Bletchley, Milton Keynes	29/11/87
Greater London	Croydon	30/11/87
Cleveland	Billingham	02/12/87
Guernsey	Guernsey ARS, St. Martins	03/12/87
Dyfed	Haverfordwest	03/12/87
Cambridgeshire	Haslingfield, Cambridge	04/12/87
Cheshire	Macclesfield	05/12/87
Wiltshire	Swindon	05/12/87
Somerset	Burnham-on-Sea	06/12/87
Gwent	Newport	07/12/87
Co. Armagh	Armagh	07/12/87
Fife	Leslie	08/12/87
Derbyshire	Clay Cross	09/12/87
Suffolk	Ipswich	10/12/87
Northamptonshire	Tiffelfield, Northampton	10/12/87
Lincolnshire	Grimsby	11/12/87
Nottinghamshire	Mapperley	12/12/87
Hampshire	Winchester	12/12/87
Dumfries & Galloway	Stranraer	12/12/87
Cornwall	Liskeard	12/12/87
Strathclyde	Ayr	12/12/87
Leicestershire	Wigston Magna, Leicester	12/12/87
Humberside	Goole	13/12/87
Staffordshire	Stafford	13/12/87
West Sussex	Horsham	13/12/87
Staffordshire	Uttoxeter	13/12/87
Avon	Redland, Bristol	16/12/87
Greater London	BBC Woodlands, London W12	19/12/87
Greater London	Wood Green, London N22	21/12/87
Dyfed	Carmarthen	07/01/88
Tayside	Kirriemuir	09/01/88
North Yorkshire	York	09/01/88
Isle of Wight	Binstead ARS, Ryde	09/01/88

We receive notification of new centres almost daily and the application form gives a full list of those currently taking advance bookings for Morse tests. There are now active test centres in 90% of counties in the UK.

Around the Groups

THE RANTS AWARD:

For the past six months, the Mid-Lanark ARS - based in Motherwell, Scotland, have been operating from National Trust for Scotland properties located in Central Scotland using the callsign GB2NTS. A total of five locations were activated for the first time: Culzean Castle, Ayrshire (twice); Souter Johnnies Cottage (Robert Burns); Greenbank Gardens, Glasgow; and Brodrick Castle, Isle of Arran. During the first four of these events a total of 2557 contacts were made in approx 80 countries. There were 36 'resident' operators and 12 'guests' from the local areas. The 'RANTS' award, issued jointly by the National Trust for Scotland and the Mid-Lanark ARS, is being offered to any station in the UK and Eire who has worked four out of the six stations, or three out of the six in the case of overseas stations (the first overseas station to claim the award was John, VP8JY in Bermuda). The award is issued free of charge except for the cost of postage and an envelope.



The Brodrick Castle team bound for the Isle of Arran on 4/5 July from where a total of 659 contacts were made in 46 countries. (Left to right: Bob, GM4VWV; Bill, GM4UBJ; Paddy, GM3MTH; Ian, GM1XOG; Jim, GMOARD; and Eddie, GM4XLU).

WAB NEWS:

Being a peak summer month, August invariably sees a high level of WAB activity and this year was no exception. Many stations spent some time during their holidays activating WAB areas and a mammoth expedition by G1SMI/M and G1NUS resulted in most of the areas in Devon and Cornwall being activated: some for the first time in several years. This meant that many WABers who made contact with the 'dynamic duo' were able to boost their scores quite substantially.

On the awards front there are two firsts. Paul, G1LSB has been awarded the first 432 MHz Islands Award for working the basic 10 islands. Endorsements are available for 25, 40, 50 and so on in steps of 10 islands for VHF and UHF contacts. The first station to collect 1200 book numbers on 144 MHz was Laurie, G6XLL. Our congratulations to both stations.

The Decade Award certificate has been redesigned. It is much more attractive than its predecessor and will grace the walls of any shack. The award is available for working 100 of the 2-digit numbers associated with the WAB area (eg SU 12, TQ 13 etc) in any one calendar year, ie working Nos. 00 to 99 with any prefix letters.

Sounds a bit complicated, but you'll soon get the hang of it.

Further information on the Worked All Britain awards scheme can be obtained from:-

Brian Morris, G4KSQ
22 Burdell Avenue
Sandhills Estate
Headington
Oxford OX3 8ED

MAURITIUS SPECIAL CALL:

Between now and 5 November, all 3B8 amateur radio stations in Mauritius will use the special prefix '3B1' to mark the 'Festival International de la Mer'.

BATTLE OF HASTINGS:

Wednesday 14 October is the anniversary of the Battle of Hastings. To mark the occasion, the Hastings Electronics and Radio Club will be active from 0900Z to 2100Z using the club callsigns G6HH and G1HHH. Operation will be in the 144 MHz band and on the HF bands as appropriate to conditions. In addition to the club stations, as many of the members as possible will operate their own stations, all of which will count towards the '1066 Award'.

SUNDERLAND GOLDEN ANNIVERSARY:

GB4SUN is the callsign of a special event station, to be run by the Lough Erne ARC, to celebrate the 50th anniversary of the Shorts Sunderland flying boat. The station will be active from the museum at Castle Archdale Country Park, formerly RAF Castle Archdale - the war-time base of many squadrons of Sunderland and Catalina flying-boats and amphibians.

The Sunderland flying boat first flew on 16 October 1937 and to mark this the special event station will be active in the evenings and all day on Saturday and Sunday from 9 to 16 October. Operation will be mainly in the 80 and 40 metre bands SSB, though some operation may be possible on other bands and other modes including CW and packet. Skeds can be arranged by contacting Cliff Corderoy, G14CZW on 0365 24500. Incidentally, you can see a Sunderland in the RAF Museum at Hendon - well worth a visit if you're in the area.

STUDENTS' UNION:

The Imperial College ARS will be running a special event station during Freshers' Week commencing 6 October. GB2IC will be active in the 80 and 2 metre bands and would

(cont from previous page)

welcome calls from other college club stations and former students of Imperial College. In addition to this, the College would like to start an inter-College net on 80 metres and anyone interested is asked to contact:-

Phil Pavelin, G4WWH
60 Elmbridge
Old Harlow
Essex CM17 0JX

AGCW-DL STRAIGHT KEY PARTY:

The Activity Group Telegraphy of Germany will be holding its annual 'Straight Key Party' on Saturday 3 October from 1300 to 1600 hours UTC. The event is open to all licensed amateurs using a straight key, and short wave listeners. Operation will be in the 40m band between the frequencies 7010 and 7040 kHz CW only. Participants should call "CQ HTP" and exchange RST + serial number, class, name and age (XYLs = XX).

There are four classes:

- Class A - 5 W output (max)
- Class B - 50 W output (max)
- Class C - 150 W output (max)
- Class D - SWL

Scoring is a little complicated but is as follows, the points are awarded for the different classes of station (as above) working each other:

- Class A - A = 9 points
- Class A - B = 7 points
- Class A - C = 5 points
- Class B - B = 4 points
- Class B - C = 3 points
- Class C - C = 2 points

Logs should be submitted by 31 October and should be sent to:-

Friedrich Fabri, DF10Y
Vor dem Steintor 3
D-3017 Pattensen
West Germany

..... and a list of the results is available from the same address on receipt of a self addressed envelope and one IRC.

SORRY:

In last month's GB Calls listing we erroneously moved New Scotland Yard to Buckingham Gate! It has NOT moved and is still in Broadway, London SW1. We apologise to G4NSY, the New Scotland Yard ARS, for the error.

Also G4LJU was inadvertently given as the contact callsign for the Special Event Station and we apologise for the error.

RAIBC NEWS:

At the Radio Amateur Invalid & Blind Club's AGM, held in July, Angus McKenzie, G3OSS, was elected Chairman and takes over from Bill Craig, G6JJ, who is continuing as Vice Chairman together with George Jessop, G6JP. The club now has a new 'Audio Aids Manager', Mr Phil Stanley, G3ESN who was also elected at the AGM.

Since July, there have been several changes to the club's committee and by far the most important of these has been the appointment of a new Executive Secretary, Ms Margery Hey of 29 Besthorpe Road, Attleborough, Norfolk, NR17 2AN. There is now an RAIBC telephone help-line at the office on 0953 454920 which will be manned at most times, otherwise messages can be left on a telephone answering machine. Mrs Cathy Clark, G1GQJ, the former Secretary of RAIBC, has been thanked by the Committee for her services to the Club during her term of office.

There were several other appointments made at the AGM: Sheila Chambers is the new Treasurer and her address is c/o G8HTG (QTHR); the new Editor of Radial, the RAIBC magazine, is Shirley Hesketh, G4HES and she can be contacted via the Club's office in Norfolk (address above); Johnny

Clinch, G3MJK (QTHR) is the new Loan Equipment Manager - all applications for loan equipment and enquiries regarding equipment for the disabled should be addressed to him. Other Committee members include: Roy Gerrard, G3LAZ, Radial cassette distribution; John Brown, G3DVV, Accountant/Auditor; Hilary Clayton-Smith, G4JKS.

RAIBC is expanding its operations with the aim of assisting disabled and blind amateurs and short-wave listeners in their enjoyment of the hobby. The club has a long waiting list for the loan of HF and VHF transceivers and HF receivers and would welcome donations of equipment in good working order or cash to purchase equipment which would help put more disabled & blind people on the air. If you can help, please contact the club's office or the Equipment Loan Manager.

VERULAM 'CLUBS' CONTEST:

Many readers will remember the Verulam/RSGB Diamond Jubilee Contest held some years ago. Over the last few years the rules for this contest have been changed to encourage participation by affiliated clubs and to activate club callsigns. The contest takes place in the 160 and 2 metre bands



A total of over 600 contacts were made in just under 80 hours of operating by two members of the Mirfield ARC. Veronica, G1STP (right) and Kath, G6YQR (left) operated GB6NWX for National Women's Year between 1 and 28 March. Some of the many QSL cards received can be seen on the board (Kath says they'll have to get a bigger board). Both ladies would like to thank all those who made contact with the station and the other club members who took over operating when they couldn't keep their eyes open any longer!

(cont from previous page)

and is open to all licensed amateurs, short wave listeners, clubs and individuals running portable, fixed or mobile stations. It is split into two sections on two days:-

Section 1 - (160m)

Sat 7 Nov: 2000 - 0000 GMT
1900 - 1990 kHz SSB/CW/AM

Section 2 - (2m)

Sun 22 Nov: 0900 - 1300 GMT
144.15 - 144.4 MHz SSB/CW/AM

Copies of the rules will be sent on receipt of a stamped addressed envelope to:-

Hilary Claytonsmith, G4JKS
115 Marshalswick Lane
St Albans
Herts. AL1 4UU

THE WELSH AWARD (3 x 8):

The Carmarthen ARS is offering an award to licensed radio amateurs and short wave listeners who have worked or heard 24 Welsh stations (three in each of eight counties).

Contacts after 1 March 1987 will be valid and may be made on any band using any mode. There is no need to send QSL cards for the award, a log-extract showing the details of the contacts made and certified by two other licensed radio amateurs will be accepted. The fee for the award is £1.50, 8 IRCs or equivalent. Cheques and Postal Orders should be made payable to the Carmarthen ARS. Applications should be sent to:-

Awards Manager
Carmarthen Amateur Radio Soc.
PO Box 4
Carmarthen
Dyfed SA31 1AA

ITU NEWS:

On 27 July, the Solomon Islands became the 163rd member of the International Telecommunication Union.

The Solomon Is, situated in the Melanesia Archipelago, obtained independence on 7 July 1978. The group consists of nine main islands (Choiseul, Santa Isabel, Malaita, Vella Lavella, New Georgia, Guadalcanal, Russell, Florida and San Cristobel) together with the small archipelago of Santa Cruz, several atolls and low-lying islands, and has a total surface area of 30,000 sq km. The estimated population (in 1984) was 259,000 and Honiara, the only large town, has a population of around 15,000.

The ITU was founded in 1865 and as such is the oldest specialised agency of the United Nations. It is

the international organisation responsible for the planning of telecommunications world-wide, for the establishment of equipment operating standards, for coordinating the data required for the planning and operation of telecommunication services and, within the United Nations system, for telecommunications development.



HSC-SCHWEIZ
HSC-SCHWEIZ
HSC-SCHWEIZ

The 'Amateur-Radio-Telegrafie High Speed Club HSC-Schweiz' has been in existence since 1980 and has seen a very positive growth during the past seven years. The aim of the club is to promote international harmony between all those interested in amateur radio telegraphy, which it considers to be one of the basic mainstays of amateur radio. It actively supports the home construction of amateur equipment.

HSC-Schweiz has four grades of membership: Honourable, Regular, Youth and Supporting Members. If you would like to know more about the club and are interested in the Club Rules (printed in five languages), further details can be obtained by sending a self addressed envelope and an IRC to the secretary:-

Jurgen H Timcke, HB9ANE
Friedaustasse 7
CH-8355 Aadorf
Switzerland

CALLING ALL CLUBS:

In last month's Talking Point "Calling All Clubs", we inadvertently omitted the details of how to obtain the nomination forms for the position of RSGB Liaison Officer. The forms can be obtained by writing to RSGB HQ, marking your envelope "RLO" in the top left corner. This information was given in the GB2RS news broadcast on Sunday 13 September and has been on the DataBox/Prestel service since 3 September.

If you have not already obtained a form, please do not delay as the closing date for nominations is first post on - Friday 16 October.

CALLING ALL CLUBS 2:

Any group of 10 or more paid-up members of RSGB may register as an "RSGB Group".

An application form is available from the Secretary's Office at RSGB HQ and registration is free of charge.

Helplines

We're very pleased to hear that many of the items in these columns are receiving a good response from our readers (see Members' Mailbag last month and first item below). If your particular problem is solved through this column, please write to us and let us know. We'd love to hear from you.

The 'Helplines' column (May 1987 issue) carried an item about a French amateur, F6AZC, who was trying to trace an English ham named Stan, whom he had known during WW2. Well, lo and behold, we've just received a letter from Mr Stanley Ingram (yes, THE Stan), G6ZY/EA6, in which he says "...You may like to know that following this (item in Helplines) and due also to some 'detective work' done by F5HS, it has resulted in G6ZY/EA6, now retired in Ibiza, getting in touch with Rene, F6AZC and they now have a regular weekly sked on 7 MHz. G6ZY and F6AZC were involved with clandestine radio in German-occupied Tunisia in 1942/43. So Helplines do help!"

..... and we're very pleased to hear it - (ED).

HFCC VACANCIES:

The RSGB's HF Contest Committee currently has vacancies for membership of the committee. The HFCC is responsible to Council for all aspects of the Society's HF contests including the drafting of rules, organisation and adjudication of contests and the writing of reports for Radio Communication.

The HFCC is a working committee which meets in central London about 11 times a year, usually on a Thursday evening from 6pm-9pm. An evening meal is provided prior to the meeting and travel expenses are reimbursed by the Society. In addition to the meetings, committee members are required to spend some time adjudicating contests at home, either individually or as a member of a team.

Applicants should have an interest in HF contests, preferably as a regular entrant and because of the need to work with other committee members, should have easy access to central London.

Any member who feels that he/she fits the bill and can contribute to the smooth running of this committee, is asked to contact:-

Ron Glaisher, G6LX
279 Addiscombe Road
Croydon
CR0 7HY

'RNS - WHERE ARE YOU?:

The North Staffordshire Raynet Group would like to know the whereabouts of G6RNS and G8RNS. It is believed that the callsigns are no longer active and the group would like to investigate the possibility of these callsigns being relinquished with a view to them being reissued to North Staffs Raynet. If anyone has any information would they please contact Allan Drake, GLEED on 0782 612868.

HAMS ACROSS THE OCEAN:

Steve Anderson, WBOVJB, from Northfield, Minnesota, is hoping to find some amateurs in the UK who would be interested in corresponding with him with the aim of arranging QSOs and a meeting when he next visits this country. He was in England last year and "had a great time" but did not get the chance to meet any UK amateurs. If you would like to write to Steve, his address is:-

413 West 1st Street
Northfield,
MN 55057
USA

G4YXF or G4YXG?:

Due to an error made some three years ago at Post Office HQ in Chesterfield, Mr Dungworth-Saxton was issued with the wrong callsign. For the last three years he has been using the callsign G4YXF when he should have been using G4YXG. He has now been issued with the correct callsign which should appear in the next UK Callbook. He is NOT a pirate!

TYPING AID:

Mr Worthington, GW3COI has a RTTY transceiver model MM4001 KB and is having problems with the 'touch-type' keyboard supplied with the unit. To help improve his one-finger typing technique, he asks if anyone has details of how to substitute another keyboard, such as the Vic 20 board or any other with a similar 'key' action. If you can help, please contact GW3COI who is QTHR.

NOTE:

"Helplines" is designed to help you to solve problems or find out information from fellow amateurs or SWLs. It is also here to help put people with similar interests in touch with each other. However, if you are looking for spares or equipment, please use the "Members' Ads" facility.

NEW CHAIR FOR EMC COMMITTEE:

At its meeting on 11 July 1987, Council appointed Dan Bernard, G4RLE, the new chairman of the EMC Committee. One of Dan's first requests was to be able to publish an occasional column in the Bulletin to keep you abreast of what's happening in the EMC world - the editorial arm was duly twisted and here's Dan's first piece:

"As the new chairman of the EMC Committee, I am hoping to make this column a regular feature of RadCom. It will not necessarily appear every month but certainly on a more regular basis than it has in the past. It will take the form of a very basic and brief progress report in an effort to give you some reassurance that positive progress is being made on EMC-related topics.

"I have already been involved in a meeting with the DTI/RIS and am happy to report that an air of mutual cooperation exists. So much so that we have agreed, in principle, to compile a joint 'Code of Practice' concerning the way in which breakthrough problems are dealt with. Note, not the technicalities of curing breakthrough but the procedures for dealing with them. It is an attempt to prevent duplication of effort and provide a sensible and reasonable solution thus making both our services effective.

"Subject to final Council approval and also the response of Society members, the Committee intends to introduce a new scheme in the spring of '88 which will provide an improved EMC service to amateurs and is part of the joint DTI/RIS/RSGB venture mentioned earlier. To a degree this service already exists but it will be greatly expanded. It should also tie in with the new RSGB Liaison Officer scheme announced in the August issue of Radio Communication.

"I should stress that this new scheme is an interim measure in dealing with EMC problems. The Committee's main thrust is towards obtaining proper and enforceable legislation which leads to manufacturers incorporating built-in suppression into domestic electronic equipment. Amateur radio is not the only radio spectrum user which suffers from the problems we are encountering today and in many ways the Society can contribute greatly towards this campaign.

"There is another side to the coin, which is the ability of several items of equipment such as computers to radiate an unacceptable amount of RF and

thereby cause interference. Tackling this problem is another major task for the committee. "None of these problems can be solved in five minutes but I can assure you that every effort is being made towards achieving goals along the lines I have mentioned.

"In the meantime, should you have a TVI, BCI or general EMC problem please do not hesitate to contact me direct at the address below. I will endeavour, wherever possible and by using the resources available, to help in any way I can."

Dan Bernard, G4RLE
EMC Committee Chairman
36 Guildford Road
Portsmouth
Hants. PO1 5HX

VHF/UHF NEWSLETTER:

As we approach what the poet Keats failed to call the season of lifts and mellow fruitfulness (uurrrgh), it's time to remind those who like chasing DX on 50 MHz and above about the "VHF/UHF Newsletter". Published by the Society, this extremely useful specialist newsletter is aimed at those who operate on 6, 4, 2 and 0.7 metres. It's recently increased in size and now covers 12 pages every month - so a large quantity of topical information finds its way into the pages.

Regular features now include band reports and propagation events, solar factual data, meteor scatter, EME, DXpedition information and information on contests and activity periods. In addition, there are occasional technical articles, propagation papers, VHF Committee reports and so on. There's even the odd photograph.

The VHF/UHF Newsletter is edited by David Butler, G4ASR. You can get it from:-

RSGB Publications (Sales),
Lambda House,
Cranborne Road,
Potters Bar,
Herts EN6 3JE.

Price to members is £7.20 pa, to non-members £8.47 pa. This includes delivery to UK and EEC addresses. For rates applicable to other overseas destinations, please contact HQ for a quotation. Don't forget that you can now pay for things like newsletters by credit card over the telephone. Just dial 0707 59015 and we'll do the rest.

Other specialist news letters are available. Please see the "Mail Order Price List" for details.

Council Brief...

The President opened the 4th Council Meeting of the year (11 July 1987) by welcoming Sir Richard Davies, KCV0, CBE, G2XM, as an observer. Sir Richard is to be the Society's President during its 75th Anniversary year in 1988.

Budgets for 1987/88 were again discussed in some detail with Mr B. O'Brien giving details of the F & S budget meetings that were shortly to take place. The need for budgets to be produced a little earlier next year were noted. It was felt possible that this role, traditionally carried out by the Honorary Treasurer, could be transferred to HQ as a staff function, now that a new HQ Accountant had recently been employed. The provision of monthly financial reports to Council, to replace the existing three-monthly reports, was also discussed. This should now be possible because increased mechanisation in the Accounts Section would enable the Accountant to spend more time in this area.

The Secretary also reported that he wished to introduce a basic scheme for staff time sheets to enable work done by the Society to be more accurately costed.

Because of rising costs, Mr B. O'Brien expressed the view that the F & S Committee should show a strong lead in guiding the Society and its volunteer helpers towards a more cautious approach to expenditure. Mr Barnes reminded Council that Committees accounted for approximately 2% of the Society's turnover.

It was reported that Mr Cornish, G3COR, had written to the Society indicating his intention to resign as Honorary Treasurer, after ten years, probably at the end of 1987. Council noted the letter and discussed a candidate as a possible replacement.

The Secretary reported that as a result of the recent mailshot, some 900 Class B licensees had joined the Society. However, there had been a small fall in membership during the 1986/87 financial year of some 1.6%. This had probably been due to the increase in subscription rates and a lack of new members caused by the falling off in the rate of increase in the number of radio amateurs in the UK.

Two new members of staff had recently been recruited to the Membership Services Department. The Secretary reported that there

were early signs of a faster response to queries even though much staff training was still required.

The Secretary reported a successful start to the introduction of payments for books and other products by credit card. Some 28 orders had been received on the first day of the introduction of this new facility. It is hoped to introduce a direct debit facility in the first quarter of 1988 now that arrangements with the banks were nearing completion.

The Secretary reported that there were a number of areas involving the Data Protection Act which were under discussion with the Society's solicitors. Much staff time had been devoted to sorting out problems which had arisen because of this new Act.

The Secretary reported that the major review of the amateur radio licence was to commence in early September. In addition, the DTI was likely to issue some Press Releases and Gazette Notices concerning third-party messages, log-keeping and packet radio, although it was not known when these releases would be made. It was also reported that the work of the Licensing Advisory Committee on special research permits was now reaching a conclusion after nearly three years of negotiation with the DTI.

The Secretary had recently met representatives of the Royal National Institute for the Deaf. The Institute was interested in the use of CW as a possible means of communication between deaf people and also generally interested in matters relating to amateur radio licensing for deaf people.

A meeting to discuss a new form of licensing aimed at encouraging more beginners into the hobby of amateur radio was due to take place at the end of September. The Secretary also reported that the Licensing Advisory Committee were discussing the CSP Report on the deregulation of the spectrum between 30 MHz and 1 GHz and would make an appropriate input to the DTI as soon as possible.

Council spent several hours discussing the annual reports of committee chairmen to Council. As part of the discussion on the important work of RSGB committees, both budgets and future activities and projects of committees were discussed. The President would write to each committee chairman personally in order to convey

Council's appreciation of the work undertaken by committees and to give Council's views on the various projects being proposed by each committee. (Reports on the work of each committee during the 1986/87 financial year will be published in the November 1987 issue of Radio Communication as part of the Society's Annual Report).

After a discussion, Council agreed to award the Founders Trophy to Peter Miles, G3KDB, for his extensive work as the Society's Awards Manager from 1980 to 1987. In addition, Council agreed that the Calcutta Key, awarded for contributions to international friendship, be awarded to Ron Broadbent, G3AAJ, for his considerable work in connection with AMSAT - UK. Council agreed unanimously that the proposal concerning the admittance to IARU Region 1 of the Egypt Amateur Radio Society be approved. Further, Council agreed that any group of ten or more members of the Society could register as an RSGB Group and that no affiliation fee would be necessary.

In addition to the above, the following items were discussed: the cost in staff time in replying to a few members of the Society who wrote frequently to request detailed information about the Society's activities; the name of the Society's journal; reduced and waived subscriptions; affiliations to the Society; the IARU Region 1 Conference report arising out of which the Secretary was asked to convey Council's thanks to both Tim Hughes, G3GVV, and John Allaway, G3FKM; the re-appointment of RSGB Morse Examiners from 1 July 1987 for a period of one year; the Junior Amateur of the Year Award and the proposed lottery registration for the 1988 Anniversary Year lottery and the notice which would advise members of those Council members who would retire at the end of 1987.

Three honorary officers were re-appointed: Audio/Visual Library, G2PA; VHF Awards Manager, G5UM, and the Observation Service Manager, G4FJN.

The President reported receipt of a letter from Lady Westbury, Superintendent-in-Chief of the St. John Ambulance Brigade. This was in appreciation of assistance given by the Grafton Radio Society at the recent event in Hyde Park.

DON'T MISS THE MAIL

Did you know that two out of every three RSGB members have a computer in their homes? If you happen to be one of the two and you have a 144 MHz transceiver (or even just an "electronic handbag" handie-talkie), why not link them together and join in the fun on packet radio? In this special feature we look at some of the reasons why more than 2,000 UK radio amateurs have already got going on this fascinating new mode and show you how to join them.

But what is packet radio?

It's another product of our digital age; what it amounts to is a form of data transmission in which the information is sent out in small bursts. These bursts (called "packets") can be passed on from one station to another. The really significant point is that your packet data messages can be relayed automatically by any other station who happens to be on the frequency - this is unique to packet radio, and as we'll see it's the mechanism by which 1W from a 144 MHz hand-held can get messages to virtually anywhere in the world.

Which is one clue to the phenomenal growth in popularity of packet radio. Traditional forms of amateur radio will always have their devotees and long may it remain so. However - and very regrettably - the vast majority of us will never possess the 10-acre fields, 120' towers, stacked mono-banders, 16 x 19-ele 144 MHz arrays, etc, which make working almost any DX you care to name relatively simple. And even if you have the kind of 144 MHz mege-station most of us dream about (400W to something enormous 3,000' asl and no neighbours for miles), your range under ordinary conditions won't be much over, say, 7-800 km on tropo. Packet radio changes all that. To go places on packet, all you need is a modest antenna and low power - from that point of view it's absolutely ideal for the city dweller with limited space for the antenna farm or the guy at the bottom of a valley. Another tremendous point about packet is that it's a lot less likely to call unwelcome attention to itself from the EMC point of

This month we take a look at the appeal of packet radio

view than a conventional high-ERP DX-chasing installation. Because - as you'll see - you only require low power for very long-distance contacts, the risk of things like pointed comments from Mrs Scruggs at No.49 about the size of your antennas or shouting matches with Mr Scruggs on account of your interfering with his viewing of the Miss World contest the other night is considerably reduced.

Anyway - to business.

We said earlier that packet is a form of data transmission in which packets of data are repeated or passed on between one station and another. The automatic relaying of messages from station to station is called "digipeating", and in principle it can carry on as long as you like. Certainly it may take hours or days, but - for example - one member of Headquarters staff has sent messages to Australia, New Zealand and the USA using a 1W 144 MHz transceiver and a quarter-wave vertical (pause to allow hardened heavy-metal VHF DX-chasers to pick themselves up from the floor, make strong coffee, fall into comfy chair etc). Many other packet operators have done the same, and every day send messages for hundreds of miles up and down the UK. The really crucial thing to grasp is that very often these are stations who couldn't expect to work any distance at all by direct two-way VHF. How this is done - by means of packet repeaters and "mailboxes" - is described later, but in essence all you need to be able to do is make contact with your local mailbox or packet repeater. In theory at least, from then on the sky's the limit because your message can be forwarded by an amateur satellite or HF link to - well, anywhere!

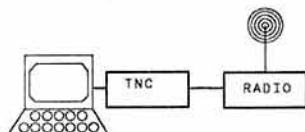
The packet which you send out from your station typically lasts a second or so. It contains all sorts of things, but basically every packet contains the callsign of your station, the callsign of the station you're talking to, the callsigns of any stations in between who are providing the route (up to a maximum of 8) and the message which you've typed into your computer. Your packet is acknowledged by the station you're talking to. If you happen to be working someone via packet and another station decides that you're ideally placed to act as a relay station for him, that's fine - it all happens quite automatically and has hardly any effect on the contact you're in the middle of. If you need to for any reason, you can cease being a "digipeater" by means of a keyboard command.

Digipeating can obviously take time, and it can also be hindered if there is a large number of stations on frequency at the same time - under these circumstances it takes a bit longer to get the message through. The alternative to digipeating is to use a "mailbox", and we'll look into this in detail later on. Either way, all you need is enough power to access the first station in what may be a very long chain - and the odds are that the first station is quite close. Incidentally, from the licensing point of view digipeating is quite acceptable in the UK - as we went to press the DTI was about to come up with a press release to clarify the position.

It all sounds terribly difficult and technical, though, doesn't it? Well, prepare for a pleasant surprise, it isn't. The most difficult series of words in the packet vocabulary are those reserved for the magic box which does most of the work (no, not swear words, fool, the name of the thing). This beast is called a Terminal Node Controller, usually abbreviated by one and all to TNC. If you can get your mind round what the TNC does, you've cracked packet in one go.

The diagram (over) shows where the TNC fits into the packet station. As you can see, it's the

device which persuades your computer and transceiver to speak to one another. As you sit typing your message to a station on the keyboard, the TNC is automatically turning this into a packet for transmission. A typical packet could contain 80 characters of text. When you type in the 80th character, the TNC automatically switched the transmitter on and sends out the packet. The TNC is also connected to the receiver's audio output so that it can decode incoming packets and also so that it can monitor the channel and not send out a packet if it's hearing any others being sent. So in practice the TNC is trying all the time to slot your packets in between others it hears - can't do that in a pile-up, can you? Much better than all this primitive shouting and hooraying for DX.....he said, living very dangerously.



You've no doubt guessed that because individual packets are of short duration, many stations can be active on one frequency at a particular time - this situation is also quite unique to packet radio.

Hooking up the TNC to the transceiver only requires three connections - audio to the transmitter, audio from the receiver and the PTT. The link between computer and TNC is normally the dreaded RS232, although some TNCs have provision for TTL connection. In a subsequent Bulletin we'll list currently available and popular TNCs, with prices and other basic details. Incidentally, your TNC comes complete with a comprehensive book which will tell you how to get it all going and make contacts with stations.

That's all there is to it!

Packet radio is in its infancy in the UK, and those taking part in it are well and truly breaking new ground. As more mailboxes become operational and more amateurs become active on packet, horizons will no doubt extend even further and message handling will become much faster. By the way, messages aren't confined to text - even at

this early stage in things it's possible to send computer programs via packet, or even still pictures in digital form. The scope of packet radio is only limited by your imagination!

Actually, don't tell anyone, but even the VHF DX heavy gang have started using packet to tell one another when conditions are good.....

POPULAR FREQUENCIES:

The most popular packet frequency in the UK is 144.650 MHz. This is where most of the mailboxes and digipeaters are located at present. The adjacent frequency 144.625 MHz is also recommended for direct station to station packet contacts in order to relieve the pressure in some parts of the country on 144.650 MHz. Depending on where you are you might also hear packets on 432.675 MHz or 50.650 MHz. On HF much packet activity can be heard around 14.10 MHz, but NOT on!

BUZZ-WORDS:

CONNECT - the command to instruct your TNC to link to another station.

DISCONNECT - when you want to finish a contact.

MYCALL - the command you use to tell your TNC your callsign. Once given your TNC will automatically put your callsign into every packet that is transmitted.

MAILBOX - a licensed unattended station with a GB callsign. You can store messages on a mailbox and read messages addressed to you. You can also send messages to friends at other mailboxes in the UK or in theory anywhere in the World. Another name for a mailbox is a Bulletin Board System (BBS).

BUSY - the message sent to your station if the station that you want to contact is already in qso.

COMMON PACKET STANDARDS:

HF - 300 baud, 200 Hz shift, tones normally 1600 & 1800 Hz.

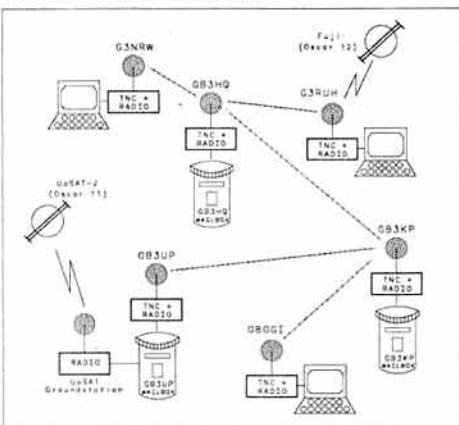
VHF - 1200 baud, tones 1200 and 2200 Hz.

AROUND THE WORLD IN 80 WAYS:

In the beginning:

Back in the early days of packet, it wasn't too easy to get messages beyond the horizon. Digipeating helped, of course, but if there were more than two or three hops in the path it became a long-winded process, especially if lots of other stations were using the same frequency. Nowadays, the only time there isn't much traffic on the packet channels is in the wee small hours of the morning, but there aren't too many people to talk to then either!

There is also the problem of trying to talk to someone who isn't there! For example, G3NRW could try to raise G3RUH in Cambridge (see the diagram), with the TNC command "CONNECT G3RUH VIA GB3HQ", but if G3RUH is not at home, or busy talking to satellites, G3NRW doesn't get very far.



Enter the packet mailbox:

The packet mailbox has changed all that. Now you can leave a message on your local mailbox, which then sends it automatically through the packet network to the mailbox nearest the person you want to contact. The destination mailbox may be in the next town, reached by a couple of digipeater hops on 2m, or it may be on the other side of the world, reached by a combination of VHF, UHF, HF, microwave and satellite links. It doesn't matter if the person you want to contact is busy doing something else when you send the message; it will be waiting for him or her in their local mailbox next time they log-in. Time differences don't matter any more. James in Cambridge, England, can collect his messages when he has finished his satellite QSOs, and James in

(over)

Cambridge, Massachusetts, can go to bed and get up at normal times, knowing that his messages will still be waiting for him.

Mailbox basics:

So what is a mailbox, how does it work and how do you use it? Well, a mailbox (or "packet bulletin board system", PBBS, as it is sometimes known) is simply a combination of a digipeater and a computer system. The computer can be virtually any micro with a disk and suitable mailbox software; for example, the RSGB HQ system uses an IBM PC, running one of the world's most popular mailbox packages written by WA7MBL, and there are similar packages available for BBC, Atari and CP/M-based machines.

Down to business:

To communicate with a mailbox, you simply connect to it in the same way as connecting to an ordinary packet station. For example, to talk to the GB3HQ mailbox, you give the command "CONNECT GB3HQ". The first time you do this, it will respond with something like:

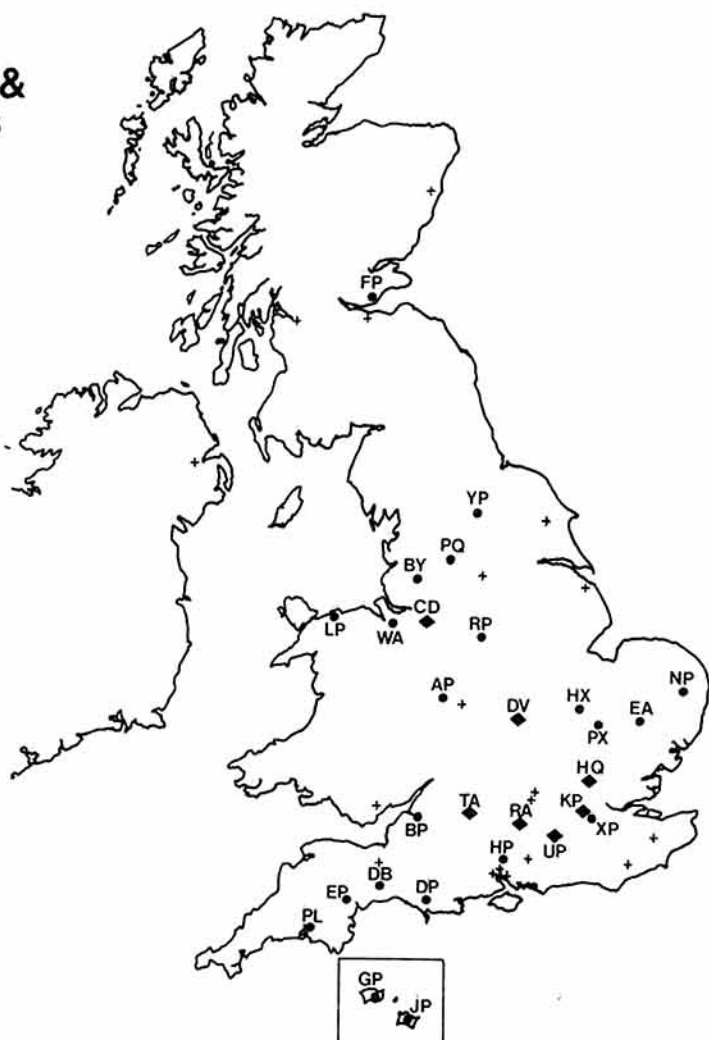
```
Hello new user.
Please use the N command to log
your name.
You have unread mail.
B,K,L,N,R,S[
```

It greeted you with a friendly hello, but although it knows your callsign it doesn't know your name yet. So the first thing you could do is to introduce yourself, using the "N" command after the [prompt. For example, you could type "N Ian", so that the next time you log in, the box will greet you properly (on most boxes there is a limit of ten or twelve characters for the name, so if you happen to be called Nebuchadnezzar, the greeting will not be as fulsome as you might have expected!).

The box also told you that you have unread mail. In other words, someone has already sent you a message, and it has been saved for you on the mailbox computer. To read your message(s), the command is simply "RM" (Read Mine). The box responds with something like:

```
Msg # 308 Stat:Y To: G3NRW
From: GOCNR Date: 21-Jul/2122
Subject: Proc. IEEE, Jan. '87
Ian, How are you - long time no
connect! Have you seen the
Proceedings of the IEEE, January
1987. The good news.....(etc).
```

UK Mailboxes & Digipeaters



KEY:

- ◆ - Mailboxes
- - Digipeaters
- + - likely sites for future mailboxes/digipeaters

NOTES: Some stations on this map may not have been licensed at the time of publication.

All stations operate on 144.650 MHz vertical polarisation.

A typical mailbox message listing.

Msg#	TS	Size	To	@ BBS	From	Date	Subject
321	N	216	GOCNR		G3NRW	22-Jul	PROC IEE
319	\$	2281	ALL		G3RWL	22-Jul	Satellite News # 0010
318	N	2361	G8GGI	@GB3KP	G3NRW	22-Jul	NET/ROM
316	N	535	DCE	@GB3UP	G8NNU	22-Jul	NK6K
295	\$	2959	ALL		G0BSX	21-Jul	BSX TNC Queries
292	N	589	G4UJS	@GB3CD	G6DLJ	21-Jul	ECKY THUMP MK5
279	N	303	G6MEN	@GB3CD	G8KBV	20-Jul	NOISY MOBILE
262	B\$	675	ALL		G8AMD	20-Jul	ACORN 512 2nd Processor
261	\$	855	ALL		G6MEN	20-Jul	Help please

What else is on the mailbox?

To find out what messages are stored in the mailbox, you can give the "L" (List) command. A typical response is shown below. At the top of the list you can see the message you have just sent, plus many others. Some of these are addressed to ALL, meaning that they are intended for general consumption, so why not take a look? To read any message, you simply give the "R" command, followed by the message numbers of interest. For example, "R 319 295 292".

Notice that the last of these messages (number 292) was addressed to a particular station, not to ALL. You are still allowed to read it, though, as no message is allowed to be "private" on the box. So you can steam open other people's mail with impunity!

Things that go bleep in the night!

We have seen how to get a message to someone who happens to share your own local mailbox, but how do you send a message to someone further away? First of all, you need to know (or guess) the callsign of his/her own local mailbox, and then you address your message to that box. For example, to send a message to G8GGI, who happens to use GB3KP as his local mailbox, the command is "S G8GGI @ GB3KP".

After you have deposited the message in your local box, automation takes over. At regular times throughout the day and night, your mailbox looks for messages addressed to other boxes, and forwards them on automatically. So, to deliver G8GGI's message, GB3HQ automatically connects to GB3KP and then sends the message, which GB3KP will then store, ready for when G8GGI next logs in.

How does GB3HQ know how to connect to GB3KP? Well, each mailbox has a routing table containing the connection routes to all other known mailboxes. These routing tables are growing all the time as the packet network expands, and within the very near future it should be possible to get a message to almost any part of the country completely automatically. So if you happen to be listening on 144.650 MHz in those wee small hours, you will now hear lots of activity, with the packet mailboxes talking to each other, forwarding their messages from point to point throughout the UK; messages

literally hop from mailbox to mailbox until they reach their final destination.

Hello world!

If you want to send a message to everyone on your local mailbox, you simply give the command "S ALL" (i.e. send to all readers). Similarly, if you want to send a message to all users on GB3UP, you could give the command "S ALL @ GB3UP".

This is fine if you just want to address a particular geographical area, but how do you send a message to all readers everywhere, if you don't know all the mailbox callsigns? No problem. All you do is send a "Bulletin", using a special form of the "S" command; e.g. "S ALL] G3NRW \$G3NRW0001". This tells the mailbox to forward the message from G3NRW to all the other boxes in its routing table. The "\$" part of the command contains a unique bulletin identifier (which you allocate yourself); this identifier is checked by each mailbox as it receives the message, so that it can check whether it has already been received from another source. A note of caution - don't flood the country with Bulletins just because you can't find a 10K resistor! In fact, though the system works well, 144.650 MHz is very overloaded. We hope to use other frequencies and bands for mailboxes and links quite soon, but we are waiting for the DTI to clarify and resolve several matters. While the system is overloaded have regard for how you use it so that everyone can use what at present is a limited resource.

Up, up and away into space:

Let's go further afield. There are two satellites orbiting the earth at present which can store and forward packet messages. One of these is the Japanese satellite Fuji (Oscar 12), which has four 2m uplink channels and one 70cm downlink channel. If you have the right radio equipment, you simply connect to the satellite with the "CONNECT 8J1JAS" command, and use its mailbox in the usual way. So wherever Fuji is visible from the ground, packet messages can be forwarded.

Calling ground control:

What happens if you don't have any of the appropriate groundstation

equipment? After all, satellite communication needs a fair amount of equipment and antennas, plus a good helping of hand-on experience before it becomes reliable. Is it still possible to send packet messages via satellite without getting involved in the nitty gritty of satellite communications?

Yes it is, thanks to the efforts of AMSAT members throughout the world. If you want to send a packet message via the UoSAT-II satellite (Oscar 11), all you have to do is get it to the nearest groundstation, which in this country happens to be at the University of Surrey in Guildford.

To do this, you send the message with the command "S DCE @ GB3UP". DCE is a special code (meaning Digital Communications Experiment), which tells GB3UP to forward the message onwards to the UoSAT groundstation at the University. At the groundstation the packet system reads the title of your message, which will be something like "VK6ADF @ VK6XYZ". This says that the message is destined for VK6ADF at the VK6XYZ mailbox. In fact, the message will be routed via the VK5AGR groundstation, but the user does not really need to know this.

It's as easy as that! So now you don't need your own satellite system to get packet messages around the world. At present there are four Oscar 11 groundstations to do this for you, in England, California, India and Australia, with two more coming on-line soon, on the east coast of the USA and in New Zealand.

It takes a little time of course to relay a message through the UK network to University of Surrey, up to Oscar 11, down to ground again and through the local network to its eventual destination. Typically, messages can take several days to reach an overseas mailbox. It was interesting to note that in a recent test exchange between RSGB and ARRL staff, the message took longer to be forwarded between California and Connecticut than it took from RSGB HQ to the UoSAT II receiving station in the USA.

CONNECT INTERNATIONAL

Published 15th of each month by RSGB. Deals with all aspects of packet radio. Price for UK/EEC is £7.95 for members. £9.35 for non-members. Tel: 0707 59015 for credit card orders or see mail-order price list in this issue.

Events Diary

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 call sign and telephone numbers direct to HQ and marked 'Bulletin'.

4 OCTOBER

*Welsh Amateur Radio Convention - Oakdale Community Centre, Blackwood, Gwent. Opens 10am, official opening by RSCB President, Mrs Joan Heathershaw, G4CHH at 11am. Trade exhibition, convention station, *RSCB stand, bring & buy, refreshments. Comprehensive lecture programme on HF and VHF topics. Talk-in from 9am on S22. Exit 28 off M4 motorway. Details Brian CW3KYA, tel: 0495 225825 (see p.675 September RadCom).

*Wakefield Mobile Rally - Outwood Grange School, Potovens Lane, Outwood, Wakefield. Opens 11am (10.30am for disabled visitors), usual traders, bring & buy, prize draw, refreshments, bar. Talk-in on S22 and via CB3WU (RB15) by CB2NWR. Free admission, free carparking. Details Steve GARCH, tel: 0532 536633. Trade enquiries Ken G3SPX, tel: Wakefield 828520.

*Great Lumley AR & ES Rally - The Community Centre, Great Lumley, Chester-le-Street, County Durham. Opens 11am, talk-in on S22 and 70cm. Details G4NSF, tel: 091 469 3955.

10 OCTOBER

*RSCB MIDLANDS VHF CONVENTION - Madeley Court Centre, Telford, Shropshire. Opens 10am, comprehensive lecture programme, VHF forum, small trade show, bring & buy, bookstall, refreshments. Buffet in evening (advance booking only - see p.680 September RadCom). Talk-in on S22 by G1SCR/A. Details Peter G3UBX (QTHR).

11 OCTOBER

*Armagh & Dungannon District ARC Mobile Rally - Drumhill House Hotel, 2 miles from Armagh on Moy Road. Details G1QAD.

18 OCTOBER

*"ELHOEX" (Electronic Hobbies Exhibition run by Hornsea ARC) - Floral Hall, Hornsey. Opens at 11am (early entry for disabled visitors). All the usual traders, bring & buy stall, demonstrations by other local clubs. Refreshment and bar facilities. Good car parking. Located on the sea front so ideal for all the family. Potteries and MERE close by. Talk-in on S22 by G4EKT. Details Duncan, G3TLI on 04012-2588.

23/24 OCTOBER

*Leicester Amateur Radio Exhibition - Granby Halls, Leicester. *RSCB stand, all the usual traders, large bring & buy stall, bar and refreshment facilities. Located close to Leicester BR station and city centre, large car park near by. Details Frank G4POZ, tel: 0533 553293.

1 NOVEMBER

*Carmarthen ARS Exhibition & Rally - Leisure Centre, Johnstown, Carmarthen. Opens at 10.30am, trade stands, flea market, cafe & bar, swimming pool. Talk-in on S22 Details GW3GUE, tel: 026 783 460.

7 NOVEMBER

*7th North Devon Radio Rally - Bradworthy Memorial Hall, near Holsworthy. Opens at 10.30am, usual traders, bring & buy. Talk-in on S22. Details GBMX1 (QTHR).

7/8 NOVEMBER

*North Wales Radio Rally - Aberconwy Conference Centre, Llandudno, Gwynedd. Amateur radio & associated electronics hobbies, large bring & buy stall, flea market. Details Derrick Watts, tel: Colwyn Bay 530041.

15 NOVEMBER

*Bridgend Rally - Bridgend Recreation Centre, Angel Street, Bridgend. Opens at 11am (10.30am for disabled visitors), usual traders. Talk-in on S22. Details G4IUP, tel: 0656 723508.

*Bishop Auckland ARS 4th Annual HamDay Rally - Elm Road Working Men's Club, Shildon, Co.Durham. Opens 11am, usual traders, bring & buy, raffle, refreshments & bar. Talk-in on S22. Details G4OHZ, tel: 0325-314638.

22 NOVEMBER

*West Manchester RC Winter Rally - Pembroke Halls, Walkden. Opens at 10.30am, usual traders and features. Talk-in on S22. Details G1100, tel: 0204-24104.

6 DECEMBER

*Verulam Christmas Rally - St Albans City Hall. Details Hilary G4JKS, tel: 0727 59318. Trade: Watford 52959.

13 DECEMBER

*Leeds & District ARS Christmas Rally - Pudsey Civic Centre, Dawsons Corner, Pudsey, nr Leeds. Details G4WYD, tel: 0274-685039.

IN BRIEF - More details later.

24 JANUARY 1988

*Oldham Amateur Radio Rally - Queen Elizabeth Hall, Civic Centre, Oldham. Details Cathy, G4ZEP tel: 061-652 8617.

31 JANUARY

*26th NARSA Exhibition - Norbreck Castle Exhibition Centre, Blackpool. Details Peter G6CCF, tel: 051-630 5790.

27 FEBRUARY

*Rainham Radio Rally - Parkwood Community Centre, Deanwood Drive, Rainham, Gillingham, Kent. Details Bob GILKE, tel: Medway 362154.

5 MARCH

*Blue Star Rally - Venue to be announced. Details Tyneside ARS, 13 Lothian Court, Newcastle, Tyne & Wear NES 3TZ.

6 MARCH

*Welsh Mobile Rally - The Barry Leisure Centre, off Holston Road, Barry. Details Mike GW8CMU, tel: 0446-711426.

13 MARCH

*South Essex ARS Mobile Rally - The Paddocks Community Centre, Canvey Is, Essex. Details G0BBN, tel: 0268-755350.

20 MARCH

*Pontefract Components Fair - Carleton Community Centre, Pontefract. Details COAAO, tel: 0977-43101.

1 MAY

*RSCB VHF CONVENTION - Sandown Park Racecourse, Esher, Surrey. Details G3FZL. Trade - Les, G5HD tel: 040 928-342.

*5th Anglo-Scottish Rally - Tait Hall, Kelso. Details Andre CM3VLB, tel: 0573-24664 (evenings).

5 JUNE

*Southend Mobile Rally - Rochway Centre, Rochford, Essex. Details G8EFC, tel: 0268-755331.

12 JUNE

*Elvaston Castle Mobile Radio Rally - Elvaston Castle Country Park, nr Derby. Details John G4PZY, tel: 0332-767994. Trade enquiries, G4HIJ, tel: 0335-43241.

15/16/17 JULY

*RSCB 75th ANNIVERSARY NATIONAL CONVENTION - * National Exhibition Centre, Birmingham. Details * RSCB HQ. Trade - Norman, G3MVV tel: 0277-225563

24 JULY

*McMichael 88 Rally - Haymill Centre, Burnham, nr Slough. Details Bob G0BTY.

*Anglian Mobile Rally - High Woods Sports & Leisure Centre, Severalls Lane, Colchester. Details GGHQI, tel: 0206-862403.

28-31 JULY

*AMSAT-UK Colloquium - University of Surrey, Guildford. Details G3AAJ, tel: 01-989 6741.

28 AUGUST (Provisional)

*RSCB MOBILE RALLY - Woburn Abbey, Bedfordshire. Details RSCB HQ. Trade - Norman, G3MVV tel: 0277-225563.

11 SEPTEMBER

*Lincoln Hamfest '88 - Lincolnshire Showground, 4 miles N of Lincoln on A15. Details John G8VGF, tel: 0522-25760.

25 SEPTEMBER

*RSCB HF CONVENTION - Belfry Hotel, nr Oxford. Details RSCB.

2 OCTOBER

*Great Lumley AR & ES Rally - Community Centre, Great Lumley, Chester-le-Street, Co.Durham.

8 OCTOBER (Provisional)

*Midlands VHF Convention - Details Peter G3UBX.

OTHER EVENTS

7 NOVEMBER 1987

*BARTG Annual General Meeting - The Churchill Room, London House, Mecklenburgh Square, London WC1 starting at 2pm.

5 DECEMBER

*RSCB ANNUAL GENERAL MEETING - Venue to be announced.

GB Calls

The list below shows ALL the special event stations (except JOTA stations) licensed for operation during October and early November - (as at press date)

It is taken direct from the GB Calls file on the HQ computer. These call signs are valid for use from the date given but the period of operation may vary from 1 to 28 days. There's now no need to send details direct to the editorial office.

NOTE: This list is taken from the Headquarters' database during the first week of the month prior to publication. If you have an event which is taking place during the latter part of the month

of issue, you must send your form in to Headquarters at least 10 weeks in advance to ensure that it can be processed ready for the listing, otherwise it will miss the copy date.

1 OCTOBER

GB0CDE - COASTAL DEFENCE "E": Fort Purbrook. Locator: 10 90 LU. Details G0DHZ.

GB0DOG - (GUIDE) DOG FOR THE BLIND: Glencraig, Ballantrae, Ayrshire. Details G4WEM.

GB1CDU - COASTAL DEFENCE "U": Fort Cumberland. Grid: SZ 683 992. Details G8TNO.

GB1XXI/GB2XXI - 21ST ANNIVERSARY GUERNSEY ARS HQ: Oberlands, St.Martins, Guernsey. Details G8ITE/G4GNS.

GB2PP - PLYMOUTH POLYTECHNIC: SU Building, Drake Circus, Plymouth, Devon. Details G0CVI.

GB4ORS - QUANTON RAILWAY STATION: Nr Aylesbury, Bucks. Details G4PSH.

GB4UOW - UNIVERSITY OF WARWICK: Coventry, W.Midlands. Details G0GWA.

GB8AAW - ACTION AID WEEK: Mansfield, Notts. Details G8AYD.

GB8RRA - RED ROSE AWARD: Bolton, Lancs. Details G1100.

2 OCTOBER

GB1CDO - COASTAL DEFENCE "O": Southsea Castle, Portsmouth. Grid: SZ 643 980. Details G1UWB.

GB2HWW - MOUTH WILLIE WILLIE: York. Details G3FTS.

GB2NK - NORWICH/KOBLENZ: Norwich. Details G8OR.

GB4BSA - BOY SCOUTS OF AMERICA: Tolmers National Scout Camp, Cuffley, Herts. Details G0CSF.

GB6HF - HOUGHTON FEAST: Kieper Hall, Houghton-le-Spring, Tyne & Wear. Details G0A8F.

3 OCTOBER

GB0SJC - ST JOHNS CENTENERY: John Radcliffe Hospital, Oxford. Details G0ACJ.

GB4BMR - BOLTON MOUNTAIN RESCUE: New Overdale Youth Training Centre, Bolton. Details G4NRD.

GB4ILB - INSHORE LIFEBOAT: Cloethorpes Lifeboat Station. Details G4YTO.

GB4NSU - NEURO SURGICAL UNIT: Oldham ARC HQ, Moorside, Oldham. Details G4ZEP.

4 OCTOBER

GB0CDW - COASTAL DEFENCE "W": Witley Fort, Portsmouth. Details G0ERS.

GB0CDX - COASTAL DEFENCE "X": Golden Hill Fort, Isle-of-Wight. Details G3RJK.

GB4EKG - ESSEX KITE GROUP: Old Warden Airfield, Biggleswade, Beds. Details G4YTC.

5 OCTOBER

GB2IC - IMPERIAL COLLEGE: S.Kensington, London. Details G4WHL.

GB2UBR - UNIVERSITY BRUNEL RADIO: Uxbridge, Middx. Details G0BKR.

GB4TCS - TWELFTH CAMBRIDGE SCOUTS: E.Cambs County Scout Camp, Abington, Cambs. Details G3RSE.

6 OCTOBER

GB2RCC - RADIO CARAVAN CAMPING (CLUB): Copt Oak, Leicester. Grid: SK 475 138. Details G4EPN.

7 OCTOBER

GB4XXX - THE 'X' N & H DX-PEDITION: Mervol Caravan Park, Chwilog, N.Wales. Details G4LPX.

8 OCTOBER

GB2CDW - COASTAL DEFENCE "W": Grid: SU 589 069. Details G0GIA.

9 OCTOBER

GB0ERH - EAST RIDDLESDEN HALL: Keighley, W.Yorks. Details G0BFE.

GB2CCP - CHATELHERAULT COUNTRY PARK: Hamilton, Strathclyde. Details G3MTH.

GB4SUN - SUNDERLAND FLYING BOAT: Castle Archdale Country Pk, Co.Fermanagh, N.Ireland. Details G14CZM (see 'Around the Groups').

10 OCTOBER

GB2WMD - WAKEFIELD METROPOLITAN DISTRICT: Ossett, W.Yorks. Details G4VRY.

12 OCTOBER

GB0CDG - COASTAL DEFENCE "G": Fort Comer, Gosport. Grid: SZ 587 989. Details G0AYZ.

15 OCTOBER

GB8CES - CLUB EIGHTY SEVEN: The Grandstand, Old Racecourse, Carlisle Rd, Lincoln. Details G1FKK.

16 OCTOBER

GB0COV - COLMORTH OUSE VALLEY: Pertenhall, Beds. Details G3UYW.

GB2FEB - FAR EASTERN BROADCASTING (ASSOCIATION): Carmunnock, Clarkston, Glasgow. Details G3ZDH.

GB2KAC - KIRRIEMUIR AGE CONCERN: Kirriemuir, Angus. Details G4BAG.

18 OCTOBER

GB2RPS - RICHBOROUGH POWER STATION: nr Sandwich, Kent. Details G3WEB.

21 OCTOBER

GB2CDQ - COASTAL DEFENCE "Q": Fort Grange, Gosport. Grid: SU 591 002. Details G4LIK.

GB2CDR - COASTAL DEFENCE "R": Fort Rowmer, Gosport. Grid: SU 593 011. Details G4LIK.

22 OCTOBER

GB1CDE - COASTAL DEFENCE "E": Fort Purbrook. Grid: SU 678 064. Details G1XJR.

Events Diary

(22 October cont)

GB1CDW - COASTAL DEFENCE "W": Fort Widley. Grid: SZ 657 065. Details G1XJR.

GB2GH - GRANBY HALLS: Aylestone Rd, Leicester. Details G4PDZ.

23 OCTOBER
GB1CDT - COASTAL DEFENCE "T": Fort Nelson site. Grid: SU 607 071. Details G8POQ.

24 OCTOBER
GB2GBB - GLASGOW BOYS' BRIGADE: BB HQ, Glasgow. Details G4HYF.

GB4WMT/GB6WMT - WEST MIDLANDS TRAVEL: Bordesley, Birmingham. Details G4KQU.

GBBEAR - 8TH (ARMY) EL ALAMEIN REUNION: Town Hall, Hove, E.Sussex. Details G2DHV.

25 OCTOBER
GB00RC - OLNEY RUGBY CLUB: Olney, Bucks. Details G0GOF.

29 OCTOBER
GB1CDO - COASTAL DEFENCE "O": Southsea Castle, Portsmouth. Grid: SZ 643 980. Details G1UWB.

GB1CDU - COASTAL DEFENCE "U": Fort Cumberland. Grid: SZ 683 992. Details G8TNO.

30 OCTOBER

GB5RC - ROTHERHAM COLLEGE: Eastwood Lane, Rotherham, S.Yorks. Details G0DZX.

GBBAER - 8TH ARMY EL ALAMEIN: Winter Gardens, Blackpool. Details G2DHV.

31 OCTOBER
GB2IBR - INTERNATIONAL BEACH RACES: Weston-super-Mare. Details G4SIY.

1 NOVEMBER
GB0CDE - COASTAL DEFENCE "E": Fort Purbrook. Locator: 10 90 LU. Details G0DZX.

GB2PMS PRESTON MANOR SCHOOL: CARLTON AVE EAST, WEBLEY MIDDX HA9 8NA G0CAJ

GB2RNX - ROYAL NAVAL AUXILIARY: Edinburgh. Details G3HUN.

GB4PMS - PRESTON MANOR SCHOOL: Dollis Hill, London NW2. Details G0EZN.

2 NOVEMBER
GB1RCW - RAYNET GROUP OF WIGAN: Hindley, Wigan. Details G1EFU.

4 NOVEMBER
GB0CDX - COASTAL DEFENCE "X": Golden Hill Fort, Freshwater, Isle of Wight. Details G3RJK.

5 NOVEMBER

GB2CDW - COASTAL DEFENCE "W": Grid: SI 589 069. Details G0GIA.

6 NOVEMBER

GBONWR - NORTH WALES RALLY: Canolfan Aberconwy Centre, Llandudno, Gwynedd. Details G4UWI.

GB6RBL - ROYAL BRITISH LEGION: Wigston Magna, Leicester. Details G6PFN.

7 NOVEMBER

GB0ACF/GB1ACF - ARMY CADET FORCE (195 CO): Drifft Hall, Leacroft, Staines, Middx. Details G4KEX.

8 NOVEMBER

GB2PPC - PRIOR PARK COLLEGE: Bath, Avon. Details G3LYW.

9 NOVEMBER

GB0CDG - COASTAL DEFENCE "G": Fort Comer, Gosport. Grid: SZ 587 989. Details G0AYE.

* FOR JOTA LIST SEND LARGE SAE MARKED "JOTA". *

S I R O T A L L I C S O D A R
W R N B Y C N E U Q E R F E S
I I A C E T A X M R N Q V A A
T L R P S U L A A P D I X M R
C A S E R S P O K V E A B S S
H P E D O I D C N C O D E A L
B S A T M G N P E C D Y O T I
A N N E T N A R R O W B A N D
R E M I X A B I I N H E D E A
A C M Z E L E M N T T A L M I
E E A R R S G B R E A M K E R
N R I R T T Y A F S T V E L A
I A A E Z R E G M T Q R N E F
L U A L V E P A R R U O O P A
O X R A Y N E T Q I A W C I R
C M I Y P G Z M U O D T S H S
A T O M E T E R X D O Y I W G
D I A R B H E A T E R A D I O

RSGB
SIGNALSTRENGTH
BANDPLAN
GAIN
ANTENNA
AERIAL
NARROWBAND
CONTEST
ARRL
RAYNET
FSTV
FM
FREQUENCY
ELEMENT
RIT

RADIO
ATOM
PCB
CASE
RSARS
RNARS
BRAID
RAFARS
WHIP
CODE
EARTH
RELAY
XRAY
NET
FET

QRP
QRO
METER
TRIODE
DIODE
GDO
OSCILLATOR
GMT
EMC
LED
COAX
HEATER
RECEIVER
COLINEAR
BEAM

SWITCH
ANODE
DISCONE
MORSE
RTTY
WIRE
QRN
CQ
DTI
QUAD
AIR
AMSAT
SEND
TIME
GRID

The 'Radio Wordsearch' (left) is only for fun - sorry no prizes this time, but we'll be having another crossword soon. All of the words and radio abbreviations can be found in the lettered grid. They are placed forwards, backwards, up, down and diagonally. Words can and do overlap and to give you a start, we've ringed the most important one in the list!

- Good luck and good fun.

DON'T USE OUR OLD ADDRESS:

RSGB has been at the Potters Bar address for more than five years. However, the new owners of 35, Doughty Street, London WC1 are still receiving mail addressed to us and it's causing them a lot of problems re-directing it to us. If you send mail to the old Doughty Street address, there is no guarantee that it will reach us at all.

The new subscribers of our old telephone number are also getting getting calls for us, which is interfering with their business. Please DO NOT use the old address or telephone number.

DTI NUMBER TO CHANGE:

As from 19 October, the "275" telephone exchange of the Department of Trade & Industry, at Waterloo Bridge House will be replaced by the "215" exchange. In addition to this, all extensions in the 3000 to 3349 series will become 2000 to 2349 numbers.

Therefore, the main switchboard number for the DTI will become:

01 215 2000

NEWS & VIEWS

HF

*John Allaway, G3FKM**

LIGHTNING does strike twice in the same place—an apology to Tom G4XTM, whose call sign was mistyped by me as G4TXM in the results of the 1986 CQ WW WPX SSB Contest in the June issue, and again in the results of the phone section of the 1986 SAC contest in August. Hopefully the real G4XTM is not a contender!

Cycle 22

Smithy, G8KG, was unable to supply his usual report last month, but he has made up for this by sending me the following—which is the best bit of hf news I have read for a long time. . .

"From the solar data for May-July it is now quite clear that Cycle 21 ended and Cycle 22 began in September 1986, the minimum smoothed sunspot number being just over 12. This means that 21 lasted just 10-25 years, placing it in the family of 'short' cycles along with 17, 18 and 19. Also, lest we forget, it had the second highest peak on record and stayed high for more than the average length of time.

"Over the past four months the new cycle has risen quite steeply, with an average sunspot number over the period of around 30 (solar flux 84 sfu). Furthermore, in a burst of activity in the second half of July the provisional daily number topped the 100 mark—102 on 23 July with the solar flux at 112 sfu. Whether or not this is a promise of things to come it is interesting to note that achieving these values while only 10 months old puts Cycle 22 way ahead of 18, 19 and 21.

"If the present trend continues we can expect a substantial upturn in conditions on the hf bands in the winter months of 1987-8. Solar activity tends to advance in short bursts lasting a few months and much will depend on the timing of these, but we can reasonably expect some monthly sunspot values in the 35-45 region, with the monthly mean solar flux approaching if not passing the 100 mark—with daily values during peaks of activity being considerably higher. At the same time the 'geomagnetic cycle' is at or near its minimum—probably just beginning to rise. All this means that during the coming months the higher bands, including 28MHz, should begin to produce good dx with increasing reliability, though on the more northerly paths the openings may still be rather short.

"When and how big the peak will prove to be is clearly a question of great interest, particularly now that we have 50MHz. At present SIDC Brussels cautiously predicts it will be between December 1990 and November 1991—past even-numbered cycles tended to have long rise times but they mostly had rather low peaks. On the other hand cycles 8 and 18 were both high peaks and rose in only 3-3 years, so the peak could be as early as December 1989—this should begin to show more clearly a year from now. The current rather low forecasts of the size of the peak should not cause too much concern, since the methods used involve a starting assumption followed by continuous readjustment as the cycle progresses. As mentioned in my last report, there is a method (Ohl/Sargent) which aims at a definitive forecast based on past geomagnetic behaviour and was successful for Cycle 21. It is hoped soon to have the data which will confirm or modify the initially encouraging result obtained by applying this method to the new cycle."

Marion Island

After reading the June column, ZS6BBY, SARL dx and awards manager, has sent a letter which makes a number of points in connection with rumours of possible future activity from Marion Is. The first is that VE3FXT had received no permission to operate from Marion Is in January 1988 at the time the letter was written, nor had a licence been applied for. The supply ship *SA Agulas* will leave for the Antarctic base in November 1987 and return to Capetown in February 1988, and will not go to Marion Is until April 1988.

ZS6BBY says that it is interesting to note that in March 1987 VE3FXT had a meeting with officials of the Department of Environmental Affairs (which controls the island and issues the call sign ZS8MI) and verbally requested permission to operate an amateur radio station from the island. The reply

*10 Knightlow Road, Birmingham B17 8QB.

was that permission could not be granted at such short notice as the full complement of 96 crew and scientists had been met and the *SA Agulas* left Capetown on 8 April 1987. No written application had been submitted by Dr Collins or any other radio amateurs to operate an amateur station from Marion Is. This permission must be sought 18 months to two years before the planned expedition on account of the number of scientists from around the world wishing to make a visit. ZS6BBY says that although VE3FXT knew that permission had been refused for these reasons he didn't seem to try to correct any misunderstanding regarding his intended trip, and continued to tell his worldwide contacts that he was 98 per cent sure of going. He left Johannesburg on 26 March 1987. Finally—the rumours that two Israeli amateurs are on the island assisting with the building of an airstrip is incorrect—there are no radio amateurs on the island at present. The planned airstrip construction has been abandoned because it has been decided that such a construction could severely harm the environment, both now and in the future.

However, there is good news because a group of South African amateurs from Johannesburg, under ZS6BBY's organisation, is planning an expedition to Marion in August 1988. Full details will be announced later.



Well-known dxers Lloyd, W6KG, Iris, W6QL, and Ian, G4LJF, at the Visalia Convention. Photo: G4LJF

Uruguay DX Group

This group was formed about four years ago with the sole purpose of organising expeditions to different parts of the world. All its members are experienced amateurs who want to promote radio communications and new countries, to "hard test" new equipment, and to give other amateurs worldwide the chance to work otherwise impossible countries, as well as gaining experience in setting up emergency equipment in remote locations. So far the most outstanding expedition has been the visit to the S Shetland Is which took place in February and March of this year. Three members operated CX0XY for 15 days in precarious conditions and made 8,000 contacts. At present, attempts are being made to organise visits to S Sandwich and S Georgia in February and March 1988. Transport has been promised and some financial backing but a US sponsor is being sought. This news has come from Cathy Cheker, CX9CB, who is taking the RAE in December for her UK licence. The group has requested help from the RSGB in getting necessary permission for the venture and I hope that something can be done in this direction.

Lebanon

Radio Amateurs of Lebanon (RAL) has circulated the following letter: "Due to the continued political situation in our country many unauthorised persons are using amateur frequencies in the hf, vhf and uhf amateur bands. In view of the above and the inability of the authorities to put an end to this, we address all amateur stations to restrain contacts with these stations. The November 1987 Callbook will carry permitted calls, only these are recognised by our authorities to date, other calls are void and not usable for entry in any worldwide amateur activity such as contests, diplomas etc. The list of legal stations in late July included OD5s, A, AO, AW, AZ, BC, BE, BU, CL, CN, EH, EP, FB, FE, FG, FH, FI, FZ, GB, GC, GI, HD, HJ, HO, HQ, HU, IG, IL, IN, IP, IW, IY, IZ, JD, JE, JU, JZ, KB, KC, KE, KI, KO, KP, KS, KV, MD, MS, and ME. OD5KB was formerly OD5SM."

Expeditions

Vic Copley-May, G3AAG, will be activating Cocos-Keeling Is between 25 November and 7 December using the call sign VK9YV. He will have Hans, F6GVD, with him. Vic will be mostly on ssb on all bands and he will not join any nets. Between the hour and 10min past, calls will only be accepted from scheduled stations. Between 30 and 35min past the hour, calls will only be accepted from QRP stations (less than 50W), from those first licensed for hf operation within the previous year, and members of RAIBC.

At other times the operator will say which area he is listening for, and will not answer anyone calling before a QSO is finished—in other words, wait for the “QRZ?”. It is requested that those who have already worked and confirmed VK9Y on a band do not call on that band. Vic intends to announce operating times and QSL details every 10 QSOs. He may be on from some Pacific islands and the Far East before or after this operation.

HMS *Bloys van Treslong* is a Netherlands naval ship based in the Antilles. It has a newly-licensed amateur, PB0AHQ, on board and is making a trip in the Caribbean. The voyage is already under way but calls still to come include Aruba (7 to 9 October), Curacao (10 to 16 October), Bahamas (30 October to 2 November), Saba, St Maarten, and Eustatius (20 to 30 November) and a final visit to Curacao from 2 to 8 December.



Carlos and Sophie of T19W fame in the T19W tent at Visalia. Photo: G4LJF

Chiltern DX club

The last committee meeting of the CDXC decided that, since considerable time has passed since the GK0JFK operation from the Runnymede Memorial, the event is now considered closed. Every contact was QSLd via the bureau and no cards are left. The club is still anxious to obtain enthusiastic new members. It is especially looking for someone in the Swindon area who could act as a relay between the London area and members in Wales and the west country although it is no longer a requirement that members shall be within 144-525MHz contact of each other. The six-months period of associate membership is also no longer required. More information from club secretary G4LJF, QTHR.

DX news

Radio (the monthly magazine for USSR amateur radio enthusiasts) says that the call sign 4K1LPK has been issued to UB5LPK for use from Antarctica until 1 March 1988. 4K0E is the call sign of the drifting ice-flow station “North Pole-29”. The same magazine mentioned that from 10 June until “the end of the summer” UA3DHZ/I, UA3DJE/I, and UV3ACX/I would be active on all bands from Vaygach Is, Novaya Zemlya, and Franz Joseph Land respectively.

In his *DX Report* Jim Smith, VK9NS, reports an unsuccessful attempt to get permission to operate from Agalega, Mauritius and St Brandon Is. He applied for a licence to cover October at the time the Mauritius government sponsors the “Festival of the Sea”, and with the help of the local society approached the Vice-Prime Minister and Ministry of Tourism and Employment. He also applied for a short term licence to cover the actual period of the festival. However, all to no avail as his applications were turned down.

Sue Richardson, J87CD, will remain in St Vincent until about June 1988 but was not able to take back rty gear after her UK leave. St Vincent amateurs have the 18 and 24MHz bands as amateur exclusive. Sue says that the three new classes of licence came into effect on 1 January this year and not in June as previously stated. She wishes to thank many people who have helped her including GW3ANU, GW3CDP, G3ZNC, and GW4FOI.

Nick Langmead, ZC4EE, now has a three-element triband beam and intends to be heard a great deal around 14,062, 21,062, and 28,062kHz with occasional excursions to 14,200, 21,200, and 28,200kHz for ssb operation. He also has dipoles for 7 and 10MHz and should be on 1-8 and 3-5MHz this winter.

According to *DXpress* F2JD(ex-TR8JD, TR0AB), is working in China. He will be on the air from Shenyang, BY2, if this is possible. XU1SS was still active at the time of writing and reported to be joining the Caribbean Net on 14,165kHz at 1300 and 5R8JD on 14,245kHz between 1600 and 1700. V85NO and V85RM are noted by the *Long Island DX Bulletin* to work together on 14,195kHz from 1100. The new operator on Amsterdam and St Paul Is will be F6CZB (formerly J28EI) and hopes to be on all nine hf bands from December with his FT8Z call.

Rumours about activity from Bhutan include comments from VU2RBI that she is making little progress with her attempts to get operating

permission. A station using the call sign A51PN has allegedly been worked but there is doubt that this is the genuine article. Father Moran, well known as 9N1MM, has been awarded the Humanitarian Award by the board of ARRL for service to the community. JF11ST/EP has been worked on 21MHz ssb but nothing was known at the time of writing about the legality of the call sign.

J52UAC is often to be found near 21,250kHz after 1700. At about the same time ZD9BV on Tristan da Cunha is often on 21,265kHz, and he has plans to be on 3-5MHz. 5H3BA is on the air on Sundays and Thursdays on 14,100 or 14,300kHz. A new station on Ascension Is is ZD8AE, Alex (also G4MBH/C5AAS/V3D).

Richard, G3CWI, has been issued a licence to use his own call/CE (and the appropriate call area number) but his chances of being on the air from Juan Fernandez Is are only 50:50. He is prepared to arrange schedules and these may be arranged by writing to Richard Newstead, Casilla 9134, Vina del Mar, Chile 735. To mark the 25th anniversary of Jamaican independence the prefix 6Y25 is being used during the months of August to October this year. N1GL is hoping to be on the air from Aruba as P40A during the CQWWDX ssb contest.

Club station OY6FRA has been on 14,215kHz from 2200 and inviting the making of schedules on other bands. Another Faroese station is OY9JD who favours 14,160kHz a little later but also makes schedules for 3-5 and 7MHz. Romanian stations now have permission to operate between 1,810 and 1,850kHz.

A major activity from 0A0KM is rumoured to be taking place this month.

Those looking for zone 2 for WAZ will like to know that VO2AZ is looking for European QSOs on 28MHz, mostly on cw.



Glen, K6NA, (l), with Kan, JA1BK, at Visalia. Photo: G4LJF

Transpolar ski trek USSR/Canada

Brief mention of this was made in the September column. An official notice from CRRL has been released and says: “In February 1988, a joint Soviet-Canadian expedition will leave the Severnaya Zemlya Archipelago to cross the North Pole to Canada by ski. The trip will end at Cape Colombia, on Ellesmere Is, a distance of some 2,000km, which will take 90-100 days. At the request of the organisers the CRRL has agreed to act as the overall co-ordinator for all the amateur radio communications, to and from Canada, in support of this important scientific expedition. It is a unique opportunity for Canadian and Soviet radio amateurs to demonstrate the effectiveness and reliability of amateur radio communications, and, it is understood that this will be the first time that amateur radio has been used to provide basic radio communications for an undertaking of this magnitude. Chief of the expedition, Dr Dimitry I Shaparo, UA3AJH, and Leonid Labutin, UA3CR, are two of the Soviet radio amateurs involved. The support and active participation of Canadian amateurs will be needed to carry out these communications assignments over a prolonged period of up to three months.”

Welcome...

... to the following who joined the Society during July: C6ARC, IK4GMI, K4HQI, PA0RKT, VS6TP, YU4DP, ZC4PW and ZS5ABH.

Contests

CQ WW DX Contests

0000 24 October to 2400 25 October (phone)

0000 28 November to 2400 29 November (cw)

1-8 to 28MHz. Exchange RS/T plus CQ Magazine zone number (UK is in zone 14). QSOs with own continent count one point, with others three. Own country may only be worked for multiplier credit. The multipliers are one for each DXCC country and zone on each band. There are single-operator single and multi-band, and multi-operator single and multi-transmitter sections as well as a QRP section in which case power output must not exceed 5W. Photocopies of the rules as well as

specimen log sheets and entry forms are available from G3FKM (sase please). Entries must be sent to *CQ Magazine*, 76 North Broadway, Hicksville, NY, 11801, USA, postmarked no later than 1 December 1987 (for the phone section) or 15 January 1988 (for the cw section).

X Concorso Ibero-Americano

2000 10 October—2000 11 October

Object is to work as many stations as possible on the bands 1-8 to 28MHz phone only. Exchange RS plus serial QSO number (starting from 001). Stations may be worked once on each band and each QSO with Latin America counts three points and with other countries one. The multipliers are Latin American DXCC countries which are listed as: CE, CO, CP, CR, CT, CX, C3, C9, DU, EA, HC, HI, HK, HP, HR, KP4, LU, OA, PY, TG, TI, XE, YV, ZP, 3C and their DXCC "dependencies". Non Latin American entrants will receive a participation certificate if they make a minimum of 50 QSOs. Logs should show time, station worked, numbers sent and received, if new multiplier, and points claimed. Duplicates must be clearly indicated. Post logs before 30 November 1987 to: "X Concorso Ibero-Americano", Gran Via de les Coris Catalanes, 594, 08007 Barcelona, Spain.

ON Contest 1987

0700 to 1100 4 October (3.5MHz ssb)

0700 to 1100 11 October (3.5MHz cw)

Only contacts with ON stations and with DA stations (Belgian Forces in Germany) are allowed. Exchange RS/T plus serial QSO number (from 001). ON and DA stations will indicate their club eg 59007 MCL. Each ON or DA worked counts three points and each club counts as a multiplier. Winners of each section receive an award. Listeners may take part and should log time, call sign of station heard, exchanges and call sign of station being worked. Send logs not later than three weeks after the contest to: Walters Leon, ON5WL, Borgstraat 80, B-2880 Beerzel, Belgium.

YL Anniversary Party

1400 14 October—0200 16 October (cw)

1400 28 October—0200 30 October (phone)

For YL operators only. Photocopies of rules from G3FKM

WA-Y2 Contest

1500 17 October—1500 18 October

CW and phone. Single-operator multi-band with QRP section for those running less than 10W output. Also multi-operator single-transmitter and swl categories. 3-5 to 28MHz in contest-preferred band segments only (where these have been specified). Exchange RS/T plus serial from 001. Y2s will also send two letters to indicate their

"kreiskanner". QSOs with Y2 count three points and each station may be worked once per band. The sum of districts worked on each band is the multiplier. Separate logs for each band together with a detailed summary sheet and signed declaration should be sent to Y2-Contest Bureau, RKDDR, PO Box 30, DDR 1055 Berlin, German Democratic Republic, within 30 days of the contest.

In the **UBA SWL Trophy 1987** (Phone) of the 42 entrants **RS32525** came first with 155,258 points, other UK listeners were **RS28198** (26,797), and **88825** (18,625). In the cw section **RS52686** scored 3,536 points.

Results of the **PACC-Contest 1987** have been received. UK stations listed and their scores are as follows: **G0AEV** (8,640 points), **G4UPS** (8,346), **G3ESF** (6,669), **G4IOM** (5,841), **GM3KLA** (3,726), **G4KHM** (3,648), **G3ZRH** (3,317), **G3AEZ** (2,678), **G5LP** (2,210), **GM4WEW** (1,980), **G4YEK** (1,606), **G4IZB** (1,364), **GW4UZZ** (1,160) and **GM8SQ** (1,026). In the listener section **RS87156** scored 4,320 and **RS87865** 2,280.

In the **1986 OK-DX Contest** (all-band section) **G3ESF** scored 24,048 points, **G4ODV** 23,680, **G4OTV** 2,703, **G4OKN** 2,700, and **G60I** 1,560. **G3XWZ/A** scored 3,690 points on 1-8MHz, **GB0WK6**, 534 on 3-5MHz, and **G6NK** 1,430 on 14MHz.

Results of the **1986 CQ WW DX Contest** (phone) have arrived from W1WY. UK scores are as follows:

SINGLE-OPERATOR SINGLE-TRANSMITTER					
Call sign	Band(s)	Points	Call sign	Band	Points
G3JX	All	669,908	GM4CHX	28MHz	1,300
GM4GPN	..	319,676	G14MWA	..	817
GB6AR	..	296,100	G4RKK	21MHz	166,026
GM3BCL	..	276,740	G3RTE	..	137,706
GM4WEW	..	233,120	G4PCI/P	..	40,950
G3SNN	..	217,588	GM0AXY	..	4,756
G4IUF	..	208,803	GM3MOR	..	1,104
G4UDU	..	184,110	GW4RHW	14MHz	155,958
G3ICG	..	85,120	G13KOR	..	45,375
G6QQ	..	64,827	GM4JFS	..	27,786
G4BWP	..	52,731	GB2RIP	..	8,668
GD4GWO	..	41,008	G3JKY	..	8,442
G4GIR	..	13,230	G4CNY	7MHz	80,200
G6NK	..	13,164	G14BBY	..	22,357
G4JOL	..	2,395	GW4VEQ	3.5MHz	123,670
GM8SQ	..	1,122	G3XTT	1.8MHz	10,974
G0AEV	28MHz	19,158	G3XWZ	..	8,272

In the **Multi-operator single-transmitter** class, **G3NAS** scored 2,775,216 points and **GM0BRS** 1,390,095. In the **multi-operator multi-transmitter** class **GB6AA** scored 997,150 points, and in the **QRP** section **G4MTC** scored 41,195 and **G3KDB** 35,460. Certificate winners are listed in bold type.

HF F-layer propagation predictions for October 1987

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie 0°=0000, 1°=0200, 2°=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 respectively.

Time / GMT	28MHz	24MHz	21MHz	18MHz	14MHz	10MHz	7MHz	3-5MHz
	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802
** EUROPE								
MOSCOW	.....111....	.....2332....	.....56653....	.....1788751....	.....68878861....	311655567863	876433235799	+++3....24++
MALTA	.....11.1....	.....25222....	.....65551....	.....1887774....	.....58778983....	452765567985	998532235899	+++2....25++
GIBRALTAR	.....21.1....	.....254331....	.....576564....	.....8877883....	.....76667883....	231576667883	897753335799	+++52....24++
ICELAND	.....	.....1321....	.....36541....	.....3788861....	.....76667871....	762554345787	762554345787	+++52....245+
** ASIA								
OSAKA	.....1....	.....32....	.....651....	.....3764211....	.....243334631....	.....11.13662....	.....34....	
HONGKONG	.....121....	.....343....	.....16661....	.....27772....	.....2665543....	.....33235752....	.....13684....	.....352....
BANGKOK	.....222....	.....1444....	.....26772....	.....367751....	.....24656431....	.....1.13235762....	.....2.13686....	.....3+3....
SINGAPORE	.....2221....	.....144431....	.....367763....	.....4677761....	.....23656751....	.....2.13235863....	.....1.13686....	.....3+4....
NEW DELHI	.....2221....	.....14442....	.....36775....	.....467771....	.....33556511....	.....411.12235675....	.....62....13688....	.....3+3....
TEHERAN	.....3322....	.....255441....	.....577774....	.....6667761....	.....1.1534567621....	.....644211235876....	.....862....12689....	.....3+3....
COLOMBO	.....3322....	.....255441....	.....467774....	.....4567772....	.....224567621....	.....21....1235877....	.....51....12689....	.....3+3....
BAHRAIN	.....13323....	.....255551....	.....566774....	.....6567771....	.....1.2433567631....	.....7531....235887....	.....861....2688....	.....3+3....
CYPRUS	.....44342....	.....266564....	.....5888872....	.....7888885....	.....22276678952....	.....876533346898....	.....95211124789....	.....+2....4+...
ADEN	.....144342....	.....265564....	.....5667872....	.....5556885....	.....2.1322367842....	.....8431....135888....	.....861....2688....	.....+3....35+
** OCEANIA								
SUVA/S	.....	.....122....	.....1344....	.....455523....	.....24333451....	.....321.123....	.....	.....
SUVA/L	.....	.....21....2....	.....2421.13....	.....1166431.541....	.....264222252....	.....31....23....	.....	.....
WELLINGTON/S	.....	.....1331....	.....3554....	.....1665532....	.....44333551....	.....221.123....	.....	.....
WELLINGTON/L	.....	.....	.....1....2....	.....21341....241....	.....125421.1531....	.....21....23....	.....	.....
SYDNEY/S	.....11....	.....3311....	.....26643....	.....487652....	.....5765663....	.....24323573....	.....1.1362....	.....3....
SYDNEY/L	.....	.....	.....3....2....	.....63....52....	.....114321.352....	.....12....152....	.....	.....
PERTH	.....331....	.....2553....	.....477621....	.....577753....	.....35556641....	.....2....23235874....	.....12673....	.....35....
HONOLULU	.....	.....	.....	.....	.....111.451....	.....13222531....	.....2421.121....	.....2....
** AFRICA								
SEYCHELLES	.....123342....	.....245564....	.....4567872....	.....4457885....	211222467842	852....135888	84....2689	+++5....25+
MAURITIUS	.....144453....	.....266675....	.....4667882....	.....55578851....	211322567852	852....235898	83....2689	+++5....3+...
NAIROBI	.....54454....	.....2666761....	.....4667884....	.....55558871....	221422267962	8741....35898	872....2688	+++4....3+...
HARARE	.....35565....	.....1567872....	.....3677895....	.....55557882....	231422257973	8842....25898	873....2688	+++4....35+
CAPE TOWN	.....135762....	.....357884....	.....25678971....	.....46567893....	221532347983	88531....14799	8841....1589	+++5....25+
LAGOS	.....566772....	.....777885....	.....18777881....	.....37556894....	24.642236984	79651....3798	8982....1588	+++5+....25+
ASCENSION Is	.....343374....	.....665586....	.....8766882....	.....8655685....	242163223794	79853....1489	88851....279	+++2+....4+
DAKAR	.....255564....	.....477686....	.....7776883....	.....8655786....	142364224793	788641....1489	88851....269	+++5+....4+
LAS PALMAS	.....144242....	.....376565....	.....6887882....	.....8888895....	131387667893	787764334798	999631112489	+++3....25+
** S. AMERICA								
STH SHETLAND	.....2233....	.....24455....	.....1467773....	.....3677775....	142365554563	587743221235	56651....12	2332....
FALKLAND Is	.....34454....	.....566761....	.....1787773....	.....4776675....	142266533463	68864322.135	78851....13	+++2....13
R DE JANEIRO	.....42234....	.....744561....	.....865673....	.....2865575....	132156322473	788643....148	89852....26	+++2....2+
BUENOS AIRES	.....34354....	.....565661....	.....1786773....	.....3775565....	132166432353	6885431....36	89852....3	+++2....2+
LIMA	.....3222....	.....53441....	.....75662....	.....75554....	11.253232	5772232....14	69852....1	+++2....2+
BOGOTA	.....3122....	.....5344....	.....75552....	.....17544....	11.14532243	5751332....14	798521....2	4+52....
** N. AMERICA								
BARBADOS	.....13222....	.....253441....	.....575663....	.....775555....	11.16522363	6762432....37	88752....15	+++52....2
JAMAICA	.....2111....	.....4333....	.....65552....	.....76554....	1.2532242	56412321....15	797421....2	4+52....
BERMUDA	.....2111....	.....4333....	.....165552....	.....376664....	.....5543463....	564.23211136	888421....15	+++2....2
NEW YORK	.....11....	.....2322....	.....45541....	.....67663....	.....2554552....	452....3221235	788321....13	5+2....
MEXICO	.....11....	.....321....	.....5541....	.....17542....	.....1.453221....	352.3123....2	388321....	+++2....
MONTREAL	.....11....	.....1221....	.....45541....	.....67663....	.....3555552....	452.1322245	787321....14	5+2....
DENVER	.....11....	.....1....	.....132....	.....3541....	.....155431....	341....232112	47731....1	4+2....
LOS ANGELES	.....11....	.....1....	.....32....	.....1541....	.....3642....	231.1....33111	256321....1	3+2....
VANCOUVER	.....11....	.....1....	.....1....	.....231....	.....1553....	22....124322	256321....2	2+2....
FAIRBANKS	.....11....	.....1....	.....1....	.....1....	.....11352....	11.132225532	233421.12211	....22....

The provisional mean sunspot number for July 1987 issued by the Sunspot Index Data Centre, Brussels, was 33. The maximum daily sunspot number was 102 on 23 July, and the minimum was 0 on 1-4, 6 and 11-14 July. The predicted smoothed sunspot numbers for October, November, December 1987 and January 1988, are respectively: (classical method), 27, 28, 29 and 31; (SIDC adjusted values) 33, 34, 35 and 37.

QTH CORNER

BY4AY PO Box 5304, Shanghai, PR of China.
 BY5RT PO Box 707, Fuzhou, Fujian, PR of China.
 G3CWI/CE via M, Atherton, G3ZAY, PO Box 146, Cambridge.
 J87CD Sue Richardson, PO Box 975, St Vincent, W. Indies.
 WY5L/KH3 via N5DAS, 12747 Thomas Sumter, San Antonio, Tex, 78233, USA
 PA0GAM/ST2 G Menting, PO Box 3794, Khartoum, Sudan.
 TR8JLD now only via AK1E, (see 3C2A).
 TU2QZ via N5DVY, 7300 Lomas Blvd NE, Albuquerque, NM, 87110, USA.
 VK9YD OH5VD, Paaskunkuja 7, SF-03100 Nurmela, Finland.
 ZC4EE Nick Langmead, via ZC4 QSL Bureau, JSB, BFPO 53.
 ZC4JA John Atkinson, via ZC4 QSL Bureau (see above).
 ZC1CW Jacques Calvo, 5-10-5 Shimomoguro, Meguro-ku, Tokyo 153, Japan.
 3C2A via AK1E, PO Box 160, Danbury, NH, 03230, USA.
 3C3CR via F6AJA, 515 Rue du Petit Hém, Ouvignies, F-59870 Marchiennes, France.
 4X7STA Shlomo Masali, 2 Shomkan, Tel Aviv 68079, Israel.
 TU4BR/SU7 KN4F, JF Lane, 5104 Pilgrim Rd, Memphis, Tenn, 38116, USA.

10MHz COUNTRIES TABLE

	All-time	1987
G3PJT	101	71
G4YWG	63	47
G4VDX	71	37
G4OBK	57	36
G4YSN	1	1

28MHz COUNTRIES TABLE (1987)

G4JBR-116	G4DXW-42
G4XAH-103	G4RWP-39
G3XOU-96	G0BXQ-35
G0AEV-93	G4YWG-30
G0DNV-70	G4IDF-25
G4MUW-69 (ssb)	GW4TEJ-27
GD4XTT-62 (ssb)	GM4CHX-22
GD4ELY-60 (ssb)	G4OBK-22
G4VPM-56 (ssb)	G5HD-10 (QRP cw)
G4NXG/M-51	G0FYD-2

Those intending to enter the forthcoming **VK/ZL/Oceania Contest** should note that at the time of writing the September column the correct address to which to send entries had not been notified and that it should be to the new **WIA contest manager**—Brian Beamish, VK4AHD, PO Box 254, Stones Corner, Qld 4120, Australia. They must reach him by 15 February 1988.



Sam, YB3JO, and wife Lucia with Brenda, G4SDF, and Andrew, G4OLF on Ball

Band reports

Well-sounded this month by G2HKU, G5JL, G3s GVV, KSH, PJT, YRM, GM4CHX, G4s EAN, EHQ FMO, IDF, GW4KGR, G4s LRS, MUW, NXG/M, OBK, UZN, VPM, XAH, GD4XTT, G0s AEV, BXQ, GD0ELY and G0HGA, to whom many thanks.

Stations listed in italic were using A1A.
1-8MHz 2200 OF0MA.
3-5MHz 0000 3C1CW 0500 ZL4BO, 2200 OF0MA.
7MHz 0000 TR8CW, V31JW, 0400 VP2VM, W6-W7, ZL1-ZL4, 0500 JY5WF, XE, ZD9CC, ZF2BN, ZL7TZ, 3C1CW, 0600 VP2VA, ZL7AA, 1000 OY/OZ3QN, 2000 JA4CRS, UA0s, 2200 FG5XC, OY1R, UA0WB, 3C2A, 2300 VK6s HD, LV.
10MHz 0300 W2-W4, 0400 T12LK, VK2-VK3, 0500 VE7ZG, 0600 VK2,3,5, W7FU, 0800 VK6, 1600 9V1TL 1700 OH0/SM7KJH, 2100 W1-W4, 2200 UD6DKW, 7X25AX, 2300 SP5EXA/JW, LU2YA.
14MHz 0500 VU2XX, Y11BGD, 0700 FP0FB, J11BT, OK1XCJT, WY5L/KH3, WB4KMV/KH3, KH6JEB/KH7, ZK2AR, 3C2A, 5W1FT, 0800 AL7JJ, FO5FO, KH6, V85GA, VR6YL, ZD9CK, ZK1DD, ZK1XV, ZK2DD, 3C2CW, 1000 AP2AU/40, JA, KH6JEB/KH7, WL7AFD, 1100 4U1VIC, 1200 WA4ZFL/JW, 1400 V85BA, W6s, 9M2DF, 1500 VU2NTA, 1800 AP5HQ/40, HL1XP, JAS, S92LB, TR8SA, TZ6FIC, UA1OT, VUS, XX9TDM, 9V1WP, 1900 SP5EXA/JW, VP8OP, 6T2MG, 2000 VP2MDY, ZD8AE, 2100 A71BH, BT9GA, FY7AN, JAS, PA0GAM/ST2, XE3AAF, 5T5EV, 2200 KN8M/5V9, W6s, V31AB, W87PAX, 3C1MB, 6Y25IC, 2300 KY0T/CU7, FS/PA0CRA, V31TP, 5H3BH.
18MHz 2100 VE3ACW 2200 VE3UD.
21MHz 0700 S79WHW, YC7JWL, 0800 BY8AC, 0900 Y11BGD, 9V1WP, 1100 OF0MA, TR0CW, VK6AY, VU2GI, 3C1MB, 1400 A4XYQ, 1500 Z44WB, 1700 5N9SRC, 1800 TA2L, TR8SA, ZD8MAC, ZS3GB, 1900 PA0GAM/ST2, 2000 FM4EB/JM, J88BN, TA2D, TR8JLD, VP9LL, 2100 C6AFF, CE, FM, J3, OA8AT, ZD8RP, 2200 CE0ICD, HH, HK, HP, LU, PY, TI, V2ACH, W1-W4.
24MHz 0800 KV4RO, LU9HBW.
28MHz 0800 C30LES, 0900 JY5DX, 9H4R, 1000 CN8DO, VE1BNN, 1100 5B4TI, 1200 3C3CR, 1300 SV0AH, 7X2SB, 1400 OF0MA, TU2QZ, 1600 CN2AQ, 9K2KA, 1700 A71BJ, TZ6CVY, 3C2A, 4U1ITU, 1800 TA1E, 7X25LS, 1900 FE6ILL/FY, LU9DKZ, UL7OB, 3G65AA, 6W7OG, 2000 EA6OK, HB0/DL3MBH, WP4CC, TK1F6BUM, W3HKI, ZP45OA/P, 9Q5NW, 2100 FG5BG, FM5WD, HK1AMW, NP4CC, T77C, ZD8MB, ZY4DY, 9Y4GC, 2200 KP2J, VE2EDK (Zone 2), ZP5RG, 2300 HC6TA.

Thanks also to the following for information: *DX Report* (VK9NS), *Long Skip* (VE3IPR), *Lynx DX Group Bulletin* (EA2JGO), the *DX Family Newsletter* (JHIKRC), *DXpress* (PA3CXC), *CQ Magazine* (W1WY), *DXNL* (DL3RK), *Long Island DX Bulletin* (W2IYX), *DX News Sheet* (G4DYO) and *The Ex-G Radio Club Bulletin* (G13OEN/W6).

Closing date for receipt of material for the **December** issue is **15 October**—please note that this is an early deadline. □

VHF/UHF

Ken Willis, G8VR*

"I CAN'T UNDERSTAND THIS. I have been on six metres for 30 years, and I have never heard anything like this before."—So said W2CAP/1, Cape Cod, Mass, USA, while working G4CVI in the massive 50MHz opening on 21 July.

This event, which lasted over four hours, resulted in QRM and pile-ups more appropriate to a hf band contest than a vhf opening. With propagation favouring vast areas on both sides of the Atlantic, hundreds of UK operators were able to make contacts with USA, Canadian and Newfoundland stations, some using very low power and simple antennas. VO1LO had just 5W into a five-element Yagi—real QRP for a "statesside" station—while many UK stations used no more than a dipole and a few watts. By the end of the event, around 2300gmt, the logs of several British stations showed lists of transatlantic contacts running into double figures.

Previously, on 17 July, there had been another big opening in which Alex, GM3ZBE, worked 24 VE and W stations. This was the first time he was able to get into the action, as during earlier openings—though he could hear the more southern stations working "across the pond"—none of the dx was audible up in Grampian. Alex also said that in this particular opening, Lefty, K1TOL, told him that he could hear stations on the west coast of the USA at the same time that he was working into GM. As Alex remarked: "Makes you wonder just what is going on—are we going to work W6 by this mode one day?"

That is a good question, of course, but just what is "this mode"? It is generally accepted that sporadic-E propagation is involved, with more than one "hop" being required to bridge the distances being covered. Sporadic-E is known to be very selective in the areas at both ends of the path which it covers, with S9 signals at one location often inaudible at stations just a few miles away.

While propagation in these transatlantic openings has also exhibited a certain amount of selectivity in the areas it favoured, this has been on a quite different scale from anything experienced at, for example, 144MHz. No 144MHz Es opening has ever embraced so much of the UK, though those who watch European tv transmissions in this part of the spectrum are well aware that Es coverage on 50MHz is very different from that on 144MHz. Be that as it may, the ability of an east coast USA station to hear signals some 3,000 miles both to his east and west simultaneously needs explanation.

Then there is the role played by the sun. It has always been argued that while we cannot say for certain what causes sporadic-E, it has always been assumed that no simple relationship exists between solar conditions and this form of propagation. It is known that this type of event is more likely to occur during the low point of the solar cycle, but on the evidence of this year's events, there appears to be some correlation between solar activity and transatlantic propagation at 50MHz. In fact, solar forecasts contained in GB2RS newscasts at times made a point of alerting operators to the fact that a major 50MHz opening was possible because an active area on the sun, previously reported, was due around again. So was it just a coincidence that 27/28 days elapsed between the major events of 19 June and 17 July? Paul, G4IJE, was of the opinion that the earlier event was the bigger one, which would be consistent with the reappearance of a solar hot-spot, which, after a further solar rotation by 17 August, had so diminished that no event occurred; for so far none has been reported around that date. There is so much we do not know. If eventually beacons are established which transmit timing signals which enable path lengths to be measured (VHF/UHF March 1987), then some light may be thrown on the subject. Meanwhile we can only marvel at and enjoy such conditions.

We are indebted to several readers who sent logs covering the various openings, among them GM3ZBE, GM3TSL, G1RST, G0DAZ, G4IZH, G4IJE, GW4BCB, G4ICD, G0GZI, G4UPS, G1CWP, E16AS and G2AHU. The various locations show the extent of the openings, and the information in the logs, which will go to the RSGB Propagation Studies Committee, has enabled a picture of the event to be drawn.

Some indication of what this band has to offer is provided by the log of Paul, G4IJE, which he has computerised. The section April to July 1987 is so lengthy that it takes a full half-hour to print out. By early August Paul had worked no fewer than 91 squares, in band, on 50MHz, together with an impressive list of crossband countries and squares.

This summer, Steve, G4JCC, made another of his annual visits to the south

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of France complete with equipment to work crossband 28/50, and provided many with a contact.

50MHz transequatorial tests

Ray Cracknell, G2AHU, wishes to publicise some 50MHz tests scheduled to start at the end of September and to continue through to the first weekend in November. The aim is to investigate transequatorial propagation (tep) over the Europe-Africa circuit, since it is known that during periods of sunspot maximum or minimum, tep coverage is sometimes extended by sporadic E propagation. In the past, extended tep has been observed as far north as latitude 56°. During the past two equinoctial periods, SV1DH (Athens) noted that tv from Zimbabwe and Zambia could be copied on about 20 per cent of evenings and occasionally during the afternoon. Amateur contacts between Japan and Northern Australia have been possible on several evenings by normal tep, while some extended openings between Japan and Southern Australia have been recorded. The potentialities of this mode are also illustrated by an amateur contact which took place at 0445gmt on 6 November 1986 when JE1MBJ worked ZL2PTY on 51.11MHz, an extremely long haul QSO.

The area in the north normally covered by tep encompasses the entire Mediterranean; since there is regular sporadic-E propagation northwards from this region, the possibility of extended tep certainly exists, and October is thought to be the most favourable month for it to occur. In this month in 1964, beacon ZE1AZC was copied as far north as Dundee.

The southern tep zone lies in the belt 15-25° south, and includes Madagascar, southern Mozambique, southern Malawi, Zambia, Zimbabwe, Botswana, southern Angola, northern Namibia and the northern tip of South Africa, with extensions possible as far for the northern zone.

It is hoped that all available 50MHz beacons, and especially those within the main tep zones, will be beamed across the equator for the duration of the test, and that stations concentrate their activity during weekends, using 50-110MHz as the calling frequency and 28-885MHz as the crossband frequency, moving off as QRM develops. From Botswana, A22KZ will be a call to listen for, while ZS3AK, who will be active, hopes to have a beacon firing this way. Beacon ZS66SIX will be QRV on 50-025MHz running 65W to a six-element Yagi from a location near Pretoria. ZS6LN will be operating from just south of the Zimbabwe border, and others to listen for are ZS6WB and ZS6PW. If things happen, no doubt others will soon appear. Quite apart from attempting to make contacts, there is a role for all to play in listening for distant beacons and other signals. Several amateurs have tv equipment covering this part of the spectrum, so their observations will be most useful. Although 50MHz has already sprung some surprises, don't go looking for S9 signals from remote spots. Ray says that there are two types of tep, the afternoon type which provides strong, clear signals, and the evening type which is subject to severe flutter fading. Early morning tep around 0600gmt is also a possibility.

70MHz

Despite the great surge of interest in 50MHz, the 70MHz band still has its adherents. Dave, G4FRE, wrote just as he was packing his expedition gear for a trip to EI, where he planned to operate on the band using callsign EI4VCH/P. The previous night from his home QTH (Felixstowe) he completed a 70MHz meteor scatter contact with EI4VBM/P, in which he received 22 bursts and 34 pings, the longest reflection lasting 10s.

Dave pointed out that he had played a major role in getting the top limit for 70MHz awards reduced from 10 to 8 (attributed to G5UM in the August VHF/UHF), and this is indeed true as readers will have noted from his previously published comments on this subject. This change in the rules did not please everyone, however. Graham Badger, G3OHC (Sutton Coldfield) believes that since the band is now available to Class B operators, working eight countries (eg G, GW, GM, GI, GJ, GU and EI) should not prove to be a very difficult task, and he feels that this is "another example of declining standards in our hobby". Graham says that it is quite possible to work 10 countries on 70MHz, as he and G4BPY both did to claim the 35 squares/10 countries award. He cites occasional operation from 5B4, C31, TF, OY and ON as possible to swell the totals, though one must be wary of working unauthorised stations when they pop up in unexpected places. Graham is concerned that the 35/10 award will now become extinct, making the two certificates already issued "null and void". This point is in fact dealt with in private correspondence between Malcolm Appleby, G3ZNU, chairman of the VHF Committee, and G4FRE. Malcolm said that the committee's decision was that the top 70MHz award would now be 50 squares plus eight countries, though an endorsement could be added to an award to anyone claiming more countries than this.

Not everyone is interested in chasing squares and countries for awards, of course, but there is little doubt that the competitive spirit which this engenders has done wonders for vhf/uhf operation in the UK and resulted in

levels of activity and enthusiasm which are envied throughout the world. For this reason, there must surely be merit in maintaining high standards, though the requirements for any award must be realistic. The problem with 70MHz is that it is something of a "maverick" in that being a band not formally recognised by IARU as one available to amateurs, there is not much chance of it being allocated more widely in future, and like 50MHz, it will therefore depend on crossband operation to extend coverage. What about some crossband awards for 70MHz?

Peter, G4IZH (Tyne & Wear), worked HB9CRQ crossband 28MHz to 70MHz on 18 June using 10W homebrew to a dipole, so here is one for 70MHz operators to look for now that so many seem to have forsaken the band for 50MHz.

Aurora

Listeners on 144MHz have not exactly been deafened lately by the rasping tones of radio auroras, but visual observers of the BAA continue their watches into the night, and Ron Livesey, director of the Auroral Section sends his usual monthly reports. They make interesting reading because of possible connections with other events which have stirred the imagination lately. For instance, take the major 50MHz opening to the USA on 19 June. On this day, BAA observer Karl Lewis who lives as far south as Saltash, Cornwall, recorded magnetic activity as being "very unsettled". On only three days in the month was activity so described. On the same day, NOAA, Boulder, Colorado, recorded a major solar storm.

Summer evenings are often too light for visual observers in the UK to see auroras, but they sometimes observe another phenomenon known as noctilucent clouds (nlc). There are some who believe that the formation of these clouds is related to the appearance of sporadic-E, (see *Dubus* 2/87). Theory suggests that nlc are more likely to form if the ionosphere is undisturbed by auroral storms, and on the night of 17/18 June, eight BAA observers reported the formation of nlc visible as far south as Northampton. The following day a major solar storm was recorded. There is a lot more we need to learn about all these matters, not least their effects on the propagation of radio waves. From the viewpoint of the 144MHz operator waiting for radio auroras to provide some dx, things can surely only get better since conditions have been at rock-bottom for some time, but it will probably be some time as we progress along the current solar cycle before any really big auroras occur.

Expeditions

In the July issue, mention was made of a "wet square" expedition by Fleming G4MJC/OZ1EVA, accompanied by Jan, G4XNL, and others. They have now been forced to bring forward the trip by one day to suit ferry sailings across the North Sea, and will now be QRV 8, 9 and 10 October. See the July VHF/UHF for details of the squares they hope to activate during the voyage. Frequency will be 144-240MHz (with QSY to 432-240 if required), and they will use a five-element antenna and 25W on 144MHz, and a nine-element and 10-15W on 1.3GHz, callsign OZ1EVA/MM. To reduce pile-ups, they intend to call for replies by areas (eg AK, ZK, etc) with further division by prefix (G1, G2 etc) if the QRM dictates. QSL will be available by sending an sae to G4XNL, QTHR. Stations outside the UK please enclose two irs.

A letter from Mike, G4XBF, arrived too late for inclusion last month. In it he mentioned his plans to operate from the Lizard, IN79 (XJ) again this year, accompanied by G4YPC. They should be there until 3 October, and frequencies where they may be found are 144-265, 432-165 and 1.262-25MHz, from mid-afternoon onwards.

Meteor scatter

After such a bad summer which brought little in the way of good dx conditions, it was just like Murphy to provide a good tropo opening to coincide with the Perseids shower. On the evening of 12 August and well into the early hours of next day, while many were calling on the meteor scatter channels or working skeds, the 144MHz band remained open for several hours to France, Switzerland and Northern Italy. Propagation was at times a bit fickle, in the words of G4OAE "like looking for a needle in a haystack" with Italians there one minute and gone the next, reminiscent of sporadic-E rather than tropo. Stations to the west seemed to have the best of the conditions, with GW4RIB and GW8ELR much in evidence.

As for the Perseids, it is too early as this is being written for a full assessment to be made, but activity seemed to be less than expected, and the 50MHz band not exploited as much as it might have been, though G18YDZ and EI8EF provided good contacts for many in the south. The night of 11/12 August produced little in the way of long or strong reflections, and the general opinion seems to be that the shower, a poor one this year, probably peaked in the early hours of 13 August. No doubt I will now get reports from operators who thought it was a great shower, with lots of completed contacts to prove it!

There are a couple of quite useful showers due this month. The Cassiopeids should peak around 13 October (range 10 to 15 October) with a zhr of about 20, and be good for SW-NE paths between 0300 and 0900 gmt. For NW-SE paths, try 1600 to 2200.

The Orionids, which arise from comet Halley, should be in evidence between 17 and 26 October. This is a broad shower with not just one, but a number of sub-peaks which makes prediction of the date and time of the main activity somewhat difficult. At its height a zhr of 38 has been measured, but the shower will lie below the horizon from 1000 and 2200 daily. Nevertheless, E-W propagation should be possible between 0200 and 0600, with NW-SE paths open between 0600 and 0800, and the SW-NE direction good from midnight until 0200gmt.

Late news: John Matthews, G3WZT, wrote: "Perseids conditions were excellent around the peak (2200 12 August-0300 14 August). Managed several complete skeds, most valuable was OH0NC/OJ0 for a new country. Others were EA3BTZ, HG7PL/P, HG7RF/P, SK7HW, SK3SN, SK4BX, OE8HWQ, EA3DXU/5, SM5DIC and YU7MJA". Did I say that I thought it was a poor shower?

Repeater news

Kent Repeater Group's latest newsletter announced with some relief that GB3RE (RB11), Chatham, had been finally commissioned. Thanks are due to G4TOG, G3YCN, and G4AKQ and many others who collectively spent hundreds of hours working to achieve this end. Initial tests showed that the coverage was very close to what had been predicted, and the group hopes that this repeater will now be used not only by locals but by those travelling through the area. Prospective members of the group should contact the secretary, G0AMZ or treasurer, G6ZAA, both QTHR.

Thanks to Peter, G6JNS, I now have a copy of the latest edition of the *ARRL Repeater Directory* which can be obtained through RSGB. It is a compact publication, rather like a thickish pocket diary, packed with USA repeater information. Anyone planning to visit the USA taking with them a hand-held or small vhf transceiver should not be without this useful aid. Especially when travelling by car in the USA, repeaters can be of enormous value in the event of vehicle breakdown or an emergency, since a call through one will invariably find someone ready to summon aid by telephone. Also, in that vast country, there is virtually nowhere where one is out of range of a repeater in either the 144 or 430MHz bands, and of course the Americans have the added advantage of repeaters on other bands not available in the UK.

Last month it was mentioned that GB3BM (Dudley, R3) is to be fitted with ctcss. This is the continuous tone-coded squelch system, and the description of this given in the *ARRL Directory* states: "The purpose of ctcss is to reduce co-channel interference during band openings. CTCSS-equipped repeaters will respond only to signals having the ctcss tone required for that repeater. Such repeaters will not respond to weak, distant signals on their inputs and correspondingly not transmit to add to the congestion".

For those who missed the announcements on GB2RS newscasts, here are some items of interest to repeater users: GB3LY (R0) is back on the air following maintenance, reports welcomed by G14MJD 0504-262413: GB3NI (Belfast R5) is also back, as is GB3UL (RB2), the latter with reduced power (5W); GB3PO (R3) near Peterborough is co-sited with GB3PB, reports please to G0AFV: a 1.3GHz tv repeater GB3HV, is on RMT3 (1.248MHz in and 1.308MHz out) from High Wycombe, and goes into beacon mode when not in use as a repeater, while another tv repeater, GB3GV (Leicester), had to close down following a lightning strike.

Apologies to the Galloway Repeater Group for inferring last month that their repeaters GB3AB and GB3BA belong to the Central Scotland FM Group. The Galloway group also points out that GB3BA has not yet been licensed.

From the postbag

Harry Wilson, EI2W, has prepared a fascinating booklet describing his 50MHz activities during Solar Cycle 19, which peaked in International Geophysical Year 1957/8, and Cycle 21 (peak 1979/80). He was not active during Cycle 20. The text deals mainly with F2 propagation, and it is interesting to note that with just 25W to a three-element antenna Harry worked 35 US states and two Canadian provinces in Cycle 19. His receiver was an all-valve job (6J6-6AM6-6BQ7 converter into a Collins 75A-4), while the transmitter was crystal-controlled on 50.016MHz with an 829B in the "final". You have to be somewhat elderly to appreciate what a joy it was in those days to operate using all home-brew equipment, with relative freedom from splatter, pile-ups, prima-donnas and the like. The booklet will find its way into the hands of Ray, G2AHU, but if there is sufficient demand we can look into the possibility of a wider circulation.

Angie Sitton, G0HGA (Stevenage), says she is perturbed by a G1 station she often hears who sends a lot of fast computerised cw on the calling

frequency who, when called, apparently cannot understand even the slowest morse sent to him. She says: "Class Bs must give their call on telephony first, and at all times, when practicing morse or sending cw." However, she is sympathetic to the needs of the Class B operator trying to learn the code, since it is not all that long since she was in that position herself. She says: "Maybe Class As do not want Class Bs down at the cw end of the band, and I do not fancy too many very slow contacts, but they need the practice, so I do what I can for them because I know that when I was a G1 I could call for ages on about 144-155MHz and get no replies." She is an example to all of us because "doing what she can for them" is taking the time to give slow morse practice over the air when requested by another station. Angie also asks how she can indicate on cw transmissions during sporadic-E that she can work full break-in and would welcome being interrupted by a calling station. The only sure way I know is to send the letters BK every five or ten seconds followed by a brief pause to listen for replies.

Dave, G4IDF, has cards left over from the days when he operated as G8DXD (Worcester), and says that anyone needing a card from him under that callsign should send an sac plus details of the relevant contact, when he will be glad to oblige. G4IDF/G8DXD QTHR.

144MHz sporadic-E

Sporadic-E on 50MHz was so prevalent this summer following the general release of the band, that one might assume that interest in this type of propagation on 144MHz would have lessened. This is by no means the case; in fact with so many stations equipped these days for the lower frequency bands, there is a tendency to monitor it to indicate when similar propagation might be imminent on 50MHz. This technique is useful, but sometimes misleading, since several cases have occurred when the direction from which the Es was observed was quite different between the two bands, and at least one opening this year produced Es on 144MHz when 50MHz was to all intents and purposes dead.

I am indebted to several readers, some of whom are listed below, who sent in reports on the 144MHz Es season this year, though at the time of writing we may still not have come to its end. By the end of June, Colin, G0DAZ, (Worcester) had concluded that "sporadic-E openings on 144MHz have been more selective than I have heard before. We all seem to be commenting on this and many times stations a few miles apart have been hearing the dx at different times". Most of us suffer this frustrating experience at one time or another. On 20 July I sat for an hour listening to G4ASR (Hereford) working strings of YU, YO, HG and OE stations, giving S9 plus reports, with not a trace of signal from the stations he was working audible at my location, and no stations much south of the Midlands apparently hearing the dx either.

A first impression was that Es this year had not been very frequent nor the events of long duration, but a summary of reports received indicates that things were not all bad. Between 28 May and 5 August there were no fewer than 12 days when Es appeared on 144MHz, sometimes occurring more than once in the same day. The following list gives the dates and times of some of the major events reported. The callsigns in parenthesis are those of the stations reporting, giving a clue to the area where the Es was effective. This is by no means a full list. There will have been other openings of course, some of them very brief, but unlike the early days of vhf, band occupancy is such that probably very few go unnoticed these days.

28 May	1650	9H1, I USSR	(G0DAZ, G4MJC, G4XNL, G1CWP) (G4FRX, G4RUW)
	1730	9H1, YU, OK, HG, UC2, UP, SP	(G4RUW)
6 June	2000	Italy	(G0DAZ)
7 June	1100	Italy & 4N2	(G4JICD)
	1200	Italy	(G0DAZ, G1CWP)
		SV8	(G3WZT, G4JCC)
	1700	YU, LZ, HG, UB5, YO	(G0DAZ, G4ASR, G8VR, G4SWX, G4JICD)
11 June	1600	9H1	(G0DAZ)
	1845	YU, SV, OD5 (hrd)	(G4JICD)
13 June		EA7	(G1CWP)
16 June	0850	9H1, I	(G0DAZ)
18 June	1320	SP, YU, OE, HG, OK	(GM3VTB, G0DAZ)
10 July	1650	RB5, RA3	(G4MJC)
20 July	1715	YU, I, EA7, TV6 YO, YU, HG, OE SP	(G4OMK) (G4MJC) (G4ASR) (G4JICD)
		Italy	(CT1WW)
21 July	1730	OE, HG, YU Italy, YU	(G6GWX) (G4OMK)
Aug	0500	CT	(Various in south)
	1615	EA3, EA6	(G8VR)

The halo net

Late one afternoon recently I happened upon some mobiles on the Kent/Sussex border working one another on 144MHz ssb during their journeys home from work. Tony G1LZE/M was working mobile to mobile with his namesake G4KLF/M, with G1HLX/M also very audible. G0FIO of Burwash Common was getting good copy from all mobiles at his home QTH, as I was near Broadstairs, some 60 plus miles from the action. This group

calls itself the "Halo Net" because they use 144MHz halo antennas on their vehicles, and they come up on or about 144-330MHz. The moral is, that if you use ssb from a vehicle, and want to have good contacts with fixed stations, then horizontal polarisation is much to be preferred and the halo, not seen so frequently nowadays, is a good antenna for the purpose. Years ago I had very good results from a horizontal centre-fed dipole on top of my car and for some reason was constantly asked if I had television in the car! Incidentally using his halo while sitting in his car on the front at Hastings, Tony G4KLF worked 9HIES during a brief Es opening.

Midlands VHF Convention

Don't forget that this is the month for the popular Midlands VHF Convention, scheduled for 11am on Saturday 10 October at the Madeley Court Centre, Telford, Shropshire. See *Rad Com* for full details. There will be the usual afternoon lecture programme followed by an evening buffet, offering the opportunity to rag-chew with many well-known vhf operators.

SATELLITES

Bob Phillips, G4IQQ*

AMSAT-UK colloquium

The colloquium was the second on the subject of amateur satellites organised jointly by AMSAT-UK and the University of Surrey. The event was attended by more than 180 delegates including representation from a large number of overseas AMSAT groups. The programme started formally at 1000 on 18 July with various opening addresses and presentations of awards; these were reported in the *News Bulletin* last month. A comprehensive series of lectures followed which covered many aspects of amateur satellite operation. All levels of interest were catered for including absolute beginners right through to some of the detailed considerations of modulation schemes for satellite transmission links.

One of the highlights of the weekend was a very interesting and most entertaining talk by Geoff Perry (late of Kettering Grammar School) on the subject of the USSR space programme. Geoff described how he and a few colleagues established themselves as a recognised authority on many issues concerning the launch and operation of USSR satellites. He described the techniques used to identify particular satellites and to decipher the various digitally coded information. With careful observation over many weeks and months it became possible to anticipate when a new satellite would be brought into operation. Geoff's talk made it clear that while a great deal can be achieved with computers you can also carry out some extremely useful work based on hard work and a lot of common sense.

Two speakers gave their ideas on the possible next developments for amateur satellites. Vern Riportella described the AMSAT-NA proposals for the Phase 4 satellite programme which would utilise satellites in geostationary orbit. A somewhat different approach was outlined by Karl Meinzer, DJ4ZC, who suggested that a more suitable development would be to continue with the highly inclined elliptical orbit similar to that of Oscar 10 but where the inclination of the orbital plane was closer to the desired value of 63.4°. This subject turned into the most significant issue of the weekend with emotions running very high. There was some, but little support for the North American position; not so much from the point of view of the choice of the orbit but rather the strong links that were foreseen with the various public service providers. Indeed it appeared from some of the points made that the only way to preserve the integrity of the existing amateur satellite bands was to stimulate much greater use of the frequencies by "lowering the entry requirements". This was seen by many as undermining the whole basis of amateur radio since one of the basic objectives of self-education would become secondary to the idea of ease of operation and guaranteed communications. One important point that was made by several of the many speakers on the subject was that the amateur satellite community probably cannot afford to fund two large programmes. The issue was certainly not resolved but there was a good expression of views. It is now up to the decision makers on the satellite construction scene to get together and agree what would really be in the best interests of the amateur satellite service.

Another of the activities of the weekend was the agm of AMSAT-UK. The main purpose of the meeting is of course to receive reports from the various officers of the committee. The chairman, Dr Arthur Gee, G2UK, described many of the significant activities that had taken place during the previous year, and in particular commended the efforts of Ron Broadbent, G3AAJ, whose continuing efforts had done so much to create a healthy financial

situation for the organisation. The election of the committee for the next 12 months followed. The outgoing committee was re-elected for a further period, and an additional member, Fred Southwell, G6ZRU, was elected.

RS10/11

Last month I provided a brief description of the transponder characteristics of this new satellite. Information has now become available on the telemetry system of which a summary is given below.

The telemetry is sent as cw and represents various status indicators and parameter values. A total of 16 channels are sent, each channel containing two alpha characters and two numeric characters. For example, Channel 4 contains the two elements 4A (alpha) and 4N (numeric). 4A can have one of two alternative pairs of characters "IG" or "NG", the meaning of which is indicated in the table below. 4N is a numeric value which in this case is a function of the age voltage of the 21MHz receiver.

Channel	Parameter	Equations
1A	TLM sampling period:	IS = 90min, NS = 10min
1N	Power supply voltage:	V = n/4V
2A	144MHz receive 20dB attenuator:	IR = "IN", NR = "OUT"
2N	144MHz transmit output power:	W = n/10W
3A	21MHz receive 10dB attenuator:	ID = "IN", ND = "OUT"
3N	29MHz transmit output power:	W = n/10
4A	21MHz uplink:	IG = "ON", NG = "OFF"
4N	21MHz receive age voltage:	V = n/5V
5A	144MHz receiver:	IU = "OFF", NU = "ON"
5N	144MHz receiver age voltage:	V = n/5V
6A	Special command channel:	IW = "OFF", NW = "ON"
6N	Special command channel age:	V = n/5V
7A	29MHz beacon output power:	IK = 1W, NK = 300mW
7N	Service command parameter, 29MHz	
8A	144MHz beacon output power:	IO = 1W, NO = 300mW
8N	Service command parameter, 144MHz	
9A	1st memory board status:	AS = "OFF", MS = "ON"
9N	29MHz transmit temperature:	T = n - 10° C
10A	2nd memory board status:	AR = "OFF", MR = "ON"
11A	Special channel for loading memory:	AD = "OPEN", MD = "CLOSED"
12A	Code store memory status:	AG = "OPEN", MG = "CLOSED"
13A	Memory output:	AU = "29MHz beacon", MU = "144MHz beacon"
14A	21MHz Robot receive attenuator:	AW = 10dB, MW = 0dB
14N	21MHz Robot receive i.f. voltage:	V = n/5V
15A	144MHz Robot receive attenuator:	AK = 10dB, MK = 0dB
15N	144MHz Robot receive i.f. voltage:	V = n/5V
16A	144MHz special channel output:	AO = 1W, MO = 300mW
16N	Robot QSO count:	n = 0, QSOs = 0 to 32 n = 80-99, QSOs = 33 to 128

Part of a typical telemetry frame might look as follows: NS49 IR45 ND00 NG08 IU00 IW00 NK01

I should stress that the parameter equations are probably based on pre-launch date and it may be that corrections will be required after the transponders have been checked out fully in space. There has been considerable activity on the transponders though there is increasing concern over the interference that is caused to the 144MHz uplink when the 150MHz signal of the navigation payload is in operation. Clearly when the primary payload comes into operation it is possible that 144MHz operation may have to be abandoned.

AMSAT Phase 3D

I mentioned above the talk given by DJ4ZC at the AMSAT-UK colloquium. The proposed satellite would provide a considerably enhanced capability over Oscar 10, particularly in terms of total eirp and uplink sensitivity. The major characteristics are summarised below:

Transponders	
Mode J	Uplink 144MHz, downlink 435MHz
Mode L	Uplink 1,269MHz, downlink 435MHz
Output power	250W p.e.p
Bandwidth	500kHz
Mass	400kg
Lifetime	Eight years
Orbit	
Inclination	63.4°
Apogee	35,000km
Perigee	1,500km
Period	12h

When the satellite is located at close to apogee it is proposed to employ a high-gain (15-20dB) antenna; however, this causes problems away from apogee as the antenna beam would no longer be directed towards the earth. To overcome this problem it is proposed to carry a second, lower-gain antenna which would be switched into operation as the satellite moved away from the apogee. If all goes well it is hoped that the satellite will be launched in 1990-91.

UoSAT Oscar 9's birthday

At 1127 utc on 6 October, UoSAT Oscar 9 celebrates the end of six eventful years in orbit. In spite of the odd operational difficulty, the satellite is probably providing better service now than at any other time in its life. □

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RAYNET

Geoff Griffiths, G3STG*

Old times—new times

Followers of the Raynet Column over the years will remember with affection the monthly and bi-monthly contributions from Sid Law, G3PAZ, the last appearing almost a decade ago. It was indeed very sad to learn of Sid's death recently, and although his service to the Raynet Committee pre-dates my own, I still remember as a "young" member of the network, scanning the pages of the *Bull* and *Rad Com* for his concise reporting of so much good work done by members. For instance, the support given to the UK fire brigades during the drought year, and in the notes which now provide an insight into the battles with authority leading to the granting of the talkthrough privileges which are nowadays regarded as an essential part of our everyday operations.

While going through some of his columns, I realise that the total membership some 10 years ago was around 2,000. How good to remember that the membership nowadays stands not far short of two and a half times as many, with traditions of service in Raynet that he would have applauded being maintained week by week. RIP.

Decisions, decisions

One thing that the original members of RAEN had to cope with was the choice between cw and phone as the most appropriate mode for emergency communications. Not so now, when there is very little use made of cw in our operations. Indeed, the only time that I recall cw being used in anger in the last five years was during the long-distance links for the RAC/Lombard Rally between Wales and Nottinghamshire, when night-time operations were only sustainable on top-band cw.

In 1987, however, once again the situation has changed dramatically, with an entirely new string to our bow. If we were to be faced with the same situation, the shortage of skilled operators on the key would no longer prove an embarrassment, since operators on the keys can adequately take their places. Hundreds of operators regularly chat on the 144MHz band by the use of AX.25 packet transmissions, with a network of well-sited digipeaters providing the necessary links. Medivac I demonstrated that many groups are capable of this mode, and indeed in some cases packet provided the only viable means of taking part in the traffic.

However, groups should not lose sight of the "kiss" principle, and try to remember that the more sophisticated and complex a station set up for emergency communications is, the more Murphy's Law is likely to strike just at the wrong time. There is still a great need for phone message procedures to be kept well rehearsed, and don't forget that old brass pounder's skill either. Meanwhile, less affluent members, or those to whom computer communications seems somehow to be not what real amateur radio is about, will be wondering how packet operations is relevant to supporting the local St John unit at a public event! Good question.

Medivac

All group controllers will have received some time ago a full report on the Medivac I exercise, and indeed many groups will have taken part in the second in the series which was planned to encourage groups to look at a different set of problems. This operation, once again organised by the National Raynet Committee, was designed to encourage groups to operate from hill-top sites, and examine the paths between widely separated groups on vhf and uhf. By now the reports will be coming in, and I hope that there were not too many late summer storms around to spoil your enjoyment on the afternoon of 20 September. The third in the series is expected to take place in the spring of 1988, and I hope that we find yet another set of problems for you to grapple with.

Statistics

1986 was the first year when a serious attempt was made to collect detailed accounts of the number of manhours devoted to Raynet operations by its members, and the results were pretty astounding. Approximately 8 per cent of all licensed amateurs were involved, and records of some 63,000 manhours of work were reported. Fortunately only 13 of the network's operations were live emergency operations, but real contributions to public safety were undoubtedly made. Of work for the user services, 56 per cent of events involved the SJAB, 27 per cent cepo, 20 per cent BRCS and 15 per cent the

police. And before you add the figures up, let me say that quite a number of events involved providing service to more than one of the users.

CMX

Many groups will have been able to look at the operation of the new county message switch systems which are being introduced into the county emergency planning officers' service from this autumn onwards, or will soon have the opportunity.

New technology should not come as a surprise to members, but they should bear in mind that these introductions in no way diminish the importance of Raynet's role in serving the cepo service. In fact, I guess that we are going to be even busier as they are introduced countrywide than we were before!

Caravan towers beware

Can I suggest that all groups who make use of caravans as centres for their activities in the field look very carefully at the small print in their members' insurance policies, or in the caravan policy which they hold. Too many policies appear to give little cover for damage to the caravan itself if involved in an accident while being towed by a member's car, and may not be insured in transit at all unless the member is insured to tow by his vehicle insurance policy. Forewarned is forearmed.

Recruits needed

The county controller for Oxfordshire, G6NPP, has been looking at his commitments for the coming year with some dismay! Like many groups, the increasing workload on the horizon means that he needs to recruit additional members to the teams in his county, and train them so that they form an effective part of the team.

Any amateurs who are convinced that they should be putting their communications skills to the service of the community in Oxfordshire, with no financial reward for many hours of boredom, frustration and hard work, but with a great deal of enjoyment, and the occasional opportunity to be indispensable to someone in real trouble should contact: Mr R Willis, G6NPP, 24 Elizabeth Avenue, Abingdon, Oxfordshire OX14 2NS.

You don't live in Oxfordshire, but would still like to help your local group? Then ask on air, or drop me a line for the name and address of your local group. Members are expected to give up around one evening a month for training, to volunteer to assist at events for user services, and work as part of the team. In return, the knowledge of a job well done.

Group activities

It's always difficult to report activities from groups in this column, since so many are received that it seems unfair to pick individual events for reporting, but here are just a few from the mailbag late in August.

The Isle of Man Group worked very successfully in the early summer to provide communications for safety cover during the island's TT races. Stan Ellis, their controller, took over the management of all the safety communications provided to support the police and county emergency authorities, and in fact managed to get a helicopter to one serious crash very rapidly by telling the pilot to get his rotors moving before hearing of the incident officially! As a result of the excellent work done, the group is involved in similar operations in support of the motorcycle races in August/September, and for the Tudor Webasto Rally in September.

The groups in Norfolk have to be particularly vigilant on the Lord Mayor's procession in Norwich in order to watch out for the children who attempt to "liberate" coins intended for the charity collectors which don't always get quite that far. A quick dart into the road to do so can prove quite hazardous for the youngsters. This time round, a broken arm and an eye injury needed treatment at the local hospital. Fortunately the Lions' Raft Race went off without injury.

When the Breckland Group provided cover for a carnival from three Raynet Landrovers, they had to cope with a wide variety of problems ranging from spinal injuries to blisters and heat exhaustion.

Sadly, this year will see the retirement of Doug Willis, G3HRK, as county controller of Norfolk, and I know that all members will wish to join me in wishing Doug well. Norfolk Raynet will not seem quite the same without this long-serving and extremely hard-working member.

Gloucestershire Raynet got a call from the county constabulary at 4.15 one morning in July which meant deploying a team to the bank of the River Wye where a party of cavers was overdue. Fortunately the team emerged safely in time for the team to get home for a late breakfast.

The North East Kent Group was able to make good use of a member's home QTH to provide good coverage for the control station for the Canterbury Triathlon this year.

In September, members of Raynet in Northumberland were setting off on a series of exercises which were to take them around the circuit of old castles

*11 The Grove, Asfordby, Melton Mowbray, Leics.

in their area. I don't think that many of the group members realised how many there are!

The West Midlands West Group was as usual having an extremely busy summer season, with shows at Walsall and Sandwell forming but a small part of the programme. The August Bank Holiday in the Birmingham area was expected to be very busy once more, hopefully with the Birmingham Superprix attracting better weather this year. The Birmingham and Midlands groups always have to prepare very carefully for this mammoth operation, and a great deal of frequency planning and co-operation is vital if all the weekend's activities are to go off without problems.

A special note of thanks appears in the W Mids West newsletter (one of several excellent newsletters which I receive) to a couple of Leicester members who travelled over to assist with the Sandwell Marathon. I think that I will give away no secrets if I reveal that they learned a lot from that experience, and some of those lessons are being put into action back at the LE/071 home ground. How long since you volunteered to assist another group one weekend? You might learn something.

October plans

I'm looking forward to joining some of the members of Scottish Raynet groups in October and taking part in safety cover for the Isle of Mull Rally. I'm told that it is quite an experience, and perhaps I may be able to share some news of this remote corner of our coverage with you next time round. Until then, 73.

SWL

Bob Treacher, BRS32525*

OCTOBER TRADITIONALLY brings the first of the winter conditions, and the contest season gets off the ground in earnest. We join in the fun with the HF Challenge, the rules of which are reproduced below. The event normally brings a good crop of logs, but the number of G logs is disappointingly low. In general, swl participation in contests is on the increase, but it would be a real boost for one swl activity to be blessed with a flood of logs from G land. Why not start with the HF Challenge, you will be surprised how easy contesting really is.

HF Challenge 1987

Time to publicise my challenge again. The rules are a little different this year, so please study them carefully.

- When.** SSB—24/25 October 1987
CW—28/29 November 1987
- Times:** 0000–2359 on both weekends.
- Categories.** Single-band or multi-band entries will be accepted.
- Frequencies.** All bands 1.8–28MHz may be used.
- Scoring.** Only one station from each DXCC country may be logged on each band. Each station logged will count two points on each band. Your score should be computed by adding together the points scored on each band and multiplying by the total number of DXCC countries heard on each band.
- Special rules.** (a) All stations logged must be in QSO. (b) Stations heard calling "CQ" or "QRZ" shall not count for points. (c) Standard-sized log sheets must be used. (d) Logs should be legible and written in ink. (e) A list of all the multipliers heard on each band must be provided. (f) Entries should show—date, time, station heard, station worked, multiplier (if appropriate), and points claimed. (g) Any log entry of less than 3 × 3 on ssb, or 339 cw will be deleted from the log.
- Entries.** Logs should be sent to Bob Treacher, BRS32525, 93 Elibank Road, Eltham, London SE9 1QJ, England, to be postmarked no later than Monday 16 November for the ssb leg, and Monday 21 December for the cw leg.

LF Challenge results

The 1987 event attracted eight entries and two check logs. Enough has already been said about conditions on the lower frequency bands during January, so I shall not dwell on conditions. It is worth reporting that much dx was available on both 7 and 3.5MHz without losing too much sleep. Many entrants managed to log 100 countries on both bands. 1.8MHz was rather poor, with little from the Caribbean to arouse interest. Some managed to log the 3Y expedition and this counted as a new DXCC country, not Antarctica, so credit has been given where it was not claimed. A few strange prefixes were noted and some have been deleted. Others were given the benefit of the doubt.

Some logs showed unrealistic signal reports, especially on 3.5MHz. As the noise level on the band is normally quite high, it is unrealistic to log a station as 5 × 1. A far more acceptable entry would be 4 × 7. However, I am aware

that some listeners diligently give reports from their S-meter, and this is probably where the discrepancy occurs.

The rule whereby stations logged had to be in QSO upset some, and entries have had to be rescored in places. It is unusual for contests to allow stations to be logged if not in QSO. The rule change for 1987 was to bring the event in line with standard practice. Most entrants commented that the Challenge was a superb way of collecting new countries on the bands. As many swls now have more than 100 countries on both 3.5 and 7MHz, and more than 50 on 1.8MHz, this was the main intention of holding the Challenge in January when lower frequency conditions are normally so good.

The logs show what is possible at lower frequencies. Congratulations to Jean-Jacques, ONL383, for submitting a faultless log. It is hoped that participation in 1988 will be greater than this year.

Posn	Station	7MHz	Countries 3.5MHz	1.8MHz	Total Points
1	ONL383	125	102	54	938
2	BRS50134	122	107	47	874
3	BRS31879	115	80	46	711
4	BRS52543	77	91	36	624
5	BRS87156	86	90	33	588
6	BRS8841	93	86	34	543
7	BRS88617	26	31	26	233
8	BRS87985	0	71	0	123
Check logs					
—	BRS32525	114	102	46	
—	BRS25429	102	110	39	

VHF news

Things at vhf continue to stir, especially where sporadic-E propagation is concerned. There are bound to be reports of 50MHz states-side openings elsewhere in the magazine, so I will not dwell longer than to say that I was amazed to hear VE1, W1.2 and 3 on 21 July with just a simple dipole in the loft!

Elsewhere on 50MHz, it is well worth reporting that during sporadic-E activity the band is superb. Es openings to either EA, CT or LA occurred on at least 11, 13, 14, 18, 19, 20, 21, 25, 26, 27, 28 July and 2, 4 and 5 August. Few swls have yet taken the plunge and purchased receive equipment for the band. My message is: go and buy a converter in readiness for the 1988 Es season. Signals have been 59 + 20dB on many occasions. The joy of the band is that it opens up far more than 144MHz and distances have been quite amazing, for example 2,084km to 9H. By next year we can hope that there will be a few more European countries on the band, and we will be a little nearer getting some real dx on the band. On 144MHz there have been several good openings and a few short affairs. In July, only one brief opening was caught, but 18KBJ, IT9SGO and 9H1FL were heard on 26 July from 1724 to 1739.

Other vhf news is scarce this month. Mick Toms, BRS31976, caught some of the Es opening on 7 June, logging some good dx from YU, YO and LZ. The last two countries being new and several new squares in YU were heard, too. Mick had produced a fine analysis of Es activity over the last 16 years. Hopefully, I can find sufficient space to reproduce it next year.

David Whitaker, BRS25429, was off to CTI when he wrote. He has not been too active but also caught some Es on 7 June from IT9, I4, I0 and IC8. Although David had resolved not to get on 50MHz this year, he is wavering somewhat with all the news of Ws and 59 + CTs and LAs!

Hardly anything to report on the tropo scene. My last tropo entry in the 144MHz log was during VHF NFD. Further afield, Colin Watson, BRS46598, (Cumbernauld) logged LA1BM, LA8AW and OZ1WT on 22 July.

HF news

A few interesting reports this month to prove that summer conditions can be rewarding. Robert Small, BRS8841, had logged KH6LW/KH7, AH6EQ, ZK1XV, KX6QR and CE0GHO all on 14MHz. BY9GA was also heard on the band at 2338. On the "new" bands UD6DKW and KP4BJ had been heard on 10MHz, while 24MHz provided G6ZY/EA6 and LU1DOW. Much time had also been spent on 28MHz, with many strong European Es signals and a few openings to Africa which brought in TJ1DL, 7X25LS and ZD8TM, and one to the USA. Another to monitor 28MHz was Mick Toms who had 53 countries heard when he wrote. Included in that total are several South American countries, namely CE, CX, LU, PY, PZ and ZP. David Whitaker boasted a 28MHz score of 70, including J37, TA and TR8. 3.5MHz had produced 5Z4EV and ZS3ZBZ. On the QSL front a card from TA2BK had arrived, taking the confirmed total to 108 on 1.8MHz—all ssb. Colin Watson mentioned some 7MHz dx in the shape of CP6XH, 8P6SG, HK1KHK, XE1OH, 6Y5RP, A22BW and a few VKs and ZLs. Most of these entailed some very early mornings!

From Africa, some news from Stan Porter, ORS45992, in Malawi. He had heard FR5ES/J and FH4EC/FR/G earlier in the year on 14MHz. Locals to Stan, but exotic stuff for us up in G land! Stan is expected to be in Britain this month on holiday. Last time he was over here, I was lucky enough to meet

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him with a few other swls from the London area. I know he is hoping to meet a few more swls on his trip home this time.

More news

P L C Riley, BRS41542, sent a photostat of a letter he had received from Richard Branson following his balloon ride across the Atlantic. I'm sure we all followed his progress with great interest. BRS41542 went one better and actually heard the intrepid balloonists on 5,680kHz from 1730 to 1906gmt on 3 July, which was pre, during and post air sea rescue. Richard's signals were 59+ using an R1000 receiver, an HF5 with radials and his famous "Tripole Sloper". Richard Branson wrote: "Thank you very much for sending me your cassette—it's very valuable indeed for my archives..."

G3ZPF remarked about my comments on the CQ VPX Award and drew my attention to the GW4OXB Award for the same achievement which is free. GW4OXB runs the International Listeners Association and writes for another magazine. A number of listeners have mentioned the fine work which he devotes to the listener movement.

QSL list

I mentioned a few months ago that I had obtained the DL8BL QSL manager list. I still have a few copies left if any reader would like information of over 2,500 QSL routes. Cost is £1.

Finale

Just the usual note for news, views and comments to reach me by 10 October in time for the Christmas issue. □

COMPUTING

John Morris, GM4ANB*

Buying a computer

"What sort of computer should I buy for the shack?" is a question that regularly appears in my mail. Another is "I have just bought an XYZ computer. What amateur radio programs are there available for it?" There is no single answer to the first question, but I can usually give a few hints.

Whenever I get asked the second, my heart sinks. It generally indicates that somebody has just gone out and spent several hundred pounds on a computer without first making sure that it really can do what they want it to do. This is a bit like buying a satellite tv system, then finding it will only receive USSR weather forecasts. The technology may be excellent, but unless the right programs are available, what you have is about as useful as a stuffed giraffe.

If you are contemplating buying a computer for the first time, you should think about what you want to do with it. Do you want to learn about computing? To use it in amateur radio? To play games? A mixture of all three? Or do you just want a status symbol?

If your reasons are any but the last, at least for a first computer, I would recommend staying well away from the latest technology and new models.

There are two ways to use a computer in amateur radio. One is to buy the basic computer, and write your own programs or adapt them from books and magazines. This is a stimulating exercise in itself, and many amateurs get as much enjoyment from writing computer programs as they do from using them. The satisfaction is much the same as that derived from home construction. But be warned—you will have to learn some new skills!

The splurge of new computers on the market in recent months means that there has never been a better time to buy an old model. They are being discounted all over the place to clear stocks. For example, G4LRX uses a Tandy TRS80 CC, and was recently able to buy a new spare for just £10, and ridiculously cheap Dragons, Electrons, VICs and others can be seen here and there. Admittedly, you won't have all the latest in technology, but you will lose a zero or two off the price. Look in the small ads of your local paper too—there are frequently bargains to be had there.

There is often little or no amateur radio software (or any other sort) available for these computers, but most of the programs published in amateur books and magazines can be got going on them with a little patience. This is, incidentally, an excellent way to learn about computing.

So if you want a computer to program for yourself, look for the bargains. At the worst, you will have wasted a few tens of pounds. At best, the time and effort you expend will give you the knowledge and experience to make the right choice if and when you decide to go for the latest technology.

The other way to use a computer in the shack is to buy everything in, and use the computer to do a job, hopefully enhancing your enjoyment of amateur radio. There are several amateur radio oriented programs available commercially, but the market is quite small, so the selection tends to be somewhat limited. If you are intending to buy a computer as a ready to use black box, make sure that the software you need is available before you part with your money.

If I were going out with a limited budget today to look for a computer to run commercial amateur radio programs I would give the Spectrum series a good look. They are the cheapest of the high-street machines, and they have been around for so long that there are lots of programs available. The keyboards are not high quality, but unless you are intending to type in long programs this is not too serious. Despite their old technology they are quite capable of running most amateur radio applications.

For a few pounds more the Amstrad CPC series are good value. The range of software is less extensive than for the Spectrum, but this situation is rapidly changing. Going up the market there is a lot of software about for the BBC computers, but these are expensive for what you get. They are nice machines to program though.

Whatever sort of computer you buy, new or second-hand, latest technology or five-year-old design, remember one thing: all you have bought is a computer, not an amateur radio computing system. The computer is only one part of that system. You will need programs, and there are only three ways to get these: type them in, buy them, or get them from other amateurs.

If you are intending to buy in any programs, make sure they are available before you buy the computer. And don't necessarily believe the shop assistant either!

SWR calculations

In a less-than-perfect antenna system, how much of the power coming out of the transmitter actually gets thrown into the sky? Program 1 will give you an estimate. It asks for the swr reading at the transmitter and the cable loss, which you will have to calculate according to cable length and the loss per metre at the working frequency. It displays the swr at the antenna, assuming there are no other mismatches on the way, the percentage of transmitter power being radiated, and the net signal loss due to cable and mismatch losses.

The results of the program can be interesting, and occasionally quite enlightening. However, they are only as meaningful as swr itself. Before taking the output of the program too seriously I recommend that you read Pat Hawker's words on the subject of swr in *Amateur Radio Techniques*. Remember also that a high swr at the antenna in a supposedly matched system indicates that the rf is probably not going where you think it is, so the real signal loss could be even greater.

Program 1

```
10 INPUT "VSWR at transmitter ";ST
20 INPUT "Cable loss (dB)"; CL
30 CL=10*(CL/10): RT=(ST-1)/(ST+1)
40 SA=(1+RT*CL)/(1-RT*CL): EF=1/CL - RT*RT*CL
45 PL=10*(FNR(-LOG(EF)/LOG(10)))
50 IF EF<0 THEN PRINT "Impossible!": GOTO 100
60 PRINT "Antenna VSWR = ";FNR(SA)
80 PRINT " Efficiency = ";INT(EF*100+0.5); "%
90 PRINT " Power loss = ";PL;" dB"
100 PRINT: GOTO 10
110 DEF FNR(X)=INT(X*100+0.5)/100
)RUN
VSWR at transmitter ?1.8
Cable loss (dB)?2.6
Antenna VSWR = 3.17
Efficiency = 40%
Power loss = 4dB
```

Oddsbits

Syd Poole, G3IMP has a problem with using his dupe-checking program on the BBC. When the power fails an open file is left on the disc. Does anybody know how to close it?

Brian Hancock, G4NPM, has cleared all hf computer QRM from his Amstrad 664 and 6128 computers by winding the dc input lead 10 times round the ferrite rod from a defunct mw/lw radio. There is still a problem on 144MHz, where the QRM appears to be radiated rather than mains borne. Tests with a handheld suggest that the source is very near the keyboard i.e.d. as well as the monitor. G4NPM would like to hear from anyone with information on this. He would also like to hear from anyone who has tried nickel screening the Amstrad.

A new edition of the *Software Exchange Register* is now out. Copies are

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available by post from RSGB HQ at £1 each. The Register has two parts: the first is a list of amateurs who have programs for various computers, and are prepared to make them available to others; the second lists all of the commercial amateur radio software of which I have details. New register entries are always welcome, especially for programs and computers not already on the list. If you have written or adapted any program for a particular computer and are prepared to make copies for others, or if you sell amateur radio software and want to be included on the register, please send the details to me at the address at the bottom of page 778.

Final

This is my last contribution to *Computing*. I have recently started my own computer consultancy business (advert), and the vagaries of that keep me moving around the country and away from the shack for too long for me to be able to prepare programs on a regular basis. However, you have not heard the last of me. There have been several topics which I would have liked to have covered in *Computing*, but which would have taken much more than the single page to deal with properly. I hope to be able to find time to explore some of these in depth now, and to write up any useful results.

Finally, I would like to thank the many amateurs who have written to me with encouragement, suggestions, comments, programs, and even pointing out the occasional bug. □

We are very sorry to lose the services of John Morris, GM4ANB who has been a contributor to our operating feature pages for over seven years; first as contributor of 4-2-70 (now VHF/UHF) from July 1980 to July 1982, and of Computing since its inception in October 1984 to the present day. I know that his many readers (and he had an enviable following) would wish me to record their gratitude for his stalwart efforts on their behalf, and I must also record my own appreciation for his unfailing regularity in supplying clear and accurate "copy" which was a joy to handle.

We wish him success and fortune in his new field of endeavour.

AWH

The departure of GM4ANB at short notice leaves a gap to be filled, and anyone wishing to take on the mantle of regular contributor of the *Computing* column is invited to write to: The Editor, *Radio Communication*, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE, giving details of relevant qualifications or experience.

MICROWAVES

Mike Dixon, G3PFR*

News from IARU Region 2

A brief but welcome and "newsy" letter was received from Joe Reisert, W1JR, a well-known and enthusiastic vhf/uhf operator, which I hope will be the beginning of updates on the microwave scene in the USA. Joe said: "Many things are happening on vhf/uhf and microwaves on this side of the Atlantic" and that he seldom seems to get time to send out individual letters to folk who might be interested in what is happening over there. I know that feeling only too well, Joe, so you are not alone!

Here's what has been happening: the first-ever claimed amateur eme QSO on 3-456GHz took place on 6 April 1987 between KD5RO/5 (EM 13PA) and W7CNK/5 (EM 15FJ), over a distance of 273km (I make this 275km, using a computer program!). KD5RO used a 3m dish, 130W output and a 1-4dB receive noise figure mounted at the feed. W7CNK used a 5m dish, 82W and a receive noise figure of 0-5dB: the cw signals were a few decibels above noise.

Six days later W7CNK/5, using the same set up, worked K0KE/0 (DM79NO) at 802km (I make it 797km) with signals, this time, at "speaker strength" in the 2-5kHz receive bandwidth — K0KE had "borrowed" a 10m dish and ran 12W with a receive noise figure of 1-9dB.

Twelve days after this, W7CNK/5 had the first claimed 5-760GHz eme QSO with WA5TNY (EM13PA) at 274km. This time W7CNK, using the same dish as before, ran 100W, receive noise figure 1-6dB, while WA5TNY used a 3m dish, 25W and a 1-4dB noise figure. The cw signals were reported as being 3-6dB above noise.

As if this were not enough, during June, W7CNK reported hearing his own (weak) 10-368GHz signals off the moon while running 4W to the 5m dish and

using a receive noise figure of 2-8dB. This is also claimed as "a first at 3cm, at least using all amateur-owned equipment".

Things are stirring on the higher bands too! WA3RMX/7 (CN93IQ) had a 186km two-way ssb QSO on 24-192GHz with WB7UNU (CN95DH) in August last year which, while not constituting a world record, is still a notable achievement. The stations used 73cm dishes and 20 and 5mW respectively. Another notable achievement was a 22-6km ssb two-way on 47-040GHz between WA3RMX (CN85PL) and WB7UNU and W7TYR (CN85NH) on 8 March this year. The former station used a 73cm dish and 3-5mW and the latter stations a 24cm dish and 44μW! The world record on this band, held by HB9MIN and HB9AMH, still stands at a little over 50km using fm. However, with narrowband signals available it looks as if it may not stand for too much longer!

News and views from nearer home

Two things to note from Joe's letter: first the universal use of Locator by the American operators, which makes reporting and checking distances so easy. Second, the effective use of narrowband modes to achieve some quite remarkable results, which of course could be predicted, given the equipment parameters, by means of any simple systems analysis program run on a modest home micro! I shouldn't have to say it, but the Microwave Committee have been "preaching" for years the advantages of narrowband, and at the same time bemoaning the decline in narrowband building and operating at 5-7GHz and above. Indeed, one of the reasons for resurrecting the Rouse Memorial Trophy was to encourage microwave constructors/operators to come forward with narrowband equipment designs using the newer technologies, rather than the "standard" and often somewhat disappointing waveguide-based designs frequently used in the UK. So far the response has been, as our American cousins would say, "zilch"! High time we looked to our laurels, chaps!

Incidentally, a means to generate narrowband signals was fully described by G3BNL in a recent issue of the *Microwave Newsletter*, and suitable components are stocked by the components service, so readers have no excuse for not having a go at the distance award (150km plus) which we recognise to be difficult on wideband but much easier on narrowband. If there is interest, we do have track layouts for the BNL narrowband design and could, perhaps have some boards made for this project.

Maybe 10GHz narrowband activity will take something of an upturn shortly, as I understand that orders have been placed for several of the Piper Communications (imported German) 10GHz transverters recently mentioned in the *Microwave Newsletter* and based on a design published in *Dubus*. For those who prefer to "roll their own", it might be timely to remind them that up to several hundred milliwatts of nbm (or fsk cw) can be generated from lower-order multipliers than those usually used with the JVL transverter and mixing. If we could get away from the apparently overwhelming desire to use ssb at 10GHz, the JVL design can, as I know, easily generate 5 to 10mW of narrowband signal when used as a "straight" multiplier rather than a mixer. And that sort of power, narrowband, coupled with the use of cw, is far, far more effective than the average wbfm station. G3PYB, for instance, is producing some 200mW by tripling from 3-456GHz to produce either nbm or wbfm, both crystal controlled, while G3BNL is reported to have produced upwards of 750-800mW by similar means. Enough sermonising — the message is quite clear!

The 10/24GHz operating ladder stands as follows (as at July):

10GHz				
Posn	Callsign	Stations worked	Best dx (km)	Multiplied score
1	G8KOW/P	34	143	4,862
2	G3PHO/P	19	244	4,636
3	G3ZME/P	19	135	2,565
4	G3NKL/P	8	160	1,280
5	G0BTA/P	7	113	791
6	G0DJA/P	10	76	760
7	GW6MEN/P	4	120	480

24GHz				
Posn	Callsign	Stations worked	Best dx (km)	Multiplied score
1	G3NKL/P	3	40	120
2	G8KOW/P	1	12	12

Talking of portable operating on the higher bands, Dave, G8VZT, gave me an old photograph of 10GHz portable operating from the summit of Snowdon. It was taken on the occasion, in 1980, of what was believed to be the first GW/EI on 10GHz, and shows Martyn, G3UKV and Pete, G4AUY manning the wideband station used for the QSO. It also shows that the wx is sometimes kind at 1,085m on this peak! (Unfortunately, the photograph was not suitable for reproduction — Ed).

The next Martlesham round table will be on 8 November, details from G4FRE or G4DDK (QTHR): tickets available from G4FRE in due course. The date for Sheffield, also in November, is not yet known. □

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DATA COMMS

Ian Wade, G3NRW*

NET/ROM revolutionises long-haul packet

NET/ROM is a firmware package developed by Ron Raikes, WA8DED, and Mike Busch, W6IXU, providing a Level 3/4 packet service which has many advantages over conventional digipeating for long-haul routes. The package runs on a TNC-2, and is supplied as a 27C256 eeprom, replacing the standard AX.25 rom in the tnc.

A NET/ROM node provides the normal functions of an ordinary AX.25 digipeater, plus a set of high level networking capabilities. A user may connect to a local NET/ROM node, establish a transport level circuit to a distant node, then connect to another end user or mailbox in the vicinity of the distant node. Routing between the local and distant NET/ROM nodes is handled automatically, and may involve setting up crosslinks between a whole series of intermediate NET/ROM nodes on the way.

One of NET/ROM's most important features is that if there is any QRM interrupting traffic between any two nodes on a route, the NET/ROM software will automatically try again to transfer the data between the affected nodes. In other words, NET/ROM takes over the responsibility of ensuring that the data gets from node to node in one piece, with each node sending back its own acknowledgement of successful receipt of data. This is quite different from conventional digipeating, where there is only one acknowledgement, sent by the receiving station at the far end of the link; even if the transmitted data arrives intact, the acknowledgement may be lost anywhere on the return journey, and so the data has to be sent again.

Another important feature of NET/ROM is that it dynamically handles changes in routing. This may be necessary if a particular route becomes unavailable (perhaps because of equipment failure, or channel congestion), or if a new route becomes available (when a new NET/ROM node becomes active). The actual routing may even change during a QSO — this is quite invisible to the end user — so that individual packets may traverse different routes on their way to the destination. Because of different time delays through different routes, it is even possible for packets to arrive at the destination node in the wrong order. This doesn't matter, however, because NET/ROM will automatically re-arrange them into the correct order before presenting them to the end user.

The old way: digipeating

To see the advantages of NET/ROM, it's useful to look first at the problems of conventional digipeating (Fig 1). If G1DIL in the Midlands wants to make contact with G8GGI in Surrey, G1DIL could set up a digipeat path with the tnc command "CONNECT G8GGI VIA GB3AP, G1XYZ, G2XYZ, GB3XP", hoping that the channel is fairly quiet all the way along the route. Assuming that all is well and that a connection is established (the dotted line in the diagram), information packets from G1DIL will then be digipeated in turn by GB3AP, G1XYZ, G2XYZ and GB3XP on their way to G8GGI, and the acknowledgements from G8GGI will follow the same route in reverse, eventually arriving back at G1DIL.

But if there is any QRM en-route (say, between G1XYZ and G2XYZ), the story is quite different. Perhaps a southbound information packet from G1DIL is corrupted, and hence ignored by G2XYZ. Or perhaps the information arrives successfully at G8GGI, but the northbound acknowledgement is corrupted, and hence ignored by G1XYZ. Either way, G1DIL's tnc does not receive the acknowledgement, and has no option but to send the information packet again. This may happen time and time again, and eventually G1DIL's tnc gives up. The result is no QSO, and frustration all round.

The new way: with NET/ROM

The alternative way for G1DIL to make contact with G8GGI is to make a connection between nodes equipped with NET/ROM (the solid lines in the diagram). To do this, G1DIL first connects to his local NET/ROM node, GB3AP, with the normal tnc command "CONNECT GB3AP". Once connected with NET/ROM on GB3AP, he then types a new connect command, "CONNECT GB3XP", telling his local node to establish a NET/ROM route to GB3XP, which happens to be the nearest node to G8GGI.

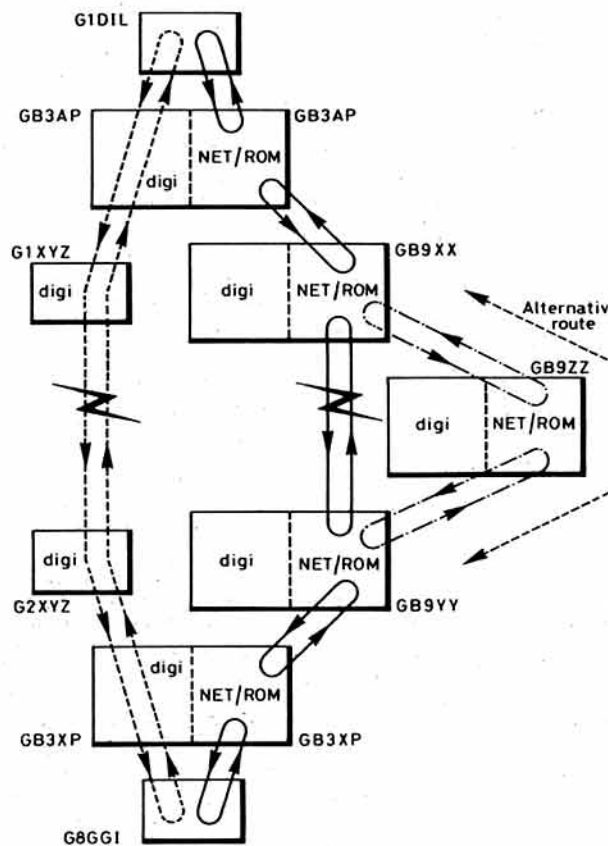


Fig 1. Digipeating versus NET/ROM. When communicating via conventional digipeaters, there is only one connection (between the end points). QRM anywhere along the path will totally disrupt the flow of data, making it necessary for the stations at the end points to send the same information again. With NET/ROM, each node sets up a separate connection with the next node on the route; each node is only responsible for handling the transfer of data and acknowledgements with its immediate neighbours. The effects of QRM or channel congestion are thus localised. Also, if QRM is so severe that part of the route is impossible to traverse, or if a particular node is shut down, NET/ROM will automatically set up an alternative route around the affected area.

To establish the route, NET/ROM automatically connects with GB9XX, which in turn connects with GB9YY, which finally connects with GB3XP. In other words, there is effectively a separate connection between each node in the route (in contrast to conventional digipeating, where there is only one connection between one end and the other).

When the NET/ROM route has thus been set up, G1DIL receives a message saying that he is connected to NET/ROM on GB3XP. He can then give the command "CONNECT G8GGI", and, all being well, he can start the QSO. From now on, all packets are individually acknowledged between each node on the route, and if there is any QRM on the way, only the affected nodes have to keep re-trying to pass the data.

So G1DIL needs only to have a good path to his local NET/ROM node GB3AP, and likewise G8GGI needs only to communicate successfully with his local node GB3XP. If there are any communication problems between GB3AP and GB3XP, the NET/ROM software will automatically attempt to get the data through, either by retries between the affected nodes, or if this fails, by re-routing around them. Thus, for example, if the link between GB9XX and GB9YY becomes unusable, the NET/ROM routing software could set up an alternative path through GB9ZZ to circumvent the problem.

The net effect

NET/ROM has been installed in several hundred tncs around the world, and has had a major impact on reducing channel congestion and improving performance over long paths with several digipeaters. Calculations have shown that NET/ROM will give an 800 per cent improvement in throughput compared with an ordinary five-digipeater path, and for longer paths, the benefit is even more marked.

NET/ROM can be installed on an unmodified TNC-2 (or clone), although to improve performance a couple of changes are recommended. The first of these is to increase the ram from 16k to 32k, to provide more message buffering, and the second is to change the clock frequency to 4.9152MHz. Both of these modifications require only minor surgery on the tnc board, and are fully described in the user's manual.

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Contest News

HF NATIONAL FIELD DAY 1987 RESULTS

WHILE radio conditions were excellent, the 1987 NFD, the 47th in the series (taking account of the war years), was marred for many groups by some of the worst weather ever reported for this event. Gale force winds, torrential rain, thunderstorms, floods and a host of other problems beset a large number of entrants. On the North Downs (Kent/Surrey border), wind gusts of over 100mph were recorded and force 10 storms were reported by many weather stations along the south, southwest and west coasts. The problem was caused by an intense low-pressure area centred south of Ireland together with the associated fronts resulting in a really nasty weekend for groups located in the south and west of the country. Such is the resilience of the dedicated NFD groups, that 122 groups out of those that registered (54 open and 68 restricted), managed to get a station on the air and sent in logs for checking. There were a number of groups which for one reason or another were unable to complete the event, and 14 of these sent in part logs for information.

Stations located further north generally fared better, and some of the Scottish and northern entrants even managed to complain of sunburn and had Saturday evening open-air "cook-ups".

The good side to the story is that the propagation favoured inter-European contacts, with some excellent overall and band scores. As has happened in previous years, these conditions act as a great leveller between the two sections, as is evidenced by the small differences in the final scores achieved by the section winners and runners-up.

Much to the surprise of those groups which checked 28MHz during the Sunday afternoon, there was an opening to North America which enabled the lucky ones to make some unexpected quick-fire contacts. Apart from this the west of the UK was favoured with long periods of sporadic-E on 28MHz, which gave them a pipeline into DL and HB, much to the envy of those in other parts, who for much of the contest could only hear one end of the contacts on scatter-back. On 21MHz, there were very few inter-UK contacts, with Europe taking most of the traffic. Some good dx was worked, with several groups managing to achieve WAC, although the openings were of limited duration. There was a similar pattern on 14MHz, although both the short-skip and the dx (when stations took advantage of it) was available for much longer than on 21MHz. As usual 3-5 and 7MHz took a heavy hammering with European /P and fixed traffic. Additionally there were excellent openings on 7MHz for dx working during Saturday night. At long last the German stations made their promised appearance on 1-8MHz and were most welcome. There were 90 different ones this year, nearly as many as the total of the UK/P stations that used the band.

The DARC has been working hard to obtain the agreement of its authorities to relax the regulations for 1-8MHz working in this portable event, and it was a last-minute decision for them to include operation on this band. Our thanks go to all the German groups which came on the band, and we are assured that the number will increase in future cw field days. As usual there was good support from the HB/P groups, and the portables from Italy and the USSR. A number of other EU/P stations were active, and now that the IARU Region 1 policy for this event has been settled, we can look forward to a much wider participation than has been the case in the past.

Since the publication of the rules, the RSGB has been presented with a new trophy by the widow of the late Charles Ponting, G6ZR. To be known as the G6ZR Memorial Trophy, it will complement the Gravesend Trophy, as it is to be awarded to the runners-up of the section with the least number of entrants. The committee have decided to award it immediately, so this year it will go to the second-placed group in the Open Section.

The award winners

NFD Shield: We always expect to see the Verulam club somewhere near the top of the NFD tables, and this year is no exception as their "A" team of G3JKS and G4DJX managed to achieve the best overall score to win the premier award. They were in the Open Section and although they did not have as many contacts as some of the other leaders, they made more use of the two bonus bands which gave them a 62 points advantage over the overall second placed group, G0AAA/P. The equipment used by G3VER/P was a TS930S transceiver feeding a mix of beams and dipoles.

Bristol Trophy: Once again the Three As Group G0AAA/P, were the leaders in the Restricted Section and while they were not able to top the 1,000 QSOs made last year, G3SXW, G3TXF and G3WVG are to be congratulated for their excellent performance. They were another TS930S user and their antenna was a 256ft centre-fed wire. While they had 11 more contacts than G3VER/P, they had 19 less contacts on 1-8MHz, four fewer on 3-5MHz and were 24 down on 7MHz. They made up some of the difference on 14 and 21MHz where their totals were up on G3VER/P by 22 and 36 QSOs. On 28MHz both groups tied with 154 contacts each.

G6ZR Memorial Trophy: The first winners of this new trophy are the Gravesend RS, G3GRS/P who achieved the remarkable feat of coming second in both the Open and Restricted sections. They originally planned to enter the Open section, but after managing to erect a single-band beam on a tower, a second Yagi on a 60ft pipe mast and a c/w wire antenna under awful conditions, just as they were ready for the off at 1500gmt, the pipe mast blew down.

As there seemed no hope of them being able to repair the damage, they erected another c/w wire antenna at 35ft and decided to change to the Restricted section, losing an hour of contest time in the process. Using this one antenna, they made enough points to secure a very good second place in the Restricted section, however, they had left the first tower and yagi in position, albeit with the feeder coiled up at the base. While there is no question that this "open" antenna was used, the inspector's report recommended that they should be reclassified in the Open section, where their score, even with first hour lost, was good enough to give them an alternative second place. G3GRS/P had a Ten-Tec Omni-D transceiver and was operated by G4BUO and G4FAM a team that has been regular winners of the NFD Shield in recent years. While they are naturally unhappy about not winning their namesake trophy, it is hoped they will be compensated by receiving the RSGB's newest award.

Gravesend Trophy: Awarded to the runners-up of the section with the most entries,

the 1987 winners are the Marple CG "B", G4MCC/P, with their team of G3WPF, G0CMM and GW3YDX. The Marple team are very experienced in this type of contest and their total of 876 contacts was spread across the six bands, their only disappointment being on 28MHz where they found it hard going. They were also a TS930S user and their antenna was a 270ft c/w wire.

Scottish NFD Trophy: Glenrothes "A", GM4GRC/P, who did not enter the Open section last year, returned in this year's NFD with a bang and once again win the trophy. Aberdeen, GM3BSQ/P, last year's winners are in second place.

Frank Hoosen G3YF Memorial Trophy: Awarded for the highest score on 14MHz irrespective of section, this has also been won by Glenrothes "A", GM4GRC/P, who were the clear leaders on the band.

Certificate winners: The committee award merit certificates to the stations placed third in each section, to the section leaders on each band and to the overseas station in each continent providing the most points for UK portables. This year the third place certificates go to the Torbay ARS "A" station, G3NJA/P for their Open entry and to Stockport RS, G6UQP/P in the Restricted. The other certificate winners are listed later in this report.

Check logs

We normally expect to receive a number of checklogs from overseas fixed and portable stations. This year several of the IARU Region 1 societies sent us lists of their participating portables and we thank ARI, DARC, UBA and USKA for their help. In addition, logs were received from C30CCA/P, G6ZY/EA6, GW3WWN, 11HAG/P, ON5VL/P, W4YN, YU7FS, YU7FT/P, YU7KM together with a number of partial logs from UK/P stations who were unable to complete the event because of the weather. The merit certificates go to 11HAG/P for Europe and to W4YN for North America. G6LX

28MHz

Conditions on this band were very good comparatively speaking, with certificate winners G0BVV/P (Open section) and GU3HFN/P in the Restricted working 183 and 149 stations respectively. As mentioned in the opening remarks, the south-west and west were the places to be for the best sporadic E openings with G4CRC (Cornwall), GD3RFH and GI3YRQ capitalising on the conditions. Early afternoon on Sunday brought an opening to the USA with 10 groups being in the right place at the right time. Other dx worked including Asiatic USSR, Israel, Brazil and Cyprus.

As reported by the other band adjudicators, the accuracy of the band logs was very mixed. Not only were there callsign/report errors, but there was also one or two logs containing unmarked duplicates. An expensive error on this bonus band where each dupe can cost up to 80 lost points for a contact with a UK or EU/P.

Comments from the field included: "Pretty good, but long periods of white noise. Some South Americans to brighten things up" (G3LRS/P), "Plenty of activity for most of the time" (G4CRC/P), "... nice to see 10 open for good periods ... could only get our antennas up 15ft due to high winds" (G4RSE/P), "Silver rod antenna better than beam for Europeans!" (G4UHI/P). G4JKS

21MHz

A combination of short-skip with some dx propagation, coupled with the band being open for virtually the whole of the 24h produced some excellent scores. Maidenhead "A", G3WKK/P with a single-band entry topped the Open section by making 293 contacts to win the section certificate. Leicester Poly "A", who mixed 21 and 1-8MHz for a two band entry finished only a few points behind from 273 contacts. If only they had pushed a little harder, they could have collected two band winner certificates! In third place in the Open section was the six-band entry from Torbay "A".

In the Restricted section, Aberdeen "A", GM3BSQ/P, receive the certificate by just piping Central Lancs ARC into second place by just three points with Swansea ARS third, again only a few points less. All the leading stations in both sections lost points, as did many other groups who used the band. Most of the deductions related to errors in recording (or transcribing) callsigns, although a few, who had become accustomed to recording 599, failed to enter a 559 or 579 report when sent.

While the majority of groups praised conditions and their results, a few found it hard going. One group commented that whenever they checked the band there seemed to be no UK portables to work and the Europeans were down in the "mud". Another went as far as suggesting their presence on the band warranted an X2 bonus, while yet another complained that it was hardly worth spending time working 21MHz as conditions were so poor at their location. These comments are surprising as a master check-list prepared by the adjudicator shows that over 260 different European portable stations and 61 different dx stations appear in the band logs. G4RWW

14MHz

Short skip dominated the contest traffic on the band with long openings to Europe, particularly between 1500-1930, 2100-2330 and during most of Sunday. There were no single-band entries this year, possibly due to the bad weather and/or the prevailing propagation.

The Open section leaders (and winners of the Frank Hoosen trophy), GM4GRC/P, visited the band five times to make 311 QSOs, of which only 16 were outside of Europe. The Restricted certificate winner, G4MCC/P, also concentrated on Europe and only seven of their 234 contacts were with dx.

The technique of rapid band changing to maintain a high average QSO rate was demonstrated effectively by the overall winners, G3VER/P, who made 193 European and 10 dx contacts from 15 excursions on the band. G0AAA/P, the Restricted section leaders, also made a number of quick visits to the band collecting 225 contacts, including 15 with North America.

There are three major areas of activity during a contest such as NFD. These are pre-contest planning and organisation; operating; and post-contest administration. Some groups pay far too little attention to the last of these and submit un-rewritten

entries containing obvious errors and unmarked duplicates. As well as causing extra work for the adjudication team, the groups' efforts are negated by a large loss of points. This year, there were a number of badly prepared logs, including those from G4AYM/P, GM0AYR/P, G4JS/P and G3YRC/P. Dupe sheets submitted with entries are helpful, both as a check for the person who is preparing the entry logs and for the adjudicator. The HFCC is considering making them mandatory for all RSGB hf contests.

Finally, many operators commented on contacts with ZB2/GB0SWR/MA and it was suggested that a callsign like that deserve extra points if copied correctly (and only a few did manage to sort out that mouthful!) G3SJJ

7MHz

A total of 112 groups submitted logs for 7MHz this year, an increase of seven over 1986, however, there were other UK/P stations active that did not send in entries. The increase in support is all the more pleasing in view of the appalling weather conditions experienced by most groups.

Comments on radio conditions ranged from "super" to "naff", thus proving the old adage about not being able to please everybody. Most of the contest traffic was with Europe and an astounding 16,000 QSOs were made with portable and fixed stations in our continent. Despite the high levels of QRM and the simpler antennas used this year, there was plenty of dx to be worked by those sufficiently determined. Over 50 different WVE callsigns appear in the logs, together with PY, ZS, TI, VK, ZL and others. Congratulations are in order for the group that made WAC, and our commiserations to the operator who worked ZL3GQ, but logged him as a DL3!

This band always seems to attract a number of single-band entries and as might be expected all the leading stations were in this category. The certificate winners are the Sutton & Cheam "A" RS Open section entry, G4ADM/P, and the G3XRO CG, G3XRO/P Restricted section entry. Mention should be made of the Guildford & DRS station, G5RS/P who used battery power without the benefit of float charging.

Logs in general were well presented and neat, although there were the usual few groups who submitted cut and paste photocopies of the original sheets, scribbled in the heat of the moment with a blunt 6B pencil or a dying felt-tip, and full of crossings-out and overwriting. For a contact to count for points, it must be possible for the adjudicator to read the details and some of these groups will find that their scores have been reduced because of the illegibility of their log entries. Several groups submitted computer derived logs and while these were a delight to check, not all were in the correct format of 40 entries to an A4 page, or with the same column format as the RSGB log sheet. (see comments later in this report).

It is regretted that so many groups do not check their logs carefully enough for duplicate contacts and over 10 per cent of the entries had one or more unmarked dupes with some logs having as many as three! Almost every entry lost points during checking, the principle cause being inaccurate logging of callsigns. Problems were posed by the USSR stations as with their changed call format, the second letter of the prefix is the clue and it is no longer safe to assume that a 9 or 0 in the callsign means the station is located in Asia. G3UFY

3-5MHz

Conditions on the band were good for European portable contracts, although with 14MHz staying open and the increased activity on 1-8MHz, some groups did not have sufficient time to run up a good score on 3-5MHz. There was a frenzy of activity during the last hour of the event when many groups strived to mop up the UK/P stations missed earlier. The band certificates for the highest scores go to Echelford, G3UES/P, who were in the Open section and to Leicester Poly "B", G3RIP/P, who led the Restricted entrants.

Few groups worked any dx, although a number were heard (and called) from both VK2 and VK3 during the early morning long-path opening! Several complaints were received about a UA contest on Saturday evening, which along with the regular 3-5MHz QRM reduced the number of frequencies available for use. (Note: this is surprising as RSF of USSR now officially support NFD. It has been suggested that the QRM might have originated from fixed USSR stations supporting their own portables—G6LX).

Few entrants escaped without losing points in the checking. To be precise only 13 groups had a clean sheet, but this included most of the leaders, who seem to pay more attention to the accuracy of their entries to ensure a minimal loss of points. (Perhaps this is why they are on the leader board.—G6LX). Many lost points were clearly due to transcription errors and the average points lost overall was 26, with a higher average loss noted for the Open section entrants—38. So please don't throw away the dupe sheets because you have more than one antenna! As noted later in this NFD report, there was one nasty incident, when a group tried to take over another frequency that was in use, and when challenged, responded with foul language.

Comments on 3-5MHz: "Little trouble with static"—G8GG/P, "Noisy band, lots of static"—G4UHI/P, "Too much hard work, except in the middle of the night"—GMTOQ/P, "Produced some nice pileups, so we must have been getting out"—G4HFT/P, "Why did everyone go elsewhere when we came on to the band?"—G3PDL/P, "Bread and butter from the small hours to dawn"—G0AAA/P, "Our £1,500 rig packed up on this band"—G4HRC/P, "As the wx worsened we wondered whether to sign /MM, /MA or /AM"—G4FNL/P, "Discovered on Sunday that our 266ft doublet had become a 133ft zepp"—G3WAS/P, "Deaf Russians in their contest refused to work us—does that make us Refuseniks?"—G3LRS/P. G4BUO

1-8MHz

With DL/P stations using this band in NFD for the first time, there was a further increase in popularity and many groups commented on the stimulation they have created. Exactly 100 G/P stations sent a log recording operation on 160 during the 24h, which added to the 90 German stations that appeared in the logs, considerably lengthened the time in which the band was used. In past NFDs this period has been sharply defined but this year the first contacts were made as early as 2000, with some groups still going strong at 0400.

Certificate winners in the Open section are the Leicester Poly ARS, G3SDC/P, who were nearly 250 points ahead of second placed Gravesend, G3GRS/P. In the Restricted section, Southgate "B", G4KZD/P, were the certificate winners with Marple "B", G4MCC/P, in second place.

Several groups commented on the lack of static and suggested it had been washed or blown away by the rain and wind. The lack of QRM generally helped groups to make contacts that would have been difficult under normal mid-summer conditions and a number of groups worked VE, W and UA9, while a report via G6LX during a contact with VK records that 11 different UK/P stations had been heard and called on

the band with no avail! Added to this, there was a wide variety of EU prefixes available for the taking to make this an interesting and very competitive band.

As has been noted elsewhere, the presentation of most logs is good, but a minority leave much to be desired; unmarked duplicates, log alterations, indecipherable writing and other careless errors can add up to a lot of points lost. The adjudicator for this band has no hesitation in deleting a contact, particularly if he is not sure what the callsign is supposed to be. There is no time to spare to indulge in guessing games. All this could be avoided by spending a little more time before submitting the entry. BRS20249

Equipment and antennas

This year there were 32 different types of transceivers in use including the usual Trio/Kenwood, Yaesu, Tentec and ICOM (in order of popularity). Additionally there was a home-brew transceiver, the usual Drake twins and a few other makes of commercial equipment listed on the cover sheets.

As a direct result of the high winds, the antennas used by the Open section this year included many more simple wires than has been the case in recent NFD events and only a relatively few groups managed to erect "aerial farms", the larger TH6 or TH7 multiband beams or the big single-banders that normally feature on the entries. While some groups did manage to erect the smaller tribanders, the scope of the antennas listed on the cover sheets clearly show the difficulties experienced by many groups. Typical of these: "a doublet at 20ft", "loop 32ft high", "inverted-vee at 22ft", "crossed dipoles", "bent delta loop with bottom 6ft off ground", "trap dipole at 25ft" etc. Only one group reported that they had managed to erect a 7MHz Yagi using a mobile tower, but were unable to crank it up, several who had laboured to make 7MHz quads decided to leave them on the ground and use wires instead!

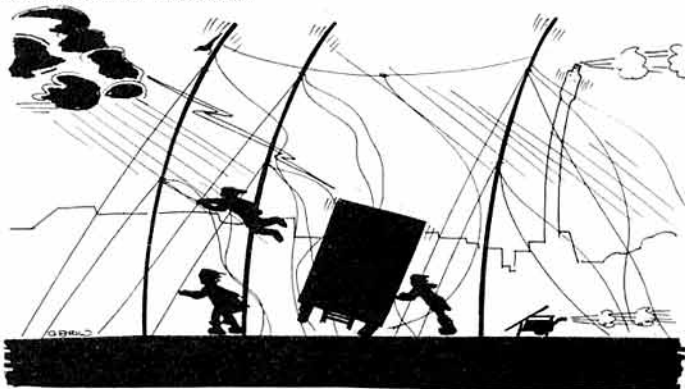
In the Restricted section, the centre fed wire was again predominant, albeit with wide variations in the exact length of the "top" ranging from 120 to 600ft. Very little antenna damage was reported by entrants in this section, although a number of groups mentioned that they reduced the height of their masts or had provided extra sets of guys. (A ladder used as a strengthener seems to have been popular!)

Generators were once again the weak link with a number of reported failures due to mechanical trouble or because rain was sucked into the air intake. Why is it that these NFD problems always seem to occur in the middle of the night when there is only a minimum number of people on the site and nobody can find a torch!

Inspections

As previously mentioned in these NFD reports, the committee try to randomise the spread of groups to be inspected and this year 26 were visited, including a number who had not previously been on the list. The HFCC thank those members who gave their time to visit the nominated sites and inspect the stations in the atrocious weather. No problems were reported other than with one group who could not be located by the inspector and the recommendation about a change in section for G3GRS/P, mentioned earlier in this report.

The co-ordinator apologises to any groups trying to contact him during the late Friday evening and Saturday morning, his telephone had become a victim of the bad weather and was out of order!



"Usual field day wx here!"

The weather

Many groups complained about the adverse weather conditions which seems to have been the worst during an NFD for many years and caused some structural damage to masts, antennas, tents, caravans and generators. Apart from the Gravesend group, a number of others lost masts and antennas. One group in east Kent had their un-guyed mobile tower blown over. They were able to re-erect it, but later they had their tent blown away and finished the contest operating from the back of a station wagon. Plymouth also reported wind problems with their mobile tower as did a number of other groups. A group in Sussex suffered three separate mast failures, first one of them broke at a mast joint during erection, then a second one got badly bent due to insufficient guys, and a third made from the wreckage of the first two, came to grief when there was a problem with the gin-pole. They did not say how they overcame their adversity, but as they submitted an entry, it must have come right in the end! It was an expensive weekend for tent owners; Cornish had two blown away. Rascal had tent damage and Echelford also lost one and a number were damaged. Many groups reported on a cloudburst that hit the Midlands, causing flash floods and dead generators which had to be dried out. Lichfield went to their usual elevated site in Wales but beat a hasty retreat to lower ground nearer their club QTH. Croydon SRCC at 850ft asl were unable to erect the beam and arrays for their "A" station and had great difficulties keeping up the shortened masts for their Restricted entry. The comment from Cornwall and the cartoon from Grimsby probably says it all!

"We consider that we are all totally insane to work under such conditions and we can only congratulate all the groups that took part and feel that every team that actually got started deserves a certificate of merit".

Comments

There were the usual sad and sorry tales about equipment failures, shortage of operators and other difficulties that seem to beset even the best organised groups.

RESTRICTED SECTION

Posn	Society or group	Callsign	1-8	3-5	7	14	21	28	QSOs	Final Score
1	Three As CG	G0AAA/P	982	635	707	734	396	960	992	4,414
2	Marple CG B	G4MCC/P	1,056	546	626	808	435	384	876	3,855
3	Stockport RS	G6UD/P	866	585	661	624	390	660	849	3,788
4	Downs CG	G4FNL/P	844	608	861	714	67	314	876	3,408
5	Lichfield ARS	G3WAS/P	768	650	571	704	363	238	779	3,294
6	Central Lancs ARC	G0FOX/P	824	456	472	662	537	300	765	3,251
7	Western ARC	G03RFH/P	470	504	416	691	480	562	795	3,123
8	Mid Beds Contest Assn	G4MBC/P	840	556	896	315	172	304	742	3,083
9	Aberdeen ARS A	G3BSS/P	848	258	552	545	540	324	688	3,067
10	Cheltenham ARA	G5BK/P	852	386	538	505	303	676	766	3,060
11	Crawley ARC	G6RC/P	868	456	598	685	259	180	699	3,046
12	Hereford ARS	G3YDD/P	712	389	467	704	347	400	729	3,019
13	Oxford & DARS	G5LO/P	656	416	662	678	253	346	697	3,011
14	Cheshunt & DARC	G4ECT/P	812	470	664	542	184	304	700	2,976
15	Leicester Poly ARS B	G3RIR/P	630	671	474	677	351	154	764	2,957
16	Clair Goin CG	G4HFT/P	720	462	475	665	314	278	684	2,914
17	South Manchester RC	G3FVA/P	672	495	463	667	377	228	694	2,902
18	West of Scotland ARS B	G4MTO/P	504	336	557	614	513	308	699	2,832
19	Central CG	G4WON/P	808	360	661	256	264	482	615	2,831
20	Telford & DARS	G3ZME/P	746	508	486	485	224	370	638	2,819
21	Red Dragon CG	G6WGT/P	688	354	409	543	303	510	677	2,807
22	Marple CG A	G4MUL/P	842	470	579	536	174	132	629	2,733
23	Aberdeen ARS B	G4MTE/P	526	340	349	637	474	254	642	2,580
24	Surrey Radio CC	G3SRC/P	536	173	470	469	264	620	548	2,532
25	TVARTS	G3TVS/P	684	382	444	438	328	186	604	2,462
26	Colchester RA	G4CRA/P	704	510	531	244	124	348	534	2,461
27	White Rose ARC	G3XEP/P	596	459	558	315	217	286	537	2,431
28	West Kent ARS	G3WKS/P	440	484	574	447	132	312	552	2,389
29	Gurnsey ARS	G3JHF/P	434	88	271	266	315	986	530	2,360
30	G4GZQ CG	G4GZQ/P	650	438	607	288	111	252	533	2,346
31	Multon Mowbray ARS	G4FOX/P	452	300	749	374	211	132	568	2,218
32	Gloucester ARS	G4AYM/P	660	236	502	475	161	170	544	2,204
33	Glenrothes ARC B	G3MUL/P	864	234	185	673	149	52	484	2,157
34	Preston ARS	G3KUE/P	640	396	437	385	144	112	469	2,114
35	Blackpool & Fylde RC	G8GG/P	696	268	296	367	180	302	432	2,109
36	Scunthorpe ARC	G4FUH/P	474	570	501	370	11	144	530	2,070
37	Swansea ARS	G4WCC/P	—	184	171	417	528	668	509	1,968
38	Easington ARS	G4APN/P	596	72	425	579	90	80	430	1,842
39	Sheffield & DARS	G3FJE/P	696	348	378	84	84	250	395	1,840
40	South Hampshire ITS	G3DIT/P	296	240	347	408	127	416	405	1,834
41	N Bristol ARC	G4GCT/P	340	176	381	734	164	28	470	1,823
42	Bredhurst RX & TX Assn	G0BRC/P	260	346	528	351	134	176	473	1,795
43	WOSARS A	G4AAG/P	722	130	255	321	203	124	396	1,755
44	Norfolk ARC B	G4RKL/P	396	210	436	397	104	204	407	1,747
45	Weston-super-Mare RC	G4WSM/P	328	256	372	212	112	284	350	1,664
46	Maidstone ARS CG	G3TRF/P	542	108	295	402	117	180	382	1,644
47	Chiltern ARC B	G3NCL/P	646	36	949	—	—	452	1,631	—
48	Stirling & DARS	G4TMS/P	308	88	144	291	348	432	369	1,611
49	Eden Vale RS	G0ANT/P	376	184	450	452	—	140	369	1,602
50	Chesham & DARS	G3MDG/P	564	72	156	407	170	210	342	1,579
51	Windy Yet CG	G3NIG/P	328	226	244	273	178	322	391	1,571
52	Braintree & DARC	G3GRT/P	274	228	290	199	156	404	342	1,551
53	Mid Cheshire ARS	G3ZTT/P	304	202	289	358	207	184	369	1,544
54	Edgware & DARS B	G4IUI/P	—	562	430	194	185	156	396	1,527
55	Hastings Elec & RC	G6HH/P	574	258	133	165	146	244	347	1,520
56	Torbay ARS B	G3TIR/P	—	234	629	374	126	40	402	1,403
57	Dynamics Hatfield Club ARS	G0AER/P	356	190	441	200	44	152	303	1,383
58	G3XRO CG	G3XRO/P	—	—	1,292	—	—	—	424	1,292
59	Southgate ARC B	G4KZD/P	1,218	—	—	—	—	—	170	1,218
60	Crystal Palace & DRC	G2LW/P	52	186	296	312	120	244	306	1,210
61	Aberdeen ARS C	G4MAZ/P	—	130	279	518	240	16	372	1,183
62	Meirion ARS	G4LZP/P	—	106	260	430	126	196	302	1,118
63	Darwen ARC	G4JS/P	—	86	360	397	133	108	337	1,084
64	Havering & DARC	G4HRC/P	—	68	483	246	74	200	316	1,071
65	Canterham & DARC	G3USL/P	—	38	57	339	224	156	231	814
66	West Manchester RC	G4MWC/P	—	236	253	176	126	4	239	795
67	Goole Radio & Elec Soc	G0GLE/P	56	184	67	154	10	8	174	479

OPEN SECTION

Posn	Society or group	Callsign	1-8	3-5	7	14	21	28	QSOs	Final Score
1	Verulam ARC A	G3VER/P	1,100	628	784	681	287	996	981	4,476
2	Gravesend RS	G3GRS/P	1,118	699	716	577	237	612	851	3,959
3	Torbay ARS A	G3NJA/P	870	591	524	530	474	708	835	3,697
4	Racal ARS	G3RAC/P	1,082	526	891	577	140	420	827	3,636
5	Addiscombe ARC	G4ALE/P	874	573	494	691	382	536	836	3,550
6	Glenrothes ARC A	G4AGRC/P	886	369	436	998	464	358	891	3,511
7	Hull Notts CG	G3TBK/P	984	523	666	501	252	416	743	3,342
8	Hull CG	G3ZRS/P	1,068	401	784	609	220	210	789	3,292
9	Scunthorpe ARC	G3POL/P	808	488	630	563	233	454	756	3,176
10	Chiltern ARC A	G3CAR/P	1,036	278	529	608	197	516	690	3,164
11	Plymouth RC	G3PRC/P	526	352	355	458	201	1,214	699	3,106
12	Cornish RC	G4CRC/P	456	295	227	654	400	1,052	695	3,084
13	Southgate ARC A	G3SFG/P	828	532	549	484	238	420	717	3,051
14	Liverpool & DARS	G3AHD/P	846	378	431	675	411	294	712	3,035
15	Reading & DARC	G3ULT/P	1,020	384	537	705	239	98	711	2,983
16	Verulam ARC B	G4DUS/P	828	414	585	566	217	328	677	2,938
17	Farnborough RS	G4FRS/P	716	470	587	619	253	250	679	2,895
18	Worthing & D ARC	G3WOR/P	624	420	776	531	191	234	684	2,776
19	Strathmore Strikers	G4MAQ/P	786	368	712	725	56	88	704	2,735
20	Leicester RS	G3LRS/P	924	316	501	405	142	442	594	2,730
21	Wirral ARS	G3NWR/P	502	486	472	626	432	146	692	2,664
22	Killmarock & Loudoun ARC	G4MDX/P	506	300	308	388	406	740	631	2,648
23	Norfolk ARC A	G4ARN/P	730	462	721	369	114	190	660	2,586
24	Scarborough ARS	G4BP/P	628	398	305	592	269	184	578	2,376
25	Southdown ARS	G3WQK/P	972	356	417	387	34	196	494	2,362
26	Worcester & DARC	G8JC/P	552	342	252	608	61	464	562	2,279
27	Edgware & DARS	G3ASR/P	—	338	784	459	231	462	625	2,274
28	Humberston CG	G3IYT/P	848	320	723	270	36	56	504	2,253
29	Leicester Poly ARS	G3SDC/P	1,364	—	—	—	870	—	470	2,234
30	Welwyn & Hatfield ARC	G3WGC/P	556	439	442	228	24	502	497	2,191
31	Hornsea ARC	G4EKT/P	608	386	440	459	152	144	585	2,189
32	Eschelford ARS	G3JES/P	848	732	240	134	26	160	466	2,140
33	Shirehampton ARC	G4AHG/P	480	368	474	496	108	162	513	2,088
34	Burton-on-Trent & DRS	G3NFC/P	772	188	286	168	106	534	437	2,054
35	Ilford RSGB Group	G3XRT/P	708	374	428	387	83	48	480	2,028
36	Chelmsford ARS	G4CUT/P	632	320	414	330	32	266	417	1,994
37	Wye ARS	G4UHI/P	520	238	269	364	264	292	433	1,947
38	Grimby ARS	G3CNX/P	520	453	898	—	20	—	518	1,891
39	Greenock & DARC	G3ZRC/P	176	20	300	570	250	436	473	1,752
40	Leyland Hundred ARG	G4TLH/P	776	164	160	248	130	230	323	1,678
41	Sutton & Cheam ARS B	G0BVP/P	—	—	—	—	—	1,574	149	1,574
42	Banger & DARS	G3XRO/P	24	133	99	226	156	306	360	1,544
43	Stamford & DARS	G4FPO/P	518	182	356	364	14	104	380	1,538
44	Sutton & Cheam ARS A	G4ADM/P	—	—	1,218	—	—	—	385	1,218
45	Sears CG	G4RSE/P	—	260	214	475	140	124	363	1,213
46	Goldford & DRS	G5RS/P	—	—	1,141	—	—	—	417	1,141
47	Clifton ARS B	G3JKY/P	—	—	1,139	—	—	—	245	1,139
48	Bromsgrove & DARS	G3VGG/P	—	92	261	312	52	228	256	945
49	Maidenhead & DARC A	G3WXX/P	—	—	—	890	—	—	293	890
50	Maidenhead & DARC B	G4OYA/P	—	—	—	622	—	—	32	197
51	Clifton ARS A	G3GHN/P	—	589	—	—	—	—	245	589

Disqualified, Rule 8 (iii): G4OAYR/P, G3YRC/P.

Some of the logs received this year did not meet this criteria and although we accepted them, entrants should take heed that in future only correctly formatted computer logs will be regarded as entries, and those that do not comply will be treated as checklogs.

As reported in the 3-5MHz summary, the committee were concerned about complaints of an incident, where it was alleged that the operator of an entrant group sent obscene remarks to, or about another group. As these remarks were heard by nine different operators who reported on them, the committee ruled that this was contrary to the spirit of the event and imposed a penalty by deducting 50 per cent of the band points made by that particular operator.

There were several late entries and two logs that were returned to the sending groups undelivered, even though they were correctly addressed and stamped. After deliberation, the committee decided to accept all these logs in this instance, even though the reasons given for the late entries were due to lack of organisation and administration by the entering groups. The two logs that went missing in the mail were properly postmarked and no blame can be attached to these groups. The committee serve notice that in the future logs postmarked after the due date will not be accepted as entries but will be used as checklogs. While this may seem hard, the checking of NFD is geared to a very tight schedule in order to meet the October deadline for *Radio Communication* and there is no extra time available to deal with late entries.

The future

For the first time in a number of these NFD reports, it is a pleasure to be able to report that there is no threat to the present NFD format. As detailed in the Conference Report in the July issue of *Rad Com*, the contest representatives of the IARU Region 1 societies that participate in FD agreed that there were too many differences to be able to harmonise the rules. Apart from agreeing dates and start/finish times, the only common feature will be a European league table based on the number of contacts made by the leading 10 stations in each section from each country. In the UK, the June cw field-day will continue under the present NFD rules, a decision that I, with the support of DK2BI and others, has been working for since the unfortunate decisions that were made at the 1984 IARU Region 1 conference in Cefalu.

Conclusion

VHF NATIONAL FIELD DAY 1987 RESULTS

OPEN SECTION		RESTRICTED SECTION
Winner	The Hillbillies	East Kent Radio Society
Runner-up	Sheppey Western CG	Martlesham Radio Society
Band leaders		
70MHz	S of Scotland VHF/UHF CG	Westmorland VHF Group
144MHz	The Hillbillies	Wirral & District ARC
432MHz	Sheppey Western CG	Martlesham RS
Microwave	Sheppey Western CG	Martlesham RS
Leading GJ	Larne & District ARS	
Leading GI	Jersey Amateur EC	
Leading GM	S of Scotland VHF/UHF CG	West of Scotland ARC
Leading GW	Albright & Wilson ARC	Wirral & District ARC
Leading swl	Bob Treacher BRS32525	

This year VHF NFD was held on a weekend blessed with excellent weather over nearly the whole country, and with very good conditions particularly in the eastern half of the country. As always there were exceptions to the rule, and members of the Lerwick Radio Club found themselves on the wrong side of the weather fronts with rain, mist and poor conditions for their first foray in VHF NFD. Stations in the south west were able to make good contacts to the south, but the north west was generally not so fortunate. The best conditions in the east were on the higher bands, with some good Scandinavian dx worked. Some groups must be waiting for the opening to end all openings, judging by comments of "flat" or "average" made by some with dx over 1,000km in their 432MHz logs.

The inspectors visited 34 groups this year, including several of the leaders in each section. No breach of the rules was found on any occasion, but some comments were made that groups were not always in a position to demonstrate compliance with the power limits. The onus is on the entrants to convince the inspector that their station is

being operated in accordance with the rules, so power measuring equipment of known accuracy should always be available on site. In a couple of cases site access instructions were inadequate, and late changes by entrants also caused problems. Maps are better than written instructions, but should be clearly marked up. Last-minute site changes should be notified to the adjudicator by phone, and clear instructions for the new site left in a prominent position at the registered location. Wasted journeys by the inspectors can be avoided if the adjudicator is informed that a group will not be taking part after all.

Last year's crop of bad signal complaints was not repeated this year, with only one or two isolated instances of poor quality signals. No disqualifications resulted on this occasion. One group made strong comments about the close proximity of another group which caused them some problems. The Code of Practice published in January *Rad Com* must be adhered to, and it is good sense to liaise with other groups if it is known that you will be on adjacent sites.

The format of the contest attracted some comments. A number of groups asked for the re-introduction of 2-3GHz in the Restricted Section. Others felt that the Restricted Section was better for the reduction of complexity this year. With the removal of the restrictions on portable operation, 50MHz may be included next year, but the prospect of running six stations does not appeal to many. Options under consideration include running 50MHz overnight between the two 70MHz sections, allowing entrants to choose, say, four bands from six, and limiting VHF NFD to the lower frequency bands only. The rules will be decided early in 1988, so please let the committee have your views on the evolution of the premier vhf contest of the year.

Thanks go to all the RSGB regional representatives who undertook inspections on behalf of the VHF Contests Committee, who often spend most of the weekend driving up cart-tracks and hiking across the hills.

A new name appears on the Surrey Trophy this year, with The Hillbillies making full use of the good conditions to score a convincing victory in the Open Section over the Sheppey Western Contest Group. In the Restricted Section East Kent Radio Society repeated their success of last year to take the Arthur Watts Trophy again, beating Martlesham Radio Society, who have emerged from retirement this year to take the runner-up spot. The Tartan Trophy for the leading Scottish entrant goes once again to the South of Scotland VHF/UHF Contest Group, with Aberdeen VHF Group moving up the tables to challenge them. Congratulations also go to Bob Treacher, BRS32525, as overall swl winner this year, and to all the band leaders and runners up, who will receive certificates. The leading groups in each UK call area will also receive certificates.

G3XDY

OVERALL RESULTS - OPEN SECTION

Posn	Group	Total Score	70MHz	144MHz	432MHz	Microwave
1	The Hillbillies	3,641	2	1	2	3
2	Sheppey Western CG	3,483	10	5	1	1
3	Parallel Lines CG	3,267	12	3	3	2
4	HADRABS & TARTS CG	2,888	9	2	4	4
5	Norfolk VHF/UHF CG	2,615	11	4	5	5
6	S Scotland VHF/UHF CG	2,134	1	6	17	29
7	Warrington CG	1,969	30	12	6	8
8	Scunthorpe VHF CG	1,942	20	20	7	6
9	Crawley & Reigate	1,893	13	17	10	10
10	Flight Refuelling ARS	1,775	8	18	8	24
11	Windmill CG	1,658	16	10	23	14
12	Victory CG & CRA CG	1,645	14	13	20	16
13	Clifton ARS	1,623	42	23	11	7
14	Ridgeway CG	1,523	32	22	12	12
15	Newbury & D ARS	1,496	26	33	13	11
16	Hull & Hornsea	1,482	18	31	24	9
17	Horsham ARC	1,424	28	9	21	22
18	Aberdeen VHF Group	1,378	3	16	36	39
19	Hastings E & RC	1,375	15	14	15	-
20	Reading & D ARC	1,367	25	24	25	15
21	Southdown ARS	1,308	22	7	19	0
22	Leicester Poly ARS	1,258	24	19	32	25
23	Exmoor RC	1,248	19	-	9	17
24	Surrey Radio Contact C	1,183	38	29	18	18
25	S Manchester RC	1,165	21	38	26	20
26	Albright & Wilson ARS	1,124	27	8	35	-
27	Edinburgh & D ARC	1,117	5	28	59	-
28	N Cornwall CG	1,080	7	26	49	-
29	N Beds Gentlemens CG	1,056	33	51	14	23
30	Galloway CG	1,006	45	15	16	-
31	Farnborough & D ARS	981	41	36	28	21
32	Sutton & Cheam RS	932	31	32	27	35
33	Preston ARS	907	4	62	48	-
34	Plymouth RC	890	6	53	60	-
35	Saffron Walden & D ARS	864	36	30	31	36
36	Harlow & D ARS	786	29	27	61	-
37	Crossways CG	772	-	25	30	19
38	Verulam ARC	765	44	21	47	-
39	Coventry ARS	754	43	45	29	32
40	Southgate ARC	737	37	52	50	26
41	Dunstable Downs RC	711	-	37	38	13
42	S Lakeland ARS	710	17	64	41	33
43	Pembroke & D ARC	700	34	41	39	-
44	Mid Cheshire ARS	671	23	56	44	-
45	Northern Heights ARS	666	35	54	58	30
46	Salop ARS	653	40	44	40	-
47	Jersey Amateur E C	625	-	11	43	37
48	Mid Sussex ARS	620	-	34	22	28
49	Liverpool & D ARS	518	39	59	56	-
50	Clwyd County Raynet G	441	-	46	34	27
51	Great Yarmouth RC	372	-	42	46	31
52	Yeovil CG	359	-	43	33	-
53	SEARS CG	347	-	35	37	-
54	Anglesey Radio Group	345	48	39	55	38
55	Grafton RS	294	47	50	51	-
56	Grimsby ARS	287	46	58	62	-
57	Welwyn Hatfield ARC	280	-	40	53	-
58	Bredhurst RX & TX S	254	-	48	42	-
59	Bulwell ARC	238	-	49	45	-
60	Stirling & D ARS	235	-	47	52	-
61	Bury St Edmunds RS	218	-	55	-	34
62	Larne & D ARS	171	-	57	54	-
63	N Bristol ARC	154	-	60	57	-
64	S Devon RC	92	-	61	63	-
65	Banff Amateur Group	58	-	63	64	-
66	Lerwick RC	24	-	65	65	-

OVERALL RESULTS - RESTRICTED SECTION

Posn	Group	Total Score	70MHz	144MHz	432MHz	Microwave
1	East Kent RS	3,157	5	3	3	2
2	Martlesham RS	3,123	10	7	1	1
3	Wirral & D ARC	2,966	2	1	4	7
4	Bracknell ARC	2,340	3	19	6	4
5	LRS & RATS	2,178	9	14	10	3
6	Univ of Surrey EARS	2,067	8	9	5	14
7	Five Bells Group	1,977	28	10	2	9
8	Basingstoke ARC	1,959	11	11	18	6
9	S Birmingham RS	1,913	16	23	9	5
10	Torbay ARS	1,911	6	6	22	11
11	Westmorland VHF CG	1,840	1	46	12	13
12	Blackwood RS	1,719	16	2	28	23
13	North Kent RS	1,595	13	28	13	12
14	Shefford & D ARC	1,541	23	17	19	10
15	Bristol & Shirehampton	1,477	14	21	8	25
16	Kidderminster & DARC	1,473	15	16	24	16
17	Chiltern ARC	1,407	24	32	11	15
18	Lichfield ARS	1,407	4	4	-	-
19	Cambridge & D ARC	1,361	29	13	21	17
20	Edgware & D ARS	1,304	17	18	26	19
21	Vale of Evesham RAC	1,301	20	20	25	18
22	W of Scotland ARS	1,229	7	22	30	22
23	Doncaster ARS	1,148	21	37	16	24
24	Nunsfield House ARG	1,107	22	24	32	20
25	S Bristol ARC	1,087	-	12	7	-
26	Maidenhead & D ARC	1,062	18	38	-	8
27	W C CG	1,060	-	5	14	-
28	Goole R & ES	964	-	8	15	-
29	Guildford & D RS	921	12	27	-	21
30	Thornton Cleveleys ARS	918	25	29	34	27
31	Ellesmere Port & D ARS	880	27	15	42	26
32	West Kent ARS	828	19	39	37	-
33	Bishops Stortford ARS	786	30	30	31	-
34	Edenbridge ARS	746	32	26	20	-
35	Burton on Trent & D RS	712	31	33	23	-
36	Braintree & D ARC	595	-	40	17	-
37	Nene Valley RC	530	-	31	27	-
38	Milton Keynes & D ARS	494	-	25	33	-
39	Dartmoor RC	458	-	34	29	-
40	Dorking & D RS	367	-	42	35	-
41	Coulston ATS	357	-	41	36	-
42	Bromsgrove Lids	330	33	44	38	-
43	Gtr Peterborough ARC	318	-	35	40	-
44	Ripon & D ARS	291	-	43	39	-
45	Kelso ARS	267	-	45	41	-
46	English China Clays RC	219	-	36	43	-

OVERALL RESULTS - SWL SECTION

Posn	Callsign	Total Score	70MHz	144MHz	432MHz	Microwave
1	BRS32525	2,445	2	1	1	-
2	BRS52543	2,073	1	3	3	-
3	BRS25429	1,525	-	2	2	-
4	BRS28198	627	3	4	4	-

70MHz

Activity on the "friendly" band was slightly up on last year, with four or five Class B licensees swelling the numbers in most of the logs. The hot, sunny weather was welcomed by all, although it caused the odd equipment problem such as for G4HON/P whose rig would only work upside down! Most entrants described conditions as somewhere between above average and very good, only SW England expressing disappointment. There was little evidence of QRM from sporadic-E, and the only report of QRN was from GM4PHG/P who had trouble with a bonded whisky warehouse! There were few bad signal complaints, except where groups were operating too close together, and no mention was made of cw operators refusing to QRS when required.

Several entrants were unhappy with the length of the sessions, particularly in view of the low levels of activity after the first couple of hours, a six-hour period being favoured by most. Alternatively, GW3UVR/P suggested that the first session be used for 70MHz cw and ssb, and the second for 50MHz cw and ssb.

A number of participants lost points because the QTH information on the cover and log sheets was either missing or did not tally with what was actually sent over the air. In one case, the information sent was insufficiently accurate, the group concerned appearing to operate in one town for the first session and another about 8km away for the second. A couple of groups misread the rules and sent the same QTH in both sessions.

Thanks to all who made the adjudication easier by submitting separate cover sheets for each mode. The 70MHz contest is being summed up by G3FDW/P: "Great fun!".

G4WAD

EQUIPMENT USED BY LEADING STATIONS ON 70MHz

	OPEN SECTION		Antenna
	Transmitter	Receiver	
GM3WOJ/P	4CX250B pa, 130W ssb output	1st rf: 3N204 Mixer: 3N204	14el NBS Yagi, 40ft agl, 450ft asl
G3ZTZ/P	4CX250B pa, 130W ssb output	1st rf: BFT66 Mixer: four iglets	12 el NBS Yagi, 50ft agl, 850ft asl
	RESTRICTED SECTION		Antenna
	Transmitter	Receiver	
G3FDW/P	QQV03-20A pa, 25W ssb output	1st rf: 3N204 Mixer: 40673	6el long Yagi, 22ft agl, 2,220ft asl
GW3UVR/P	QQV06-40A pa, 25W ssb output	1st rf: fet Mixer: diode ring	6el Yagi, 30ft agl, 1,830ft asl

70MHz RESULTS - OPEN SECTION

Posn	Callsign(/P)	CW Section Points QSOs	SSB Section Points QSOs	Loc	Best dx	Km
1	GM3WOJ	1,315 91	1,608 114	74NP	G4MEL/P	567
2	G3ZTZ	921 83	1,414 135	94RJ	G4ADV/P	502
3	GM4ZUK	1,129 59	1,169 61	86RW	G3ZYF/P	700
4	G3SYA	918 86	1,345 131	84SA	G4MEL/P	502
5	GM3RFQ	1,072 73	1,075 80	85DJ	-	-
6	G3ZYF	733 82	1,336 122	80AQ	GM4ZUK/P	700
7	G4ADV	786 65	1,189 101	70PP	GM4MEL	572
8	G3PFM	743 84	1,178 139	80WP	GM4ZUK/P	699
9	G4BUW	799 79	1,106 112	80CO	GM4PHG/P	576
10	G4BVY	709 81	1,142 128	01KK	GM4ZUK/P	651
11	G3MPN	704 82	1,129 120	02QQ	ET9ED	561
12	G4HNS	684 86	1,008 125	03BF	GM4ZUK/P	445
13	G4MEL	661 73	961 100	01OC	GM4ZUK/P	692
14	G4ZYA	652 82	959 124	90MX	GM4ZUK/P	671
15	G3YF	673 93	895 105	00RU	-	-
16	G4ZRS	767 86	785 97	01LD	GM3RFQ/P	564
17	G3ZTZ	525 49	1,024 95	84KG	G3SJV/P	457
18	G4EKT	706 80	827 101	93RS	G4ADV/P	449
19	G4RVJ	719 78	801 92	81CC	GM4ZUK/P	653
20	G4ERG	628 79	815 103	93UC	G4ADV/P	433
21	G4HON	621 85	810 115	93BF	GM4ZUK/P	414
22	G3SJV	549 71	860 104	00DR	GM3RFQ/P	583
23	G4CAX	549 68	842 106	83PF	GU2FRO	422
24	G3ORY	570 89	816 129	92NP	GM4ZUK/P	489
25	G3MGV	492 93	865 130	911H	GM4ZUK/P	631
26	G3UAX	559 81	796 118	91GI	GM4ZUK/P	624
27	GW3UEY	544 70	783 107	82JG	GM4ZUK/P	520
28	G3SMC	611 78	656 109	90SV	GM4ZUK/P	685
29	G3WUX	709 76	550 85	01BR	-	-
30	G4HGI	496 67	761 107	93AD	GM4ZUK/P	423
31	G4BOB	528 75	716 108	93AC	GM3RFQ/P	453
32	G4VWH	518 80	652 102	91FN	GM4ZUK/P	600
33	G4FOH	424 66	717 105	92WE	GM4ZUK/P	550
34	GM4VRO	519 52	610 75	71OW	G3SJV/P	432
35	G4GAK	452 54	667 83	93BS	G4ADV/P	398
36	G4KFT	486 68	589 88	02DA	GM4ZUK/P	576
37	G3KFT	559 79	515 107	91NA	GM3RFQ/P	519
38	G4FUU	521 70	544 77	01JP	GM3WOJ/P	504
39	G3XSN	460 54	597 70	83NJ	G4MEL/P	381
40	G3NSY	407 81	646 113	82OU	GM4ZUK/P	454
41	G4DKN	448 82	578 107	91OF	GM4ZUK/P	644
42	G3JYK	338 52	632 97	01DH	GM4ZUK/P	652
43	G2ASF	457 72	464 85	92HD	GM4ZUK/P	537
44	G3VER	342 75	545 96	91SR	GM4ZUK/P	594
45	G4OBQ	125 14	560 49	84AT	G3YF/P	536
46	G4KAL	190 28	284 43	93VJ	GM4ZUK/P	420
47	G4RPK	15 3	193 42	01EW	G3FDW/P	357
48	GM4BZD	15 3	130 18	73UJ	G4BVY/P	412

70MHz RESULTS - RESTRICTED SECTION

Posn	Callsign(/P)	CW Section Points QSOs	SSB Section Points QSOs	Loc	Best dx	Km
1	G3FDW	815 69	1,286 121	84UR	G4ADV/P	482
2	GW3UVR	678 86	1,137 141	83JA	GM4ZUK/P	436
3	G4DDN	700 82	879 105	80ST	GM4ZUK/P	681
4	GM3WAS	617 86	897 120	82JU	GM4ZUK/P	446
5	G3LTY	592 70	802 86	01OI	GM4ZUK/P	667
6	G3LHJ	646 66	657 66	80FN	G3ZTZ/P	472
7	GM4PHG	567 39	621 53	75QS	G3YF/P	648
8	G4CWH	435 69	739 108	91XG	GM4ZUK/P	650
9	G3HYH	503 81	660 112	92MO	GM4ZUK/P	494
10	G4CXT	552 64	609 71	01QX	E15WAR/P	521

Posn	Callsign(/P)	CW Section Points QSOs	SSB Section Points QSOs	Loc	Best dx	Km
11	G3ZOI	420 70	706 105	91KF	GM4ZUK/P	641
12	G3PJX	515 76	590 95	91TF	GM3RFQ/P	513
13	G3WHR	498 68	606 93	01BH	GM4ZUK/P	649
14	G4HHL	456 71	646 92	81TK	-	-
15	G4GXP	494 76	607 99	82RJ	GM4ZUK/P	504
16	G4OHM	424 72	616 108	82KJ	GM4ZUK/P	649
17	G4IUZ	502 79	528 83	91VR	GM4ZUK/P	598
18	G3TWG	400 78	625 102	91OS	GM4ZUK/P	585
19	G3WKS	425 63	573 87	01CF	GM3WOJ/P	509
20	G4WET	452 74	501 87	92CA	GM4ZUK/P	548
21	G0GTI	354 51	590 84	93JK	-	-
22	G3EEO	483 77	455 76	93BA	GM4ZUK/P	438
23	G3WRJ	419 67	501 83	92VB	GM4ZUK/P	563
24	G4PIE	378 71	493 88	91PQ	GM3WOJ/P	455
25	G4YVQ	303 44	536 68	83MT	G3YF/P	411
26	GM4ZBN	124 16	709 96	81NV	GM4ZUK/P	561
27	GM4WSE	348 51	449 64	83JG	GM4ZUK/P	409
28	G4ENK	293 46	390 57	92TR	E15WAR/P	387
29	G2XV	264 48	383 66	02AD	E15WAR/P	429
30	G3TWV	352 54	283 49	01DW	GM3WOJ/P	456
31	G4ZYU	86 18	257 43	92BV	G4MEL/P	291
32	G0EID	-	231 41	01AH	G3FDW/P	410
33	G4XQW	-	55 11	82VJ	G4BVY/P	237

Checklogs gratefully acknowledged from: G4ARI, G2DHW, G4FMC, G3SLI, G3BPM, G3NKS, G6VX/P, G3VIP, and G4OZM.

Disqualified: G4TIN/P, G4ANP/P (VHF NFD Rule 2)
G4MSF/P (VHF NFD Rule 10)

70MHz RESULTS - SWL SECTION

Posn	Callsign(/P)	CW Section Points QSOs	SSB Section Points QSOs	Loc	Best dx	Km
1	BR52543	-	454 54	83LT	G3YF/P	412
2	BR532525	-	202 47	01AL	G3ZTZ/P	327
3	BR528198	-	135 23	00HX	G3FDW/P	450

144MHz

This year's event saw some very good conditions especially in coastal areas; most stations worked some choice dx, with many contacts over 1,000km. Weather conditions seemed almost universally good, with the usual crop of overheated amplifiers and burnt-out transformers. One group found its fridge couldn't keep up with the demand, what luxury! Another group, which perhaps should remain anonymous but could be found north of the border, dined on freshly caught and prepared rabbit!

Everyone had a good time, with no bad quality signal complaints this year. The amplifiers in the open section were almost universally based on 4CX250 tubes, either singles or pairs. As these can be very linear indeed using a few simple power supply components, it is impossible to justify using larger valves except to produce powers in excess of 1kW. It was nice to see only two groups using a very large valve pa this year; hopefully this trend will continue to move downward in vhf contests.

Congratulations to G4APA/P with a well deserved and clear win in the open section after many years of effort and to GW4MGR/P in the Restricted Section showing that a good high site with good operators can produce the goods G8TFI

144MHz RESULTS - OPEN SECTION

Posn	Callsign(/P)	Points	QSOs	Loc	Best dx (km)
1	G4APA	16,329	1,111	94RJ	1,009
2	G4LUB	15,400	979	80CO	2,695
3	G4LIP	15,207	1,137	03BF	1,137
4	G3ZIG	13,446	1,034	02QQ	992
5	G4ZAP	13,141	1,040	01KK	946
6	GM3WCS	12,297	953	74NP	1,045
7	G3WQK	9,510	703	00DR	870
8	GW3OXD	9,365	790	82JG	1,043
9	G4HRS	9,259	771	90SV	1,109
10	G0FBB	8,940	727	01LD	971
11	GJ1TJP	8,804	680	89WG	852
12	G4CDA	8,763	711	93AD	1,127
13	G8LNC	8,683	788	90MX	904
14	G6HH	8,676	646	00HU	932
15	GM0CLN	8,324	708	84AT	1,088
16	GM4CAN	8,089	506	86RW	1,000
17	G3WSC	7,927	609	01OC	975
18	G4RFR	7,781	635	80WP	983
19	G3SDC	7,642	699	92NP	995
20	G4CDC	7,222	546	93UK	907
21	G4VER	6,501	484	91SR	923
22	G3PIA	6,138	618	91FN	1,098
23	G3GHN	6,110	548	01DH	1,015
24	G4CCC	5,903	537	91IH	922
25	G3GAF	5,894	535	01HR	835
26	G4WVD	5,662	430	70PP	1,054
27	G6UT	5,573	574	01BR	931
28	GM4HAM	5,526	462	85DJ	867
29	G4DDY	5,210	461	01JP	832
30	G3TXC	5,164	484	02DA	880
31	G8GBY	4,525	450	93RS	897
32	G4ADM	4,306	554	93AC	907
33	G3NVO	4,224	494	91GI	927
34	G3ZMS	4,208	414	90WV	924
35	G4RSE	4,159	421	01EN	802
36	G0FRS	4,123	456	91OF	1,075
37	G4DDC	4,050	474	91RU	982
38	G8SMR	3,942	511	93BF	916
39	GW6DOK	3,878	449	73UJ	968
40	G3WGC	3,717	434	91UT	831
41	GW2OP	3,658	336	71OW	1,030
42	G3YRC	3,599	298	02UM	761
43	G4JBH	3,401	297	80LV	1,006
44	G3SRT	3,343	439	82QU	900

Posn	Callsign(/P)	Points	QSOs	Loc	Best dx (Km)
45	G4IEV	3,072	397	92HD	826
46	GW0CCR	3,038	402	83LB	590
47	GM4TMS	2,974	259	76XA	887
48	G0BRC	2,918	326	01GH	809
49	G6NLD	2,784	382	93JB	882
50	G3AFT	2,775	320	01EW	760
51	G4VHF	2,696	270	92WE	795
52	G3SPG	2,616	366	91MA	-
53	G3PRC	2,494	273	80AQ	-
54	G2SU	2,421	311	93BS	809
55	G6BSE	2,379	237	02HE	929
56	G3ZTT	2,038	272	83PF	960
57	G14UUC	1,963	208	74BS	1,011
58	G3CNX	1,820	214	93VJ	806
59	G3AHD	1,783	231	83MJ	919
60	G6PNB	1,751	226	81TL	991
61	G4SSD	1,494	137	80FJ	945
62	G3KUE	1,182	148	84SA	587
63	GM8SVB	926	110	87SP	601
64	G4RWO	432	50	84KG	561
65	GM3ZET	395	28	90HM	686

144MHz RESULTS - RESTRICTED SECTION

Posn	Callsign(/P)	Points	QSOs	Loc	Best dx (Km)
1	GW4MGR	6,407	714	83JA	934
2	GW6GW	6,084	635	81NV	1,036
3	G6EKR	5,082	476	01OI	788
4	GW0DAY	4,394	526	82JU	905
5	G3VRE	3,859	472	91CL	942
6	G3NJA	3,742	276	80FN	971
7	G4SWX	3,653	349	01QX	721
8	G0GLE	3,254	340	93PW	696
9	G4KSK	3,241	367	91XG	1,034
10	G8NWM	3,220	270	92TR	961
11	G3TCR	3,177	403	91KF	889
12	G4WAW	2,895	343	81QJ	982
13	G8EYV	2,782	376	02AD	789
14	G6XRS	2,376	340	92MD	771
15	GW3CSA	2,338	318	83JG	876
16	G4CTU	2,234	282	82RJ	1,048
17	G3FJE	2,215	272	92VB	809
18	G3ASR	2,198	276	91VR	764
19	G4BRA	2,186	198	80ST	948
20	G0ERA	2,184	318	92CA	-
21	G4AHG	1,994	231	81TK	940
22	GM4AGG	1,962	170	75QS	924
23	G1OHM	1,712	227	82XJ	874
24	G3ZBI	1,707	231	93BA	789
25	G3HIU	1,700	239	92PE	780
26	G1DMO	1,700	235	01AH	824
27	G6GS	1,677	218	91TF	876
28	G8TNK	1,660	224	01BH	844
29	G4ATH	1,660	181	83MT	845
30	G5ZG	1,513	185	01DW	842
31	G4NWZ	1,469	188	92PG	821
32	G1MDG	1,367	227	91PQ	884
33	G3NFC	1,325	185	92BV	901
34	G1RCD	1,323	104	70XN	942
35	G4EHW	1,246	166	92TN	710
36	G0ECC	1,219	104	70MI	885
37	G1IUQ	1,159	149	93JK	745
38	G3WXX	1,141	181	91OS	585
39	G0CRW	1,126	178	01CF	781
40	G6BRH	1,116	143	01GV	774
41	G4FUR	1,096	148	91VG	866
42	G3CZU	1,075	169	91UG	745
43	G4SJM	996	131	94DD	509
44	G4XOT	938	126	82VJ	863
45	GM3VLB	938	94	85SP	593
46	G3JYP	108	14	84UR	523

Checklogs gratefully acknowledged from: G1LKA, G8HAC, G0HGA, GM8XFT/P, G6DZH, G8ZRE, G3NKS/P, G6VX/P, G4OSJ, G18NBM/P, and YU3DGO.

Disqualified: G4CRA/P, G3FYQ/P, G8PHN/P (VHF NFD Rule 2)
G1AMX (VHF NFD Rules 2,3,5)
G5MW/P, G3GWB/P (VHF NFD Rule 3)
G4Euz/P (VHF NFD Rule 10)

144MHz RESULTS - SWL SECTION

Posn	Callsign	Points	QSOs	Loc	Best dx (Km)
1	BRS32525	1,684	202	01AL	833
2	BRS25429	1,150	124	93FX	667
3	BRS25243	720	94	83LT	520
4	BRS28198	311	43	00HX	650

432MHz

This year's good weather made a welcome contrast to last year's NFD, bringing with it the conditions that we had all hoped for. Even the dreaded Syledis seemed to be less of an annoyance for most, so may be somebody does read the results after all. However, judging by the appalling logging standards, I suspect that last year's comments weren't read by this year's contestants.

Once again the Restricted Section was decided more by the logging than in the operating, with half of the claimed top 10 losing at least 20 per cent of their claimed scores. Under the General Rules (19) these could be liable for disqualification, but as almost a third of all logs submitted were as bad, no action has been taken this year—standards must improve to avoid harsh penalties in the future.

Almost all the errors were from missing or superfluous suffixes and prefixes leading to numerous unmarked duplicates in logs that simply hadn't been checked

properly before posting. Do you need more time? Should we delay the results until a later *Rad Com* in future?

A worrying trend was the number of "contacts" made with a station while that station was actually working a third party. Contrary to opinion, these are not valid and confirm what was said last year: IT IS ESSENTIAL FOR BOTH PARTIES TO EXCHANGE AND CONFIRM BOTH CALLSIGNS (including suffixes etc) as accurately as the rest of the information.

Please, for the sanity of the adjudicators, take more care in the contest exchange. It is not sufficient just to insert /P after every Continental callsign as one station did, but it is essential to ensure that it is really you that they are working.

As for conditions on the day, they were mostly superb, particularly in the south and east and for those elsewhere with high erp, with the band open in almost any direction from LA through HB to EA. Those further north were denied the dx and found things very hard as few beamed in their direction. While you peruse the best dx column spare a thought in particular for GM8PNP who only heard one station in the whole 24h.

Finally, congratulations to the winners and runners-up, and thanks to all the entrants whose comments on the logs helped brighten up my task with the red pen. G4NBS

EQUIPMENT USED BY LEADING STATIONS ON 432MHz

	Transmitter	Receiver	Antenna
G4EZT/P	FT901 plus transverter	MGF1402 preamp	17el MET
G4YHF/P	Homebrew transverter	SRA-2H mixer	21el
G0EKR/P	IC475	MGF1402 preamp	21el
		FET mixer	
G8TFI/P	Belcom LS707	MGF1402 preamp	8 x 19el at 14m
	2 x 4CX250	FT726	
G4THB/P	TS780	MGF1402 preamp	252el array at 17m
	2 x 4CX250	TS780	
G4CLA/P	TS770	MGF 1400 preamp	8 x 21el at 12m
	2 x 4CX250	TS770	

432MHz RESULTS - RESTRICTED SECTION

Posn	Callsign(/P)	Points	QSOs	Loc	Best dx	Km
1	G4EZT	2,060	236	01QX	OZ8SMA/P	810
2	G4YHF	1,553	133	92TR	OZ9FW	877
3	G0EKR	1,462	184	01OI	LAIYCA	862
4	GW0DVV	1,439	204	83JA	OZ2EDR/P	923
5	G4WGE	1,419	191	91XG	SM6HYG	1,154
6	G4TDL	1,343	144	80ST	OZ7TOM/P	986
7	G0BCG	1,309	171	81QJ	F8CH	913
8	G3TAD	1,188	155	81TK	F6HTJ/P	1,055
9	G8OHM	1,147	173	82XJ	OZ6HY	834
10	G3LRS	1,139	221	92MO	OZ1FKZ	817
11	G8CAR	975	155	91PQ	OZ2EDR/P	861
12	G4RCD	973	88	84UR	DK4LI	780
13	G4CW	946	135	01BH	OZ1FKZ	847
14	G0HAS	943	134	91CL	OZ7TOM/P	899
15	G8HSG	940	94	93PW	-	-
16	G8JJR	909	142	93JK	OZ9FW	897
17	G3OLU	867	109	01GV	OZ1FKZ	782
18	G4XIP	840	122	91KF	OZ1FKZ	919
19	G8PTP	816	126	92VB	OZ1FKZ	811
20	G8PPQ	764	112	01AH	OZ1FKZ	851
21	G1ALF	745	113	02AD	OZ2EDR/P	789
22	G8NJA	724	108	80FN	HB9FG	905
23	G4SXE	705	117	92BV	PA0GUS/P	492
24	G3LZT	689	125	82RJ	F1KLI/P	877
25	G0EMS	643	112	92CA	DF1VM/P	-
26	G3SHY	627	98	91VR	OZ1FKZ	837
27	G0GBB	620	114	92PG	OZ2EDR/P	821
28	GW6BK	594	105	81NV	GM0FRT/P	561
29	G1RCD	520	55	70XN	DF1VM/P	799
30	GM0ETC	519	44	75QS	FF6KBP/P	753
31	G6GOL	510	81	01DW	OZ1FKZ	793
32	G8KGC	494	102	93BA	PA0GUS/P	541
33	G8MKC	471	76	92PE	OZ7TOM/P	791
34	G6GMW	437	65	83MT	OZ2EDR/P	871
35	G6XVW	410	94	91UG	F3AS/P	689
36	G6HC	384	88	91VG	GM4TXX/P	488
37	G1WKS	365	113	01CF	-	-
38	G1SEW	325	60	82VJ	PA0GUS/P	522
39	G1WCY	280	35	94DD	OZ2EDR/P	863
40	G4DXW	256	51	92TN	PA0EME	420
41	GM4KHS	250	45	85SP	-	-
42	GW4VPC	180	35	83JG	-	-
43	G4MXB	60	9	70MI	HB9AOF/P	810

432MHz RESULTS - OPEN SECTION

Posn	Callsign(/P)	Points	QSOs	Loc	Best dx	Km
1	G8TFI	7,621	547	01KK	SM4KYN	1,207
2	G4THB	6,846	432	94RJ	F1KLI/P	1,079
3	G4CLA	6,153	475	03BF	SM4KYN	1,093
4	G4JAR	4,702	335	80CO	EA8BEX	2,759
5	G4LOJ	4,505	364	02QQ	OZ4HAM/P	927
6	G8XVJ	3,549	369	93AD	DK7ZB	977
7	G6TJW	3,493	320	93UK	OZ4HAM/P	1,005
8	G0FRR	3,445	316	80WP	OZ1FKZ	1,013
9	G4HGU	3,333	298	81CC	FC1DLL	1,087
10	G5LK	2,972	270	01OC	SM6HYG	1,032
11	G0DCG	2,829	293	01DH	SM6HYG	1,052
12	G3SEK	2,487	298	91FN	LA8AK	946
13	G2CPM	2,438	283	91GI	OZ8SMA/P	1,014
14	G1HHH	2,348	239	00HU	OZ7TOM/P	848
15	G3WTP	2,312	250	92WE	OZ2EDR/P	796
16	GM6TKS	1,993	198	84AT	OZ6ARC/P	855
17	GM4TXX	1,897	169	74NP	PA0GUS/P	697
18	G3ZPB	1,872	219	01JP	SM6HYG	989
19	G1KAR	1,858	188	00DR	OZ7TOM/P	903
20	G8NEH	1,803	223	90MX	OZ1FKZ	929
21	G3WZT	1,725	214	90SV	OZ2EDR/P	906

Posn	Callsign(/P)	Points	QSOs	Loc	Best dx	Km
22	G6LPZ	1,663	214	90WV	OZ1FKZ	893
23	G3GRS	1,622	203	01LD	LA3VW	966
24	G3AMH	1,556	140	93RS	OZBERA/P	856
25	G0CCC	1,534	218	91IH	F8CFO	891
26	G3FVA	1,490	230	93BF	F6GZC/P	947
27	G4CQR	1,454	224	93AC	OZ1FKZ	847
28	G6FRS	1,343	184	91OF	F1KLI/P	730
29	G4DSF	1,334	214	92HD	OZ1FKZ	869
30	G4TNB	1,270	152	01HR	H89FG	740
31	G3PGN	1,207	170	02DA	OZ1FKZ	911
32	G61FU	1,186	170	92NP	OZ9FW	911
33	G4PJO	1,153	128	80LV	OZ7TOM/P	1,006
34	GW1RCC	821	145	83LB	PE1EWR	480
35	GW8AB1	735	122	82JG	PA3DEA	582
36	GM0FRT	722	62	86RW	G4JAR/P	709
37	G6RSE	704	116	01EN	F3AS/P	699
38	G8DDC	693	141	91RU	DJ3DZU	486
39	GW4WMK	686	71	71OW	FF6KBF/P	940
40	G0E1Y	670	149	82QU	PE0MAR/P	547
41	G6LKB	617	74	84KG	PA0GUS/P	578
42	G1LHD	569	157	01GH	OZ2EDR/P	823
43	GJ6TMM	560	58	89WG	GM6TKS/P	628
44	G8ZTT	533	108	83PF	OZ2EDR/P	883
45	G1RZR	522	109	92JB	DALUM	635
46	G8VPE	490	60	03JH	OZ1FKZ	677
47	G8VER	486	124	91SR	OZ1FKZ	847
48	G8R1P	462	63	84SA	FF6KBF/P	587
49	G6CEP	437	47	70PP	F3AS/P	836
50	G3ZVW	416	79	91MA	F1KLI/P	753
51	G8DWL	402	118	01EW	OZ2EDR/P	786
52	GM0GDL	401	43	76XA	PE0MAR/P	696
53	G4WVM	400	107	91UT	OZ1KLU	770
54	G14PHA	388	45	74BS	G6LPZ/P	-
55	GW6DDB	375	77	73UJ	PA0GUS/P	648
56	G8WCL	361	60	83MJ	FF6KBF/P	472
57	G4GCT	359	92	81TL	OZ7TOM/P	928
58	G4EMW	351	108	93BS	OZ1FKZ	810
59	GM0HLK	333	73	85DJ	PA0GUS/P	644
60	G4HTD	224	39	80AQ	PE0MAR/P	579
61	G6BUT	109	45	01BR	-	-
62	G4EBK	107	23	93VJ	PI4YRC	339
63	G0CDB	8	6	80PJ	-	-
64	GM1CBZ	7	3	87SP	GM3JFG	94
65	GM8PNP	1	1	90HM	-	-

Checklogs gratefully acknowledged from: G4IDF, G4OSJ/P, G4FPQ, G6DZH, GM8XPT/P, G8PW, G8HAC, YU3DGO and GI8NBW/P

Disqualified: G4WFR/P, G6FUM/P, G8PHN/P (VHF NFD Rule 2)
G4OCQ/P (VHF NFD Rule 10)

432MHz RESULTS - SWL SECTION

Posn	Callsign(/P)	Points	QSOs	Loc	Best dx	Km
1	BRS32525	512	85	01AL	F6GZC/P	721
2	BRS25429	431	48	93FX	OZ2EDR/P	779
3	BRS2543	330	44	83LT	PA0GUS/P	565
4	BRS28198	74	16	00HX	G4HGU/P	305

Microwave

VHF NFD 1987 has proved to be the best ever for the microwave bands, with the leading scores some three times up on 1986. The reason for this was a prominent duct over the North Sea which was accessible to stations in the eastern part of the country. Stations in the west and in Scotland did not, however, enjoy the superb conditions, as the duct only seemed to penetrate some tens of miles inland, although there were a few fortunate exceptions. The layer bounding the duct was clearly visible from the North Downs at the start of the contest, some 100 miles from the east coast. The result was that 1,296MHz sounded more like 144MHz, and 2,320MHz was even better than 1,296MHz although there were far fewer stations to work.

Logging standards were excellent, with few exceptions, making the adjudicator's task manageable in spite of the level of activity. There were no disqualifications, but a few entrants were careless in recording time, and some points have been lost because of this.

This year the Restricted Section was limited to the 1,296MHz band, and this has caused a lot of controversy with opinions fairly evenly divided. Your views will be extracted from the logs for analysis, and those who have not yet registered an opinion are asked to write to the VHF Contests Committee well before the end of the year when rules for 1987 come under scrutiny. In one extreme it has been suggested that both 1,296 and 2,320MHz should stand on their own for both Open and Restricted sections.

Overall, all participants enjoyed themselves, thanks to both the weather and conditions.

EQUIPMENT USED BY THE LEADING STATIONS IN THE MICROWAVE SECTION

OPEN SECTION	
G0FRE/P (23)	FT225 + transverter + 2 x 2C39A pa Receiver rf: MGF1412-08 Antenna: 4 x 55el F9FT stacked Yagis
(13)	FT221 + transverter + 2C39A pa Receiver rf: MGF1412-08 Antenna: 1.2m dish
G4CBW/P (23)	TS700 + transverter + 2 x 2C39A pa Receiver rf: NE72089 Antenna: 16 x 23el
(13)	TS700 + transverter + 2C39A pa Receiver rf: MGF 1412 Antenna: 2.5m dish
RESTRICTED SECTION—1,296MHZ ONLY	
G4DDK/P	HB transverter + 2C39 pa Receiver rf: MGF1202 Antenna: 1.8m dish
G4ICM/P	IC271 + MM transverter + 2C39 pa Receiver rf: no information given Antenna: 1.5m dish

1.3/2.3GHz BAND RESULTS - OPEN SECTION

		1.3GHz		2.3GHz	
Posn	Callsign(/P)	Points	QSOs	Points	QSOs
1	G0FRE	3,053	01KK	2,463	209
2	G4CBW	2,899	03BF	2,180	178
3	G4HWA	2,883	94RJ	2,262	158
4	G0ALE	2,065	80CO	1,697	132
5	G4ANT	1,751	02QO	1,522	146
6	G4CCH	1,672	93UK	1,672	145
7	G3BSN	1,668	01DH	1,668	170
8	G3CKR	1,637	93AD	1,261	136
9	G3ZTR	1,455	93RS	1,214	102
10	G3GRO	1,415	01OC	1,053	126
11	G3WOI	1,382	91GI	1,055	123
12	G3NNG	1,286	91FN	1,154	129
13	G3YKI	1,137	91RU	1,137	131
14	G8XIR	1,119	01LD	1,119	134
15	G3ULT	1,039	91IH	814	100
16	G8VOI	992	90MX	901	112
17	G4JKN	888	81CC	888	87
18	G8TB	774	01JP	627	89
19	G4PWA	746	01HR	746	103
20	G3UHF	727	93BF	707	90
21	G4FRS	617	91OF	617	88
22	G3NPF	606	90SV	606	80
23	G4JTB	589	92WE	589	90
24	G4WHO	576	80WP	563	66
25	G4OOR	489	92NP	489	71
26	G4AEZ	472	91MA	472	64
27	GM8ACG	449	83LB	449	68
28	G1DVU	440	90WV	440	62
29	GM4BYF	402	74NP	402	40
30	G4ENR	271	93BS	271	40
31	G4GBT	268	02UM	268	33
32	G4HRY	232	92HD	232	39
33	G1DOX	222	84KS	222	32
34	G4UCW	220	02HE	220	34
35	G3DCZ	156	93AC	156	39
36	G6FOE	68	02DA	68	17
37	G3HPCY	41	89WG	41	7
38	GW4UKW	26	73UJ	26	7
39	GM6MGS	6	86RW	6	2

1.3GHz BAND RESULTS - RESTRICTED SECTION

Posn	Callsign(/P)	Points	Loc	QSOs	Pwr
1	G4DDK	1,475	01QX	162	20
2	G4ICM	1,475	01OI	158	25
3	G4JDI	1,035	92MO	114	25
4	G0FCT	877	80ST	88	25
5	G3OHM	876	82XJ	108	20
6	G8APB	766	91KF	94	25
7	GW6SNO	594	83JA	81	25
8	G3VCT	584	91OS	98	20
9	G4ODA	583	92TR	65	25
10	G1ATQ	533	92VB	79	23
11	G4ELZ	525	80FN	46	10
12	G8BHD	519	01BH	81	10
13	G4RCE	518	84UR	47	22
14	G3IGQ	461	91XG	72	0.7
15	G3COJ	452	91PQ	71	10
16	G6KRC	393	82RJ	67	25
17	G6KWA	379	02AD	53	0.1
18	G4UXX	286	92CA	50	2
19	G4RMD	247	91VR	44	10
20	G6KUI	229	93BA	43	2
21	G4XYW	196	91TF	48	25
22	GM0GCG	156	75QS	12	25
23	GW4JKV	125	81NV	25	1
24	G6XVV	113	93JK	17	0.5
25	G3ZKI	95	81TK	21	1
26	GW1OCA	72	83JA	18	-
27	G8KBH	71	83MT	13	1.8

Checklogs gratefully acknowledged from: GI8NBW/P, YU3DGO
Disqualified: G0HEG/P (VHF NFD Rule 2)

1,296 MHz Trophy Contest 1987 results

This year's 1,296MHz Trophy saw fairly average conditions but at least the weather was generally good after mist and rain reported at most locations during the previous night's 432MHz contest. Surprisingly the portable entry was a little disappointing this year. Most entrants enjoyed the event and generally activity was very high although it was apparent that far too many stations simply call CQ and rarely tune. This may work on the lower bands but some tuning, calling and rotating is essential to maximise the strike rate on the microwave bands especially in these fairly short events.

The log keeping standards were generally good but all operators must be more careful with the copying and recording of serial numbers; cross checking is straightforward as most entrants worked each other; don't guess—"if in doubt send rogers" should not apply in contests.

Little dx was worked, only nine QSOs being over 500kms, seven by G0FRE/P located in Devon! Two groups used large arrays of sixteen Yagis, although these produced good results little dx was captured. Was most of the power sent out in side-lobes due to phasing errors?

Geographical location and system quality proved a finely balanced equation as usual in these events with average points/contact and quantity of QSOs just working in favour of GW4LIP/P in the portable section. The fixed station section provided a close fought battle between G3JXN and G0ALE, the latter just making enough extra contacts to win the section.

Congratulations to the winners and runners-up in both sections. Many thanks to all entrants and the Parallel Lines CG will be awarded the VHFCC Trophy subject to approval by Council.

G8TFI

FIXED STATIONS

Posn	Callsign	Points	QSOs	Loc	Best dx (kms)	Pwr	Ant
1	GOALE	367	75	01AH	399	400	4 x 23
2	G3JXN	361	69	91UM	398	100	4 x 23
3	G8IFT	329	61	82XJ	322	150	4 x 23
4	G8XIR	318	56	01EJ	385	230	6ft DISH
5	G4SIV	252	42	92TR	379	100	6ft DISH
6	G8OHM	243	49	92AJ	317	100	4 x 23
7	G4NBS	226	40	02AF	330	10	4 x 23
8	G4LU	225	37	82LT	326	110	4 x 23
9	G4ZTR	198	43	01LV	366	80	55
10	G4VHF	165	40	92QB	218	25	2 x 23
11	G8HHI	153	34	91OH	282	50	15/15
12	G4PMK	150	28	93GT	386	50	23
13	G6HKM	145	27	01FT	332	10	23
14	G1KDF	131	23	83NN	327	10	4 x 23
15	G8CHW	122	32	91TO	273	10	48
16	G3XBY	103	23	92DG	234	6	55
17	G8NEY	97	15	81VK	262	100	15/15
18	G1PPY	76	19	92NF	180	1	23
19	G6LOH	37	9	92IC	187	1.3	4 x 23

ALL OTHERS (PORTABLES)

Posn	Callsign	Points	QSOs	Loc	Best dx	Pwr	Ant
1	GW4LIP	728	93	83KB	549	300	16 x 23
2	G0FRE	708	56	80AQ	662	150	2 x 55
3	G3CKR	653	91	93AD	486	200	16 x 23
4	G6EKR	349	50	01OI	369	120	6ft DISH
5	GW4MGR	240	36	83JA	352	40	4 x 23
6	G3UHF	239	46	93BF	316	50	2m DISH
7	G0AWP	235	31	94OA	428	30	23
8	GW4GFX	75	13	82JG	247	2	23
9	G4RGK	69	17	91ON	240	1.5	23
10	G6CSY	38	10	01BH	295	0.8	23
11	GM0GCG	13	1	75OR	316	20	2 x 23

CW Cumulative Contests 1988 (1-8, 3-5 and 7MHz) rules

Will entrants please note that there are some changes to the rules and awards from previous cumulative events.

1. Dates and times.

1-8MHz. Monday 4 January, Tuesday 12 January, Wednesday 20 January and Thursday 28 January. All sessions from 2000 to 2200gmt.

3-5MHz. Sunday 3 January, Saturday 9 January, Sunday 17 January and Saturday 23 January. All sessions from 1000 to 1200gmt.

7MHz. Saturday 2 January, Sunday 10 January, Saturday 16 January and Sunday 24 January. All sessions from 1000 to 1200gmt.

2. Frequencies. All contacts must be between 1,835 and 1,865kHz, 3,520 and 3,550kHz, and 7,015 and 7,040kHz, cw (A1A) only.

3. Eligible entrants. All entrants must be members of the RSGB.

4. Sections. Single-operator and SWL. All stations must operate from the same location for all sessions. Entrants may enter any number of sessions they wish, but only the three best sessions on any one band will count and the others (if entered) will be treated as checklogs. The sessions on each frequency band will be treated as a separate contest from those on another band.

5. Exchanges.

(a) Transmitting Section. Stations may be contacted worldwide. Stations may only be contacted once in each session, but may be worked again in other sessions. The contest exchange is RST and serial number (starting at 001 for each session). Report and serial number (when sent) must be logged.

(b) SWL Section. Stations may only be logged once in each session. The call sign of the station logged together with the RST and serial number sent and the call of the station being worked constitute a log entry. The call signs of the stations being worked may only repeat in every three contacts logged.

6. Scoring. Three points may be claimed for each completed contact or swl complete entry. The total contest score is the sum of the best three sessions on each band.

7. Logs. should be sent to: RSGB HF Contests Committee, c/o G4RWW, 279 Addiscombe Road, Croydon CR0 7HY, to arrive not later than 8 February 1988. A coversheet showing the name, address and call sign of the entrant together with a signed declaration that the entrant has observed the rules and spirit of the contest is required. All claimed scores must be totalled for each band (untotaled entries will be treated as checklogs).

8. Awards.

(a) The leading transmitting station having the highest aggregate score for the three best sessions will receive a certificate. (Separate certificates will be awarded for each of the three bands.)

(b) Subject to there being a minimum of five swl entrants, a certificate will be awarded to the entrant with the best log (separate certificate for each of the three bands). If there are less than five entrants, swl awards are at the discretion of the committee.

(c) To encourage newly-licensed entrants, a certificate will be awarded to the best log from a first-time entrant, as defined in the general rules for hf contests to be published in *Rad Com* January 1988.

(d) A certificate will be awarded to the longest-licensed entrant. To be considered for this award, entrants must state the date they received their first full (not AA) transmitting licence.

Affiliated Societies Team Contest 1988 rules

1. General. The 1988 rules follow the general pattern established in earlier events. Apart from a minor change to the operating frequencies to fall in line with agreed IARU Region 1 policy (Rule 5), the retention of the experimental "QRS CORRAL" and the addition of a "dupe" sheet (Rule 8) and some alterations to the award of certificates, there are no other changes to the rules.

2. When. 1300 to 1700gmt Sunday 10 January 1988.

3. Teams. This is a competition between teams of up to five stations, with each team representing an RSGB affiliated society. Each affiliated society may enter as many teams as they wish. The composition of a team is determined by the society entering the event, and no change will be made to the composition by the HF Contests Committee during adjudication. The team placing will be determined by the aggregate of the checked points achieved by each of the stations in the team. Club secretaries are responsible for the entry and must include a summary which shows the calls, individual claimed scores for each station in the team, and the

total claimed aggregate team score. If a club enters more than one team, a summary is required for each of the teams.

4. Eligible entrants.

(a) Each entering club must be affiliated to the RSGB.

(b) Each operator of a team station must be a member of the club he/she represents (he/she need not be a member of RSGB).

(c) All stations representing a club must be located and operated within a radius of 50 miles of the normal club meeting place. In the case of a "national society" such as RNARS, each team may define its local separate meeting place (eg, a naval base), but in such cases, other than the indication of affiliation, each such team will be considered to be entirely separate.

(d) Each entrant may be single or multiple operator, but no station may represent more than one affiliated society.

5. Contacts. CW (A1A) only in the band 3,510 to 3,560kHz, with the recommendation that 3,550 to 3,560kHz be reserved for slower speed contacts. (Note: this is a change from previous rules.)

6. Exchange RST and serial number commencing with 001.

7. Scoring. 10 points per contact. Entrants are reminded that each unmarked duplicate for which points are claimed will be penalised at 10 times the points claimed (viz 100 points). Stations having more than five unmarked duplicates will be excluded from the contest.

8. Entries.

(a) Each individual entry must conform to the general rules for RSGB hf contests to be published in *Rad Com* January 1988.

(b) Each log must be accompanied by an hf contest summary sheet (Form HFC2).

(c) Each log must be accompanied by a "dupe" sheet listing all the call signs worked in alphabetical order. Duplicate contacts must be so marked. (Note: this is a change from previous rules.)

(d) Each team entry must be accompanied by the team summary sheet as defined in Rule 3, and a declaration signed by an officer of the affiliated society that each entrant operator is a member of that society. The normal meeting place of the society must be stated on this declaration.

(e) All entries from each competing society are to be sent in one package to RSGB HF Contests Committee (AFS), PO Box 73, Lichfield, Staffs WS13 6UJ. Packages underpaid and bearing postage-due stamps will be refused and returned to the sender. Packages must be postmarked not later than Monday 25 January 1988. Entrants must ensure that logs are well packed to avoid damage or loss in transit.

9. Awards.

(a) The Edgware Trophy will be awarded to the leading AFS.

(b) A certificate of merit will be awarded to the second and third placed AFS. (Note: this is a change from previous rules.)

(c) A certificate of merit will be awarded to the station having the highest individual score.

May 1987 432 MHz-24GHz Contest results

In contrast to last October's UHF contest this one saw the weather and radio conditions at their worst. Almost every entrant commented on how bad things were and as a result activity in the UK was significantly down on previous events. At one time or another the whole of the country suffered cold, strong winds with horizontal rain, hail or snow.

It is interesting to note therefore that some reasonable dx was still worked by many stations showing just what can be achieved when there is activity even under poor conditions. It was also nice to see activity from the more remote areas of the UK, with EI, GM and the West Country all active on 432MHz providing many points for those that chose to look for them. Stations in the south-east had reasonable conditions to the east before the rain front hit them and enjoyed the enhancement it brought before suffering the consequences for the rest of the contest. Those in the Midlands had poor conditions to begin with but those up early enough caught the "dawn lift" as the weather improved.

Generally the log keeping was good but several points were lost by careless errors in call signs and suffixes. The rule allowing crossband contacts was well received and seems to be achieving its aim as more stations are now giving the higher frequencies a try even when the path looks unlikely.

The only complaints received were about stations not beaming around the UK; with G1GEY convinced that he had heard a new beacon beaming south-east from Kent and G6MXL only raising 5 stations. Several commented that they were glad they were not out portable and those that were found keeping dishes aligned on the higher frequencies almost impossible. With this in mind congratulations to all the band winners and in particular to the Overall Winners, Hadrabs and Addiscombe CG for being the only group to put stations on all bands while their rivals were too busy holding their equipment down to operate it. Thanks also to everyone for their support in this event.

G4NBS

OVERALL TABLE (MULTI-OPERATOR SECTION)

Posn	Group	Points	Band position						
			432 MHz	1-3 GHz	2-3 GHz	3-4 GHz	5-7 GHz	10 GHz	24 GHz
1	Hadrabs & Addiscombe CG	5,866	3	3	2	2	1	2	1
2	Sheppey Western CG	4,000	1	1	1	1	—	—	—
3	The Windbreakers	2,507	6	5	4	—	—	1	2
4	The Hillbillies	2,272	4	2	3	—	—	—	—
5	Warrington CG	1,941	2	4	5	—	—	—	—
6	S. Manchester RC	1,012	5	6	6	—	—	—	—
7	Luton VHF Group	200	7	—	—	—	—	—	—

OVERALL TABLE (SINGLE-OPERATOR SECTION)

Posn	Callsign	Points	432MHz	1-3GHz	2-3GHz	3-4GHz
1	G6DER	2,295	7	6	4	1
2	G4DDK	2,000	—	1	1	—
3	G3JXN	1,932	3	3	2	—
4	G8IFT	1,309	11	2	3	—
5	G6XVV	1,154	1	10	—	—
6	G8GDZ	1,019	—	4	5	—
7	G1LSB	839	2	—	—	—
8	G4PMK	604	—	7	7	—
9	G6CSY/P	595	6	8	—	—
10	G8ZQB	573	10	9	6	—
11	G4FOH	474	4	—	—	—
12	G4LU	461	—	5	—	—
13	G6MXL	98	11	—	—	—

432MHz MULTI-OPERATOR									
Posn	Callsign (P)	Loc	Points	QSOs	Best dx	Km	Pwr (W)	Ant	
1	G8TFI	01KK	2,445	255	OZ1KLU	741	400	8 x 19ele	
2	G4RNL	93AD	2,393	255	DF9ZP/P	787	400	252ele	
3	G4PUB	01QI	2,284	238	—	—	350	4 x 21ele	
4	G4THB	94RJ	2,048	168	DF9ZP/P	766	400	252ele	
5	G3FVA	93AF	869	156	DF0AP	745	150	4 x 23ele	
6	G4ZTR	01PU	865	101	HB9RDB/P	673	300	4 x 21ele	
7	G4LBH	91RU	488	113	—	—	150	2 x 46Mbm	

432MHz SINGLE-OPERATOR									
Posn	Callsign	Loc	Points	QSOs	Best dx	Km	Pwr (W)	Ant	
1	G6XVV	93JK	559	73	DK9VD/A	707	60	21ele	
2	G1LSB	02CT	469	63	DF0AP	601	80	21ele	
3	G3JXN	91UM	305	43	—	—	120	4 x 21ele	
4	G4FOH	92XI	265	39	DK0VS/P	564	5	21ele	
5	G1EHJ	92EO	224	57	PA0GUS/P	479	8	19ele	
6	G6CSY/P	01BH	201	43	G4THB/P	346	50	19ele	
7	G6DER	93GN	171	24	DK3FB/P	692	60	21ele	
8	G6HLL	83RE	138	36	GM0DGL	338	50	19ele	
9	G1GEY	94FW	119	22	G4JCC	464	100	2 x 17ele	
10	G8ZOB	92JN	59	11	PE0MAR/P	358	40	19ele	
11	G8IFT	82XJ	55	13	G4PUB/P	260	25	21ele	
12	G6MXL	80XR	55	5	PE0MAR/P	449	30	48Mbm	
13	G3ILO	81VQ	50	6	G4KUX	325	10	19ele	

1-3GHz MULTI-OPERATOR									
Posn	Callsign (P)	Loc	Points	QSOs	Best dx	Km	Pwr (W)	Ant	
1	G4ZAP	01KK	486	68	HB9SAX/P	642	180	2m dish	
2	G4HWA	94RJ	480	51	PA0WMX	516	350	202ele	
3	G0ALE	01QI	461	73	—	—	400	2m dish	
4	G3CKR	93AD	361	57	PA0WMX	537	150	368ele	
5	G4BCH	01PU	328	46	DL4EBB	418	50	2.6m dish	
6	G3UHF	93AF	257	36	G0ALE/P	307	90	2m dish	

1-3GHz SINGLE-OPERATOR									
Posn	Callsign	Loc	Points	QSOs	Best dx	Km	Pwr (W)	Ant	
1	G4DDK	02PA	228	32	DL1EBR	333	50	4 x 23ele	
2	G8IFT	82XJ	124	28	F1COW/P	379	150	4 x 23ele	
3	G3JXN	91UM	114	24	—	—	100	4 x 23ele	
4	G8GDZ	92AK	107	23	G0ALE/P	257	100	4 x 23ele	
5	G4LU	82LT	105	25	G0ALE/P	336	110	4 x 23ele	
6	G6DER	93GN	86.5	25.5	G4ZAP/P	284	100	1.4m dish	
7	G4PMK	93GT	81	23	G4ZAP/P	307	50	23ele	
8	G6CSY/P	01BH	53.5	8.5	G3UHF/P	256	0.8	23ele	
9	G8ZOB	92JN	40.5	9.5	G0ALE/P	222	40	27ele QLY	
10	G6XVV	93JK	35	11	G4BCH/P	243	0.25	1.4m dish	

2-3GHz MULTI-OPERATOR									
Posn	Callsign (P)	Loc	Points	QSOs	Best dx	Km	Pwr (W)	Dish	
1	G0FRE	01KK	5,421	30.5	—	—	45	1.2m	
2	G4ALE	01QI	5,032	26	G4XUM/P	362	35	1.6m	
3	G4XUM	94RJ	2,417	12	PE1ALA	413	35	2m	
4	G4VIX	01PU	2,223	17	—	—	4	2m	
5	G4CDA	93AD	1,189	13	—	—	40	2m	
6	G8SMR	93AF	696	9.5	G0FRE/P	277	0.2	0.9m	

2-3GHz SINGLE-OPERATOR									
Posn	Callsign	Loc	Points	QSOs	Best dx	Km	Pwr (W)	Ant	
1	G4DDK	02PA	1,847	16	PA0EZ	268	2	44ele QLY	
2	G3JXN	91UM	1,636	12	—	—	25	1.2m dish	
3	G8IFT	82XJ	1,232	11	G4ALE/P	261	20	44ele QLY	
4	G6DER	93GN	1,126	12	—	—	20	1.4m dish	
5	G8GDZ	92AK	1,016	10	G4ALE/P	258	25	1.2m dish	
6	G8ZOB	92JN	533	6	G4ALE/P	222	1	1.5m dish	
7	G4PMK	93GT	459	7	G4CBW	100	8	0.6m dish	

3-4GHz MULTI-OPERATOR									
Posn	Callsign (P)	Loc	Points	QSOs	Best dx	Km	Pwr (W)	Dish	
1	G0FRE	01KK	536	3.5	PA0PLY	302	1.5	0.9m	
2	G4FUF	01QI	200	3	PE0MAR/P	202	0.6	0.5m	

3-4GHz SINGLE-OPERATOR									
Posn	Callsign	Loc	Points	QSOs	Best dx	Km	Pwr (W)	Dish	
1	G6DER	93GN	94	0.5	G4BYV	189	0.3	0.6m	

5-7GHz MULTI-OPERATOR									
Posn	Callsign (P)	Loc	Points	QSOs	Best dx	Km	Pwr (W)	Dish	
1	G4EZP	01QI	12	1	G8KBV/P	—	2mW	0.5m	

10GHz MULTI-OPERATOR									
Posn	Callsign (P)	Loc	Points	QSOs	Best dx	Km	Pwr (W)	Dish	
1	G6CMS	01PU	349	4	PA0PLY	260	40mW	0.75m	
2	G4EZP	01QI	238	5	G6PAE/P	57	—	0.7m	

24GHz MULTI-OPERATOR									
Posn	Callsign (P)	Loc	Points	QSOs	Best dx	Km	Pwr (W)	Dish	
1	G4EZP	01QI	132	3	G6PAE/P	57	7mW	0.3m	
2	G6CMS	01PU	9	2	—	—	7mW	0.4m	

South Manchester DF Qualifying Event results.

Ten teams assembled at the start near Crewe, in fine weather, and good signals were received from both hidden stations. Most competitors decided to locate transmitter "A" first.

Station A, G3FVA/P was hidden some 10 miles ne of the start on Congleton Edge which, being considerably higher than the start, enabled line of sight signals to be received. This deceived many competitors into believing that the station was fairly close to the start! The operators, Dave Holland and John Morrison, had hidden in a small cave halfway up the Edge and had added a disguise of chicken wire with shrubbery attached to it. 1km of antennas added to the fun! First arrival was Brian Bristow at 1426. Some locals picking Bilberries soon became used to being approached by desperate competitors asking if they were the hidden station.

The B transmitter G3UHF/P, operated by Dave Yorke and John McNeil, was located 17 miles se of the start in a large area of woods, canals and the odd lake or two. Pinpointing the exact location was obviously a problem to some teams. The nearest footpath to the site meant a one mile run and incorporated 150 or so steps, much to the dismay of those encountering them! Some teams ran over two miles along the canal bank, obviously putting in extra training in preparation for the National Final! The transmitter was sited above a disused quarry which had been

suitably wired with antennas into ferocious nettles! The operators were befriended by a stray dog which developed a consuming passion for Dave Yorke's nose! First arrival was George Whenham at 1457.

After the event, tea was provided at Jodrell Bank where the usual plethora of excuses were produced by unsuccessful competitors. Brian Bristow, G4KBB, was then awarded the South Manchester Club's DF Cup for achieving first place. Is no one able to nobble "The Professional"?

The South Manchester club would like to thank all who took part and especially those who ran the event.

Time of arrival					
Posn	Name	Club	Stn A	Stn B	
1	B Bristow	Mid-Thames	1426	1539	
2	C Plummer	Mid-Thames	1455	1608	
3	C Wells	S Manchester	1502	1623	
4	G Whenham	Coventry	1624	1457	
5	T Gage	Mid-Thames	1502	1629	
6	J Armitage	S Manchester	1518	—	
7	K Chan	S Manchester	1520	—	
8	D Newman	Northampton	1525	—	
9	A Collett	Dartford Heath	—	1544	
10	C Metcalfe	Mid-Thames	—	1627	

C Plummer and C Wells qualify for the National Final

Marconi Memorial Contest 1986 results

The following table has been extracted from results supplied by I4LCK. Full listings can be obtained from G3FZL, QTHR, on receipt of an A4 size SAE. The 1987 Marconi Memorial Contest takes place on 7, 8 November 1400 to 1400gmt.

SINGLE-OPERATOR SECTION									
Posn	Callsign	Loc	QSO	Score	Posn	Callsign	Loc	QSO	Score
1	DK8ZB/P	JO40	402	131,608	199	G4YFN	IO91	54	9,162
2	I4XCC	JN63	267	123,711	208	G4NBS	JO02	47	8,658
3	DJ5AR	JO51	317	106,018	210	G4OUT	IO92	44	8,228
79	G3XBY	IO92	105	25,987	211	G3ILO	IO81	41	8,220
93	G4WFR	JO01	84	21,822	239	G4BZP/P	IO84	30	6,492
101	GM4CAN/P	IO86	48	20,122	241	G4ZVS	IO92	48	6,333
115	G3OYJ	IO91	79	18,400	242	G4HZF/A	IO93	41	6,276
125	G4ARI	IO92	85	16,239	261	G5UM	IO92	46	4,877
129	G4XEN	IO92	75	15,931	284	G0ATR	IO92	30	3,503
137	G4AGO	IO91	91	14,939	298	G2DHF	JO01	31	2,694
145	G4NDG	IO80	63	13,618	302	G4WVD/P	IO70	8	2,201
160	G4UZN	IO93	57	12,187	332	G0EQO	IO71	8	844
161	G3VIP	IO93	54	12,134					
162	G4HVC	IO93	63	12,026					
163	G3UKV	IO82	55	12,006					
164	G3LET	IO90	52	11,957					
167	G4WVS/P	IO94	48	11,860	1	DL13MEK	JN59	399	148,812
170	G4OTU	JO01	62	11,656	2	I4KLY/4	JN63	293	132,286
173	G0CLP	IO92	64	11,292	3	HG8KCP/3	JN96	353	114,899
175	G4EZA	JO01	50	11,071	45	G4NUT/A	IO91	207	53,518
181	G3ISL	IO94	36	10,573	93	G4VXE/P	IO81	114	27,064
189	G4NSE/P	IO94	46	9,648	95	G4UJS	IO83	123	24,489
198	G4ULS	IO82	48	9,170	109	G4BLX	IO90	87	18,518
					118	G6GS/P	IO91	81	14,139

7MHz Contest 1988 rules

1. The general rules for RSGB HF contests, as published in the "Operating Guide" supplement, *Rad Com* January 1988, will apply.

2. Date and time. Phone: 1200gmt 6 February to 0900gmt 7 February 1988.

CW: 1200gmt 20 February to 0900gmt 21 February 1988.

3. Sections. Single-operator entries only. British Isles entrants must also be members of RSGB. (a) British Isles. (b) European. (c) non-European.

4. Band and mode. SSB: 7.04-7.10MHz. CW: 7-7.03MHz. Entrants in the cw section are requested not to operate above 7.03MHz.

5. Exchange. RS(T) plus serial number starting 001.

6.1 Scoring.

(a)—British Isles section: five points for each completed contact with European stations, fifteen points for each completed contact with non-European stations. British Isles stations may not work each other.

(b)—European section: five points for each completed contact with British Isles stations.

(c)—Non-European section: 15 points for each completed contact with British Isles stations.

(d)—Contacts with GB5CC will count as a country multiplier and 50 points for all contestants.

6.2 Multiplier

(a)—British Isles section: one for each ARRL DXCC country. In addition VE, VK, W and ZL call areas each count as a separate country.

(b&c) European and non-European sections: one for each different British Isles prefix worked, ie G0, G2, G3, G4, G5, G6, G8, G0, GD2, GD3, GD4, GD5, GD6, GD8, G10, G12, G13, G14, G15, G16, G18, GJ0, GJ3, GJ4, GJ5, GJ6, GJ8, GM0, GM2, GM3, GM4, GM6, GM8, GU0, GU2, GU3, GU4, GU5, GU6, GU8, GW0, GW2, GW3, GW4, GW5, GW6, GW8 (maximum of 49).

6.3 Final Score. Total contact points multiplied by total of multipliers.

7. Documentation. Logs to be headed: date/gmt; callsign; RS(T)/number sent; RS(T)/number received; multiplier; points. A summary sheet showing the multipliers worked must be included. Duplicates must be clearly marked without claim for points. Unmarked duplicates will be penalised at the rate of 10 times number of points claimed; logs containing more than five unmarked duplicates, for which points have been claimed, would normally result in disqualification. Each entry must be accompanied by a cover sheet and the following signed declaration: *I declare that this station was operated strictly in accordance with the rules and spirit of the contest and agree that the decision of the Council of the RSGB shall be final in all cases of dispute.*

8. Name and address for entries. Address logs to G3HCT, HF Contests Committee, Brooklands, Ullenhall, Nr Henley in Arden, Warks B95 5NW, England.

9. Date for entries. SSB logs must be received by 30 March 1988, and cw logs must be received by 23 April 1988.

10. Awards. The Thomas (G6QB) Memorial Trophy will be awarded to the leading

British Isles entrant in the cw contest. Certificates of merit will be awarded to the entrants placed first, second and third in the British Isles, European and non-European sections of each contest.

11. Receiving Section.

(1) Transmitting section rules 1, 2, 3, 4, 6, 7, 8, 9 will apply.

(2) A station may appear once only in the column headed "Station heard". The call signs of the stations being worked may only repeat once in every three contacts logged. Logs to be headed date/gmt; call sign of station heard; RS(T)/serial number; call sign of station being worked.

(3) Holders of British Class B licences may enter the receiving section.

(4) Scoring

(a)—British Isles listeners should log only overseas stations in contact with British Isles stations. European stations logged, five points; others, 15 points.

(b)—Overseas listeners should log only British Isles stations participating in the contest. European listeners claim five points, other 15 points.

(5) Multiplier as per rule 6.2.

12. **HF Contest Championship.** Participants in this contest by British Isles stations will count towards the HF Contest Championship for 1988/89.

13. **Data Protection Act.** Entrants should note that the contest adjudicator may enter information from their logs into a micro-computer for the sole purpose of checking for duplicate contacts and preparing contest tabulations. If any entrant objects to this, they must clearly state their objection on the cover-sheet so that the adjudicator can hand-process their information.

The Golden Anniversary Commonwealth Contest 1987 results

The golden anniversary of the Commonwealth Contest proved to attract more entrants than ever before, some 150, and although band conditions were only fair some respectable scores were made. It is remarkable and a tribute to the contest that contacts being made between stations over 50 years ago are still being made today, and the strength of friendship which has resulted and continues to form between participants is surely an essential part of our hobby. The contest also tests an amateur's station and operating skill to the maximum, demanding a good knowledge of band conditions, and the ingenuity to construct even better antennas to weedle out those faint but crucial signals from the noise. The Commonwealth is a dignified contest where manners and experimentation are set against a competitive spirit.

The results

The winner of the Golden Jubilee contest is Lee Sawkins, VE7CC, making this his fifth outright victory in the past 10 years. Lee used a combination of TS820 and L4B driving 3.5MHz inv-V, 7MHz two-element Yagi at 105ft, 14MHz five-element KLM at 100ft, 21MHz four-element Yagi at 85ft. He was closely challenged by John Sluymmer, VE6OU/3 who made over 100 extra QSOs but just lost out on bonus points. Nigel Hoyow, 6Y5HN, drops to third place this year, but I have a feeling we have not heard the last of Nigel if his new QTH is as promising as it sounds. Doug Renwick, VE5RA, made a gallant effort from Barbados as 8P9HG, and must have felt he was in with a chance up until the last few hours when things went quiet from there. Perhaps the biggest improvement has come from Kevin Smith, VK6LW, who ends up in fourth place. This was a clever piece of operation and Kevin made good use of all bands to pick up over 130 bonus points. Could we have a future VK6 winner here? I am beginning to loose count of the number of times Al Slater has won the Col Thomas Rose Bowl. He wins it yet again, but not after a severe testing from first time entrant, Ron Stone, GW3YDX. As Ron said on his entry, "had the contest ended at 0900 I probably would have beaten that old ***** Slater. However I am sure he has done it again on bonuses". Only just Ron, 161 to your 158—not much of a difference after 24 hours.

AWARD WINNERS

Senior Rose Bowl L Sawkins, VE7CC
Junior Rose Bowl J Sluymmer, VE6OU/3
Col Thomas Rose Bowl A Slater, G3FXB
Receiving Rose Bowl C Bradbury, BRS1066

SINGLE-BAND WINNERS

3.5MHz UK G3KSK
7MHz UK G4ODV
14MHz UK G3RZP
3.5MHz O/s VK7ZO
7MHz O/s VK4BRF
14MHz O/s ZL3AGI
21MHz O/s VU2UR

HOW THE LEADERS MADE THEIR SCORES

Call sign	3.5 MHz			7 MHz			14 MHz			21 MHz			28 MHz		
	Q	B	A	Q	B	A	Q	B	A	Q	B	A	Q	B	A
VE7CC	57	37	17	86	46	21	225	64	33	33	24	10			
VE6OU/3	68	30	18	175	52	26	257	44	33	5	5	3			
6Y5HN	71	20	10	138	41	19	254	53	25	11	10	7			
VK6LW	25	20	13	98	37	16	151	49	23	97	28	15	1	1	1
G3FXB	37	20	12	88	50	25	131	72	37	17	17	13	2	2	2
GW3YDX	39	21	13	87	49	26	134	69	36	17	17	13	2	2	2
G4BUO	34	24	15	62	44	25	110	65	34	19	19	15	2	2	2

Q = QSOs

B = Bonuses

A = Areas

TOTALS INFORMATION

Band	QSOs	Bonuses	Points
3.5	1,882	1,252	34,316
7	4,507	2,518	72,496
14	9,127	4,085	126,140
21	1,417	798	22,983
28	56	46	1,200
Totals	16,989	8,699	257,135

Special awards

The special awards given to celebrate the Golden Anniversary have been allocated as follows:

Special Award Dud Charman, G6CJ
Overseas winner Lee Sawkins, VE7CC
UK winner Al Slater, G3FXB
UK receiving winner C Bradbury, BRS1066

The committee discussed at length who should receive the award for giving the most to the contest throughout its history. There were many candidates—some of whom are mentioned later, but it was decided unanimously to present the award to Dud Charman, G6CJ for the length of time he has participated in the contest, and for the skill in operating he has shown over the years. Dud entered his first BERU contest in 1936, and has been present ever since. Many of the OTs will remember the time when Dud led the list of entrants in 1952, but could not accept the Senior Rose Bowl because he was chairman of the HFCC at that time. This reflects his ability in operating since this feat has only been accomplished by two other UK amateurs in

the history of the event. Many thanks Dud, for all you have done for the Commonwealth contest and I am sure I speak for all amateurs when I wish you good luck for the future.

The committee also recognised, the outstanding contribution made by Mal Geddes, G2SO/Z23JO, Snow Campbell, VK3MR, Frank Cooper, G2QT, John Tutton, VK3ZC and Victor Williams, VE3KE/VE7UZ. In order to thank them for their participation, they will be receiving a special certificate for their efforts over the years.

The GB5CC story

Don Beattie, G3OZF and myself made the journey over to Wokingham for the weekend to operate special event station GB5CC from the QTH of Captain Ian Sheppard, G4LJF. If you think you have a decent station take a look at this one—a four element tri bander for 14.21, 28 MHz, a three element 40m beam, and five 80m slopers all over 100ft up!! We arrived at 10am, began preparing the shack, and by 1130am put out a few tentative CQs. Since this was to be the first ever use of a GB5 prefix we were expecting a certain amount of interest, but fortunately this was minimal and we were able to concentrate on working Commonwealth stations once the contest began. With the favourable site and call sign we were hoping to prove that the contest can be won again from the UK, and indeed if you include the 300 odd UK QSOs also made, this was the case. However, although we obviously lost out on some of the other Commonwealth call areas due to UK traffic, there is still a mighty difference between the top UK entrant, Al Slater, and the overall winner Lee Sawkins. Maybe next year? We tried to make the best use of all bands, making skeds and QSYing where appropriate. The big disappointment to us was 28MHz. It was only in the dying minutes of the contest that we got through to Mal Geddes, Z23JO. Attempts with ZB2EO, ZC4AP and 9J2BO gave no results. Things may be different next year when openings to VE from the UK may occur. The operation by Commonwealth stations was exemplary and it is a pity other operators failed to take notice of this. One station, who would only give his call as UA1AA, continually jammed us repeating that we were on a dx frequency. If he had taken the trouble to listen to our operation he would have heard the dx and us working it. It is a shame that a perfect example of communication between amateurs throughout the world should be spoilt by a few. This apart, Don and myself enjoyed ourselves tremendously, and had given a reasonable opportunity for other stations to work GB5CC.

GB5CC results

Band (MHz)	QSOs	Bonuses	Areas	Points
3.5	102	24	13	990
7	174	50	26	1,870
14	186	57	27	2,070
21	72	24	16	840
28	18	4	2	170
Total	552	159	38	5,940

Activity and conditions

Compared to last year the biggest improvement was in the number of different call areas active. Although conditions were not markedly different this increase in call areas makes the contest much more enjoyable and interesting. This year a total of 60 areas were worked at one time or another and again it is the UK amateurs who seem to be in the best location for working the majority of areas, with G3FXB contacting 41 out of the 60. With increased publicity and improved conditions (!) there could be over 70 call areas active during next year's contest.

3.5MHz held out to the east coast of VE and ZL but propagation to VK and Africa was disappointing. Many stations were pleased to work VU2LAM who provided the only signals from Asia, while G3MXJ, G4FAM, G3PEK, G4BUO, GD3AHV, and GB5CC were the only ones to contact 9J2BO on this band. North America is the place to be for 3.5MHz, with 27 call areas being worked and the only absence being Asian signals from that part of the world. No doubt strong east European signals wipe out Commonwealth signals for the Asian stations on 3.5 and 7MHz, but it made a pleasant change to have a good level of activity from them on the hf bands. 7MHz would certainly supply more if it opened to VE4, 5, 6, 7 from the UK. Signals to Oceania are always good at this time of the year and quite often more reliable than 14MHz. 14MHz was again the "bread and butter" band supplying 54 per cent of the total number of QSOs. The biggest change in propagation is shown on 21MHz where there was a substantial opening to VK/ZL and also VE which did not happen last year. Perhaps this sheds some light on the change in propagation due to our shift through the sun spot cycle. It was a shame for the Asian stations that 21MHz failed to open to VE, otherwise they would have had a share of all the activity present on that band.

28MHz has still to show any appreciable sign of improvement. If it hadn't have been for the presence of GB5CC and Z23JO there would have been no contacts made from the UK. Elsewhere there was minimal use of the band with most traffic taking place between VK2/3 and ZL1/2. Surely things can only improve.

The RSGB would like to thank everyone who has helped to publicise this event. Hopefully, there will not be a clash between the Commonwealth and VK/ZL field day for next year. We hope to run GB5CC again as this seems to have had only positive comments from entrants, see you on 12–13 March 1988. Finally, thanks to those who sent in check logs: VK3VQ, GW3HCL, G3VDL, VK3KF, G4HMD, G4CP, V56UO, ZL0AKB, GM3ITN, G2QY, G3WP, VE3OAT, G15TK and again to John Tutton VK3ZC for help with publicity in VK land.

G4DJX

TRANSMIT SECTION

Posn	Call sign	Area	Bonus	QSOs	Total	Posn	Call sign	Area	Bonus	QSOs	Total
1	VE7CC	33	171	398	5,391	21	VE7UZ	24	102	214	3,099
2	VE6OU/3	31	131	505	5,123	22	ZL2BR	20	102	212	3,083
3	6Y5HN	26	124	474	4,794	23	VK3MR	25	105	191	3,050
4	VK6LW	25	135	372	4,548	24	G4WQN	34	108	165	2,972
5	G3FXB	41	161	275	4,536	25	G4BWP	34	106	143	2,823
6	GW3YDX	40	158	279	4,488	26	9J2BO	29	85	224	2,790
7	G4BUO	37	154	227	4,213	27	VK2BQQ	22	100	169	2,788
8	VE3CRG	31	103	433	4,199	28	VK7RO	22	96	176	2,783
9	G4EDG	38	142	250	4,066	29	VO1HP	20	55	352	2,757
10	G4CNY	36	144	239	4,058	30	G2OT	30	105	132	2,755
11	VK2APK	30	132	290	4,055	31	VK5AGX	23	94	175	2,738
12	8P9HG	23	88	452	4,005	32	VK3ZC	25	98	141	2,660
13	G3MXJ	38	140	210	3,840	33	9V1TL	23	75	196	2,455
14	VK4XA	23	125	244	3,703	34	G3JKS	31	91	121	2,420
15	ZB2EO	17	61	483	3,605	35	VE3JKZ	21	58	249	2,393
16	G3PEK	37	129	194	3,541	36	VK4XW	19	89	120	2,375
17	ZL1A1Z	25	120	217	3,468	37	VK6RU	23	79	162	2,367
18	ZC4AP	21	51	435	3,170	38	ZL1HV	21	85	116	2,272
19	VE3ST	29	84	304	3,165	39	ZD8CW	17	54	218	2,165
20	G3LET	35	117	159	3,118	40	VK3DQ	24	83	97	2,140

Posn	Callsign	Area	Bonus	QSOs	Total	Posn	Callsign	Area	Bonus	QSOs	Total	Posn	Callsign	Area	Bonus	QSOs	Total	Posn	Callsign	Area	Bonus	QSOs	Total	
41	VK3XB	19	76	126	2,138	96	G4WYG	19	41	52	1,080	23	G3JJG	26	61	74	1,585	47	G3COJ	20	36	40	918	
42	G3IGW	30	80	108	2,135	97	VE2AEJ/3	13	29	112	1,078	24	GW3WOJ***	33	58	78	1,545	48	G3HAL	14	33	35	830	
43	G3MIR	31	81	105	2,128	98	ZL3JO	10	23	113	1,025	25	G3TMA	27	57	80	1,535	49	G2DLJ	13	31	39	808	
44	G6LX	34	85	90	2,115	99	ZL3AGI***	16	33	75	1,025	26	G3TKK	27	59	71	1,530	50	G3DOT	13	27	48	780	
45	G6CJ	29	76	110	2,066	100	5B4UK	6	17	124	950	27	G3VW	25	57	76	1,515	51	G3JKY	16	30	35	771	
46	G4OBK	31	77	108	2,063	101	VE3IR	18	36	43	930	28	G3SJK	28	59	67	1,503	52	G4ZLB	15	27	36	720	
47	VK5GZ	18	69	134	2,045	102	G3COJ	20	36	40	918	29	G3TFF	28	58	67	1,495	53	G4IJW	14	27	33	703	
48	VK5BN	21	79	91	2,030	103	VK4TT***	17	29	53	845	30	G3NOM	29	55	78	1,478	54	GM3ITN	18	26	36	698	
49	VK3MJ	19	74	118	2,020	104	VK3FC	13	32	39	835	31	G3KDB	27	57	62	1,448	55	G3UYM***	18	27	31	695	
50	VK5UM	18	72	105	1,960	105	VE3NBE	9	21	92	830	32	G3NKS	25	55	69	1,440	56	G4ODV**	16	28	20	660	
51	VK2DID	20	73	99	1,945	106	G3HAL	14	33	35	830	33	G3EBH	27	55	67	1,433	57	G5LP**	21	26	29	659	
52	VU2LAM	18	49	181	1,880	107	G2DLJ	13	31	39	808	34	G3OLU	26	54	73	1,431	58	G3ICH	19	25	29	645	
53	G5MY	30	72	87	1,868	108	ZL2ALJ	14	31	37	805	35	G3KSH	25	56	61	1,420	59	G4ZOB**	18	25	29	643	
54	VP2MDY	13	43	202	1,849	109	VK3DOV	13	31	37	805	36	GM3CIX	23	52	67	1,373	60	G8OZ	12	25	28	640	
55	VK2EL	19	68	95	1,823	110	VK2SU	16	32	32	800	37	G3SJF	23	50	64	1,315	61	G3HJF	11	24	33	636	
56	G3RZP***	31	61	117	1,780	111	VK4BRF**	16	31	35	795	38	G3ESF	22	48	69	1,305	62	G3XYV	13	23	33	625	
57	VK3BDH	27	67	88	1,775	112	G3DOT	13	27	48	780	39	G3YDV	28	46	72	1,275	63	G2BLA	11	22	27	575	
58	VK5RG	18	61	97	1,698	113	G3JKY	16	30	35	771	40	G3GLL	19	49	54	1,245	64	G3WRR	12	20	24	515	
59	G3JYP	30	63	87	1,683	114	VK3KS	16	30	31	755	41	G3OEP	19	46	57	1,200	65	G6NK	11	19	27	515	
60	G3SWH	24	62	83	1,653	115	G4LZB	15	27	36	720	42	G3LJK	21	46	49	1,165	66	G4HPS***	16	19	23	495	
61	G2HLU	25	64	75	1,643	116	G4IJW	14	27	33	703	43	G3RTE***	29	42	56	1,115	67	G3YBH	8	18	20	460	
62	VK3CGG	16	61	83	1,630	117	GM3ITN	18	26	36	698	44	GW3MPB/A	21	43	50	1,110	68	G3KSK*	7	11	13	285	
63	VE3IJ	20	47	140	1,627	118	G3UYM***	18	27	31	695	45	G3DYI***	28	42	54	1,098	Average		40	59	82	1,601	
64	G3JUG	26	61	74	1,585	119	V01AW	9	25	40	693	46	G4WYG	19	41	52	1,080	Totals			4,071	5,599	108,879	
65	5N0BRJ	19	44	143	1,575	120	VK6ED	11	25	33	665	* = 3.5MHz ** = 7MHz *** = 14MHz **** = 21MHz												
66	VK2AQF	18	58	79	1,550	121	VU2UR***	15	23	41	665													
67	GW3WOJ***	33	58	78	1,545	122	G4ODV**	16	28	20	660													
68	G3TMA	28	57	80	1,535	123	G5LP**	21	26	29	659													
69	G3TKK	27	59	71	1,530	124	G3ICH	19	25	29	645													
70	G3VW	25	57	76	1,515	125	G4ZOB**	18	25	29	643													
71	G3SJK	28	59	67	1,503	126	G8OZ	12	25	28	640													
72	G3TFF	28	58	67	1,495	127	G3HJF	11	24	33	636													
73	G3NOM	29	55	78	1,478	128	VK6RZ	13	24	29	625													
74	G3KDB	27	57	62	1,448	129	G3XYV	13	23	33	625													
75	G3NKS	25	55	69	1,440	130	VK3XF	13	23	33	625													
76	G3EBH	27	55	67	1,433	131	V02AC	10	17	52	600													
77	G3OLU	26	54	73	1,431	132	VK2AIC	13	24	24	600													
78	G3KSH	25	56	61	1,420	133	VK7CH	12	24	24	588													
79	VK6AJ	22	44	108	1,408	134	G2BLA	11	22	27	575													
80	VK7RY	12	54	67	1,403	135	VE1EP***	16	21	24	540													
81	VK8HA	16	44	104	1,395	136	VK3JI***	12	17	40	540													
82	VO1CA	18	35	150	1,387	137	VK2AZR	7	20	25	520													
83	GM3CIX	23	52	67	1,373	138	G6NK	11	19	27	515													
84	VE3CPU	18	41	123	1,368	139	G3WRR	12	20	24	515													
85	G3SJF	23	50	64	1,315	140	5N2KRC	8	12	63	505													
86	G3ESF	22	48	69	1,305	141	G4HPS***	16	19	23	495													
87	G3YDV	28	46	72	1,275	142	G3YBH	8	18	20	460													
88	G3GLL	19	49	54	1,245	143	VE1ALJ	8	14	19	375													
89	G3OEP	19	46	57	1,200	144	VK7ZO*	7	13	15	335													
90	G3LJK	21	46	49	1,165	145	VK2GT***	7	12	13	305													
91	VK3AUQ	12	45	50	1,150	146	VK5BS*	8	12	12	300													
92	G3RTE***	29	42	56	1,115	147	G3KSK*	7	11	13	285													
93	GW3MPB/A	21	43	50	1,110	148	VK3VO	8	10	11	255													
94	G3DYI***	28	42	54	1,098	149	VE7DAV	2	6	7	155													
95	VK4BKM	16	42	60	1,090	Average		35	58	114	1,725													
* = 3.5MHz ** = 7MHz *** = 14MHz **** = 21MHz												Totals			8,699	16,989	257,135							

Listener Championship 1986 results

The committee was pleased to see such a large increase in listener participation in Society contests last year. For many years there had been half a dozen swls who would give their support. In 1986, there were a very healthy 34 listeners who entered contests organised by the Society, of which 25 scored points for the SWL Championship. The committee hopes that this trend will continue.

Tony Blackburn, BRS87156, gained most points during the year by winning two contests and being well placed in a further three. There was a two-way tie for second place and the listeners placed fourth and fifth scored over 100 points. In recognition of this, certificates of merit have been awarded to these leading five listeners.

BRS32525

Posn	Station	7MHz SSB	7MHz CW	1-8 T&C	RRU	HF SSB	HF CW	21/28 SSB	21 CW	28MHz cum SSB	28MHz cum CW	Total
1	BRS87156	50	—	25	—	80	—	65	—	40	—	260
2	{BRS1066 BRS32525	—	70	—	50	—	—	—	80	—	—	200
4	G1GMZ	45	—	35	—	25	—	15	—	35	—	155
5	BRS20249	—	—	30	—	—	—	35	—	30	40	135
6	BRS28198	55	—	—	—	—	—	45	—	—	—	100
7	BRS31879	—	—	—	—	—	80	—	—	—	—	80
8	{BRS48178 BRS52543 BRS87865	—	—	—	—	—	65	—	—	—	—	65
11	{BRS26407 BRS87139 BRS25429	—	—	10	—	55	—	55	—	—	—	55

RECEIVE SECTION

Posn	Station	Area	Bonus	QSOs	Total	Posn	Station	Area	Bonus	QSOs	Total
1	BRS1066	33	89	122	2,385	3	BRS52868	31	51	63	1,330
2	BRS195	21	75	92	1,955	Average		49	71	92	1,890
						Totals			215	277	5,670

ANALYSIS OF G OPERATION

Area	3-5	7	14	21	28MHz	Total	Area	3-5	7	14	21	28MHz	Total
GB	1	1	1	1	1	5	ZC4	1	1	1	2	4	4
J7	1					1	ZD8	1	1	1	1	4	4
VE1	15	17	23	9		64	ZF	1				1	1
VE2	5	8	23	6		42	ZK1			1		1	1
VE3	23	50	81	31		185	ZL0		1			1	1
VE4		8				8	ZL1	4	8	11	7	30	30
VE5		9				9	ZL2	6	2	2	2	10	10
VE6		10				10	ZL3	2	3	7	2	14	14
VE7	1	18	1			20	ZL4	1	2	2	2	5	5
VK1		1				1	3D6		1	1	1	2	2
VK2		13	11	11		35	4S			2		2	2
VK3	2	14	19	10		45	5B4	1	3	2		6	6
VK4		6	10	5		21	5H			1		1	1
VK5		3	8	3		14	5N		2	3	2	7	7
VK6	2	3	4	6		15	5Z			1	1	2	2
VK7	3	3	2			8	6Y	1	3	3	2	9	9
VK8	1	1	1			3	8P	1	1	1	1	4	4
VK0		1				1	8R		1			1	1
VO1	7	7	9	6		29	9H			2	1	3	3
VO2		1				1	9H4				1	1	1
VP2M	2	2	2	2		8	9J	1	1	1	1	5	5
VP2V		1				1	9L		1	1	1	2	2
VP5		1				1	9M2			1		1	1
VP9		1				1	9V	1	1	1	1	3	3
VS6	2	4	2			8	9Y		1	1	1	2	2
VU	1	4	4			17							
Z2		1			1	3	Areas	17	37	43	36	3	3
ZB2	1	1	1			4	Stxs	70	174	297	137	3	3

53 call areas worked

UK RESULTS

Posn	Callsign	Area	Bonus	QSOs	Total	Posn
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Posn	Callsign	County	Score	Posn	Callsign	County	Score	Posn	Callsign	Valid QSOs	Bonuses	Points
19	GW4COZ	CWD	363	31	G4SND	HWR	234	8	G3SXW	129	55	662
20	G4WYG	KNT	354	32	G3GMM	CHS	226	9	GM4AZZ	134	51	661
21	G4YDG	YSW	353	33	G3ZRZ	LNH	222	10	G4ODV	107	56	597
22	G3VVI	SRV	337	34	GW0DDK	DFD	193	11	G3SWH	102	48	546
23	G4EBK	HBS	328	35	G0BVZ	DYS	187	12	G2MJ	103	47	544
24	GW3RGL	GNW	304	36	G4VVM	WKS	186	13	G5MY	98	49	539
25	GM3JUM	LTH	300	37	G4ZFO	IOW	172	14	G4OGB	97	41	496
26	G3VGB	LNH	295	38	G4BYA	OFE	170	15	G3VVI	90	44	490
27	GM4EWM	GRN	284	39	G0BVW	BFD	164	16	G3VRE	94	41	473
28	G3MCX	LDN	275	40	G3WOC	BKS	159	17	G3YLC	82	45	471
29	G4OYY	DVN	257	41	G4VXT	BFD	137	18	G4LPK/A	83	44	469
30	G3UHU	ESX	246	42	G0CUQ	ESX	110	19	GM3CFS	72	45	441
Check logs: G5LR G6LX E19FK*												
20				21				21	G3MCX	68	44	424
21				22				22	G3SOX	68	38	391
22				23				23	G4EBK	69	36	387
23				24				24	G3YLA	62	37	371
24				25				25	G4UZN	60	38	370
25				26				26	G4ICP	70	31	365
26				27				27	G3GMS	54	37	345
27				28				28	GM3JUM	51	34	323
28				29				29	G3ZRZ	50	34	320
29				30				30	G3GMM	46	29	283
30				31				31	G4HSD	44	28	269
									G4NFX	30	25	213

*Certificate winner, 1Under-18 Award winner.

RECEIVING SECTION

Posn	Station	Score	Posn	Station	Score
1	RS20249*	363	5	RS32525	288
2	RS87156*	362	6	RS587949	242
3	RS87865	335	7	RS87383	137
4	RS28198	333	8	G1VDW	94

*Certificate winners

432MHz Trophy and SWL Contest 1987 results

Entries for this event were down over 20 per cent on last year with lower scoring rates to match. Widespread adverse weather was associated with below average conditions and low activity, only eastern England reporting anything near normal, although an improvement all round was noted towards the end of the contest. G4UEM/P summed it up as "very poor, very wet, very muddy and very dark!" GD8EXI commented that high power appeared essential and many stations worked were only just out of the noise. This may account for the large number of logging errors in the entries, with several stations losing their best dx. The timing of the contest caused some comment, particularly the late finish, but no consensus of opinion was forthcoming. Subject to Council approval, the 1951 Council Cup is awarded to the Sheppey Western Contest Group G8TFI/P, operated by G8TFI, G4VXE, G4FRE and G0DAZ. Congratulations and certificates go to G8TFI/P, GW4LIP/P, GD8EXI, G8ZHP and BRS32525.

G4WAD

SECTION O—ALL OTHER STATIONS

Posn	Callsign	Points	QSOs	Loc	Pwr	Ant	Best dx	Km
1	G8TFI/P	1,800	163	80AQ	400	8 × 19Y	PA0WMX	663
2	GW4LIP/P	1,774	214	83KB	400	4 × 21Y	PE1ACB	679
3	G4RNL/P	1,640	207	93AD	400	252BS	DG9YN	712
4	GW4MGR/P	1,389	187	83JA	400	4 × 19Y	PA0EZ	570
5	GW4BYY/P	1,354	176	82JG	400	4 × 21Y	ON5FF	590
6	G3EFX/P	1,108	164	90XV	250	2 × 21Y	GM4TXX	633
7	GW6GW/P	779	126	81NV	100	4 × 21Y	—	—
8	G4NOK/P	626	90	93BS	100	2 × 21Y	PA0ZM	606
9	G3FVA/P	604	113	93BF	150	4 × 23Y	PA0RDY	464
10	G1DOX/P	545	82	84IH	100	1 × 24Y	—	—
11	G4UEM/P	498	86	91SX	400	1 × 21Y	PA0ZM	496
12	G6EKE/P	483	63	01OI	25	4 × 19Y	—	—
13	G16ATZ/P	480	43	74CN	100	2 × 17Y	—	—
14	G6CSY/P	317	69	01BH	50	1 × 19Y	—	—
15	GM0GCG/P	136	17	75OR	40	8over8Y	GW6GW/P	444
16	G1BHR/P	97	23	92LJ	10	48MB	GD8EXI	—
17	G4XOM/P	91	31	82RJ	10	4 × 24Y	G8TFI/P	213

SECTION F—FIXED STATIONS

Posn	Callsign	Points	QSOs	Loc	Pwr	Ant	Best dx	Km
1	GD8EXI	1,029	97	74PC	400	88MB	—	—
2	G8ZHP	761	97	92TR	300	8 × 21Y	DG9YN	601
3	G3JXN	674	122	91UM	120	4 × 21Y	GM4TXX	564
4	G6IAT	556	102	91TV	100	2 × 21Y	PA0WMX	405
5	G4NBS	444	65	02AF	100	1 × 21Y	GM4NPH/P	470
6	G6HKM	342	57	01FT	50	1 × 21Y	G16ATZ/P	516
7	G1KDF	327	57	83NN	100	1 × 21Y	G6EKR/P	379
8	G1GEY	272	30	94FW	100	2 × 17Y	G8TFI/P	502
9	G4VHF	269	64	92QB	120	1 × 19Y	—	—
10	G6LOH	269	58	92IC	10	2 × 21Y	GM4TXX	477
11	G1EHJ	258	60	92EO	8	1 × 19Y	E15FK	500
12	G4ZNM	171	29	00BS	100	48MB	G4NOK/P	360
13	G4IDF	135	35	82VE	20	1 × 11Y	GD8EXI	270
14	G1OMP	64	17	82KN	30	1 × 21Y	G8TFI/P	246
15	G3ILO	49	11	81VQ	10	1 × 19Y	GW4LIP/P	165

SECTION SWL—LISTENERS

Posn	Station	Pts	QSOs	Loc	Ant	Best dx	Km
1	BRS32525	263	61	01AL	1 × 19Y	—	—
2	BRS25429	156	26	93FX	1 × 19Y	G8TFI/P	385
3	BRS28198	41	5	00HX	48MB	GW4LIP/P	330

Check log received with thanks from PE1EWR

Summer 1987 1.8MHz Contest results

No trouble from thunderstorms this year according to G4ODV who had to give up last time to avoid going into competition with the fried bacon for breakfast! The support from overseas was gratifying and possibly aided by the increased number of countries now active on the band but UK entries were down one on 1986. Once again VE1ZZ provided a "dx" interest as did stations in DL, EA, F, HB, LA, LZ, OE, OH, OK, ON, OZ, PA, SP, UA3, UB5, UC, UL, UO, UP, UQ, Y2 and YU. The standard of logs was high with few errors but nearly every QSO logged was 599 both ways!

G3FKM

UK SECTION

Posn	Callsign	Valid QSOs	Bonuses	Points
1	G4BWP*	161	58	770
2	GM3ZSP*	152	58	745
3	GW4IOI	151	56	733
4	G3TXF	139	60	716
5	G4VER/P	144	55	705
6	G4BUO	141	56	701
7	G4TBK	136	54	678

OVERSEAS SECTION

Posn	Callsign	Valid QSOs	Bonuses	Points
1	UQ2GKL*	65	35	370
2	OL1BLN*	62	30	336
3	OZ1W	55	31	320
4	SP1PEA	52	30	296
5	YU3MM	47	30	291
6	LA2UA	48	29	289
7	SP5GH	41	29	266
8	OL4BNJ	44	27	264
9	OL5BPH	42	26	256
10	OK1DRU	35	25	228
11	LZ1KOZ	32	25	221
12	OK1GR/P	30	26	220
13	OL4BRP	33	24	219
14	ON6TJ	31	24	213
15	RB5EX	29	22	197
16	ON4XG	29	21	192
17	OK3TAE	23	20	169
18	LA1IE	22	20	165
19	EA2CR	24	19	165
20	OK2BOU	24	18	162
21	UO5OGB	22	18	156
22	FE1JOG	21	16	143
23	EA7MDF	19	17	139
24	OH2PM	13	12	99
25	UA4NFV	8	8	64
26	UL7IBO	3	3	24

*Certificate winner. Check logs received with thanks from G3UFY, OK1KAY/P, and RA3AUU.

Contests Calendar

RSGB HF CONTESTS

Oct	28MHz CW Cumulative (Rules in July issue)
11 Oct	21/28MHz SSB (Rules in May issue)
18 Oct	21MHz CW (Rules in June issue)
24 Oct	DF Treble Night, Mid-Thames
Nov-Dec	28MHz Phone Cumulative (Rules in July issue)
14, 15 Nov	2nd 1.8MHz (Rules in September issue)

RSGB VHF CONTESTS

3, 4 Oct	IARU UHF/SHF & SWL (Rules in June issue)
3, 4 Oct	432-24GHz & SWL (Rules in August issue)
8 Oct	432MHz Cumulative (Rules in August issue)
16 Oct	1.3/2.3GHz Cumulative (Rules in August issue)
24 Oct	432MHz Cumulative (Rules in August issue)
25 Oct	70MHz Fixed (Rules in August issue)
1 Nov	1.3/2.3GHz Cumulative (Rules in August issue)
7, 8 Nov	144MHz CW (Rules in August issue)
9 Nov	432MHz Cumulative (Rules in August issue)
17 Nov	1.3/2.3GHz Cumulative (Rules in August issue)
25 Nov	432MHz Cumulative (Rules in August issue)
3 Dec	1.3/2.3GHz Cumulative (Rules in August issue)
6 Dec	144MHz Fixed & AFS
11 Dec	432MHz Cumulative (Rules in August issue)
13 Dec	70MHz CW
19 Dec	1.3/2.3GHz Cumulative (Rules in August issue)

OTHER CONTESTS

3, 4 Oct	Columbus (Rules in September HF)
3, 4 Oct	International DX—HC Middle of the World (Rules in September HF)
3, 4 Oct	VK/ZL/Oceania Phone (Rules in September HF)
4 Oct	ON 3.5MHz SSB (Rules in October HF)
10, 11 Oct	X Concurso Ibero-Americano (Rules in October HF)
11 Oct	ON 3.5MHz CW (Rules in October HF)
10, 11 Oct	VK/ZL/Oceania CW (Rules in September HF)
14-16 Oct	YL Anniversary CW (Rules in October HF)
17, 18 Oct	WA-Y2 (Rules in October HF)
24, 25 Oct	CQ WW DX Phone (Rules in October HF)
28-30 Oct	YL Anniversary Phone (Rules in October HF)
14, 15 Nov	European DX RTTY (Rules in August HF)
28, 29 Nov	CQ WW DX CW (Rules in October HF)
1988	
Jan	1.8, 3.5 and 7MHz Cumulative (Rules in October issue)
6, 7 Feb	7MHz Phone (Rules in October issue)
20, 21 Feb	7MHz CW (Rules in October issue)

1985 IARU Region 1 VHF/UHF/SHF Contest results

The following results have been extracted from the full results table supplied by the Swedish radio amateurs' national society. Particular congratulations go to GJ4ICD as winner of the Single-Operator section on 144MHz, and BRS32525 as leading swl on 144MHz.

OVERALL UHF SINGLE-OPERATOR					
Posn	Callsign	Score	Posn	Callsign	Score
1	PA0EZ	230,544	41	G3JXN	58,352
2	DC9XO	167,794	196	G1DOX	19,899
3	DJ6JJ	151,235	407	G4TAW	3,980
10	G3XDY	103,045	434	G3FYX/P	3,180
509 entries					

OVERALL UHF MULTI-OPERATOR				
Posn	Callsign	Score	Posn	Callsign
1	PA3BPC/P	297,404	107	G4APA/P
2	DK8VR/A	286,487	110	G3PIA/P
3	DL0HC/P	265,825	122	G8LOO/P
29	G8TFI/P	93,231	137	G3OHM/P
33	G4RNL/P	89,518	155	G6EKR/A
37	G4PUB/P	79,819	157	G3NNG/P
40	G4NXX/P	74,425	169	G5LKP/P
42	G3CKR/P	71,940	174	G4CDA/P
46	G4ANT/P	68,250	184	G3FVA/P
49	G4FRE/P	63,520	197	G6CSY
52	G4LOJ/P	61,812	200	G4PZZ/P
68	G8OHM/P	51,365	203	G4ALE/P
75	G4NVA/P	48,865	211	G8FEZ/A
76	G6YLO/A	48,724	231	G4TAW
91	G0ALE/P	42,825	238	G3JOC/P
102	G3ZIG/P	38,440		
239 entries				

144MHz SINGLE-OPERATOR					
Posn	Callsign	QSOs	Score	Posn	Callsign
1	GJ4ICD	1,091	409,283	170	G8ABI/A
2	HB9MM/P	505	227,807	204	G8UDV/P
3	HB9AE/P	479	217,035	222	G6HXU
55	G4AGO	224	64,718	227	G4YFN
63	G4PIQ	220	60,978	240	G8ZRE
148	G0CLP/P	198	34,525	404	G8GFF
163	G6CSY/P	149	32,128	478	G8NMQ/EA2/P
581 entries					

144MHz MULTI-OPERATOR							
Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	HB9SAX/P	881	416,115	34	G4NUT/P	643	171,755
2	ON4ASL/A	1,056	341,450	39	G8MBI/P	739	166,725
3	HB9S/P	715	323,768	45	G4WET/P	634	152,695
4	G4W4NXO/P	940	321,649	46	G4SIV	469	151,933
5	G4LIP/P	965	318,810	55	G3ZMS/P	439	133,000
7	G8LNC/P	862	303,870	56	G2XV/P	521	131,816
9	GW8KQW/P	924	299,617	57	G6ZKE/P	535	130,723
10	G3NJA/P	687	283,242	81	G4LUA/P	400	109,494
13	G1HHH/P	728	261,354	93	G3PIA	484	106,094
14	G4PUB/P	832	258,067	134	GM3BSQ/P	266	92,992
18	G4APA/P	738	237,897	166	G4SNX/P	372	76,697
19	G4CDA/P	804	235,162	214	G1DWI/P	239	57,426
23	GW6GW/P	759	219,974	243	GW6JXR/P	169	48,992
24	G4SWX	664	210,406	245	GM6FPX/P	191	48,720
26	G3WQI/P	630	208,720	271	G1MDG/P	139	40,850
31	GD4IOM	571	177,309				
437 entries							

432MHz SINGLE-OPERATOR							
Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	DK2GR	283	77,883	79	G3XDY	68	22,095
2	DC5NA/P	390	77,396	167	G3JXN	92	11,387
3	PA0PLY/A	330	73,419	323	G1DOX	34	3,299
391 entries							

432MHz MULTI-OPERATOR							
Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	DK8VR/A	618	146,377	21	G4LOJ/P	197	61,812
2	DK0VS/P	512	124,005	35	G6YLO/A	166	48,724
3	PA3BPC/P	493	112,509	56	G4APA/P	176	36,445
6	G8TFI/P	343	93,231	137	G3FVA/P	134	13,482
11	G4RNL/P	342	89,518	151	G6CSY	83	9,940
15	G4PUB/P	297	79,819				
185 entries							

1.3GHz SINGLE-OPERATOR							
Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	DK1VC	122	17,797	7	G3XDY	55	12,480
2	DJ6JJ	117	17,737	39	G3JXN	43	5,759
3	PA0EZ	102	17,454	72	G1DOX	26	3,320
153 entries							

2-3GHz MULTI-OPERATOR							
Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	DL0HC/P	56	10,682	23	G3NNG/P	13	1,957
2	PE0MAR/P	44	7,226	28	G4CDA/P	15	1,572
3	PA3BPC/P	51	6,124	33	G4ALE/P	8	852
5	G4FRE/P	26	4,680	37	G8FEZ/A	3	678
10	G3ZIG/P	18	3,844	38	G4NVA/P	7	558
20	G3OHM/P	17	2,535				
43 entries							

1-3GHz MULTI-OPERATOR							
Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	DL0HC/P	161	31,801	31	G4NVA/P	51	8,657
2	DK8VR/A	141	28,022	33	G0ALE/P	40	8,565
3	PA0GUS/P	113	24,067	40	G3PIA/P	41	6,338
13	G4NXX/P	75	14,885	44	G8LOO/P	47	6,182
14	G3CKR/P	79	14,388	58	G6EKR/A	19	3,963
18	G4ANT/P	60	13,650	93	G4TAW	5	549
26	G8OHM/P	73	10,273				
97 entries							

2-3GHz SINGLE-OPERATOR							
Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	PA0EZ	56	8,622	22	G3XDY	16	1,855
2	DC9XO	32	6,767	25	G3JXN	15	1,817
3	DJ6JJ	40	6,255	45	G4TAW	5	398
53 entries							

3.4GHz SINGLE-OPERATOR				SWL CONTEST 1.3GHz			
Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	DJ5AP/P	5	989	1	NL213	21	3,230
2	DL1EBR	9	855			1 entry	
15	G3FYX/P	1	53				
17 entries							

3-4GHz MULTI-OPERATOR							
Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	DK0HT/P	9	1,319	3	G4FRE/P	6	760
2	PA3BPC/P	9	1,160	6	G4PZZ/P	3	482
8 entries							

5.7GHz SINGLE-OPERATOR				5.7GHz MULTI-OPERATOR			
Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	I3ZVN/IN3	5	995	1	IW1ASJ/1	5	798
2	I2FUM/2	6	884	2	I2AV/4	4	568
14 entries				11	G3JOC/P	1	29
				12 entries			

10GHz SINGLE-OPERATOR				10GHz MULTI-OPERATOR			
Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	I2MUT/3	25	3,682	1	IW2BDX/4	25	3,330
2	I3DRE/3	22	3,638	2	I4CHY/4	25	2,715
48	G3FYX/P	1	53	26	G4FRE/P	1	76
56 entries				33 entries			

24GHz SINGLE-OPERATOR				24GHz MULTI-OPERATOR			
Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	I2MUT/3	3	466	1	I0SNY/O	2	208
2	I4QIG/4	3	221	2	I4CHY/4	2	168
5	G3FYX/P	1	53				
8 entries				5 entries			

47GHz SINGLE-OPERATOR				47GHz MULTI-OPERATOR			
Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	HB9AGE/P	1	51	1	HB9CVC/P	2	81
1 entry				1 entry			

SWL CONTEST 144MHz				SWL CONTEST 432MHz			
Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	BRS32525	210	53,189	1	NL5184	83	13,654
2	Y2-14521/H46	176	50,321	2	NL213	9	2,073
3	NL8722	160	42,300			2 entries	
18 entries							

Disqualified, 144MHz: G3CNX/P

OBITUARIES

The Society records with regret the deaths of the following radio amateurs:

Mr H Brislin, G3FRY

Harry Brislin died on 18 April 1987. He had been a member of the RSGB for over 40 years and was founder member of the Cheltenham RSGB Group. Formerly a keen cw operator, in recent years he was only occasionally on 3.5 and 144MHz fm.

Mr G Jessup, G4HG

George Jessup died on 16 June 1987. He was licensed pre-war, was one of the "secret-listeners", and was net controller for G5OT, the old-timers net on 144MHz.

Mr R G E Lamb, G3GLM

Ray Lamb died on 24 June 1987, aged 65. He was active on all hf bands, mainly cw, ssb and 1.8MHz a.m.

Mr Bob Mathieson, G6UND

Bob Mathieson died on 16 June 1987 aged 44. He was a member of the Bredhurst R&TS, and a member of the GB3KN and GB3RE working groups. As an engineer working on X25 packet switch systems, he had recently taken up packet radio.

Mr L Parker, ex-G5LP

Lionel Parker (Snr) died on 13 June 1987 aged 80. He was first licensed in 1935 and held the AA licence as 2BV1. A keen cw operator, he was well-known on the dx bands. During the war, he was active as a voluntary interceptor and was mentioned in despatches. In later years he was active on the lower frequency bands until ill-health led him to give up the hobby and pass his callsign to his son, Lionel jnr, in 1984. He was a founder member of the Wellingborough T&RS.

Mr E Shapton, G3JMS

Eric Shapton died suddenly on 15 June 1987. He had only recently recovered his old callsign G3JMS. In the mid-fifties, when he lived in Hertfordshire, he was an active member of the RSGB Mid-Herts Group and a pioneer of vhf construction.

Mr R J Toby, G2CDN

Rex Toby died on 6 June at the age of 74. He also held

callsigns E15B, ZS6XC and ZS2RJ, and was one of the pioneers of mobile operating in the UK.

Mr J P P Tyndall, G2QI

John Tyndall died on 24 March 1987. With the help of his wife, he compiled the first RSGB *Amateur Radio Callbook*.

Also:

Mr R Andrews, G2BSQ, on 19 May 1987.

Mr D A Burton, RS90137, on 2 May 1987.

Mr R (Bob) Calder, G3UNR, on 28 March 1987.

Mr D H Caton, G3WVX, on 13 May 1987.

Mr R Cavill, G3AOI, on 6 March 1987.

Mr R B Coker, G4TZU.

Mr R V Court, G3SBO, on 10 May 1987.

Mr S C Edeling, PA0CML, on 17 June 1987.

Mr P D Elsom, G1KEE, in March 1987.

Mr D F Halliday, GM2AHD, on 30 May 1987.

Mr L B Johnston, RS15690.

Mr T Jones, RS34513.

Mr R G Kimpston, G3YHX, on 15 June 1987.

Mr Lambert, FE2XO, in September 1986.

Mr W C Leslie, GM4VUQ, on 2 April 1987.

Mr E A Margerison, RS90067, on 8 April 1987.

Mr F C Price, G3YNL, on 27 May 1987.

Club News

The following is the latest information received by RRs from the RSGB affiliated societies, clubs and groups in time for inclusion in this issue. Basic unchanged information on other affiliated organisations will be published again in July 1987.

RSGB affiliated organisations are requested to report all programmes and new items to their regional representatives regularly. Information for inclusion in the **December** issue should reach them by **12 October**, and for the **January** issue by **9 November**.

Club programmes are given in order of date, subject, time and place of meeting. All call signs of club secretaries and other contacts are QTHR (correct in the current RSGB *Call Book*) unless otherwise stated.

All clubs welcome visitors and would be pleased to hear from potential new members.

REGION 1—RR B Donn, G3XSN, 7 Thurne Way, Liverpool L25 4SQ. Tel 051-722 3644.

Bury (BRS, G3BRS)—13 Oct (Construction competition). 8pm. Mosses Community Centre, Cecil St, Bury. Details G1VQE, tel 061-796 5296.

Chester (C&DARS, G3GIZ/G8GIZ)—6 Oct (Committee meeting), 13 ("Esperanto in radio communications", G4MOU), 20 (Constructional project, G8OJQ), 27 (Faroes dx trip), 3 Nov (Committee meeting). 8pm. Chester RUFC, Hare La, Vicars Cross, Chester. Details G6IFA, tel Chester 336639.

Croston (The Leyland Hundred ARG)—New venue. Second Monday of the month, 7.30pm. The Grapes ph, Town Road, Croston. Sec G4YSU, tel 0772 612815.

Darwen (DARC, G4JS)—14 Oct (Talk by G3SYA), 17/18 (JOTA, Scout Hut, Manor Road, Darwen), 7.30pm. Highfield WMC, Ratcliff St, Darwen. Sec G2AKK, tel 0254 73767.

Fylde (FARS)—6 Oct ("Computer planning", Steve Williamson), 20 (Informal), 7.45pm. The Kite Club, Blackpool Airport. Sec G8GG, tel 725717.

Leyland (Central Lancs ARC)—5 Oct (Junk sale), 12 (Committee meeting), 19 (Noggin and natter), 2 Nov (Quiz night), 8.15pm. The Priory Club, Broadfield Drive, Leyland. Details G4ZYN, tel 0257 452287.

Liverpool (L&DARS, G3AHD/G8WCL)—6 Oct (AGM), 8pm. The Churchill Conservative Club, Church Road, Liverpool 15. Sec Lynn, tel 061-728 8811.

Manchester (South MRC G3VFA/G3UHF)—2 Oct ("Microwave Modules equipment", G4EFO), 9 ("Fast scan tv", G8YKL), 16 ("Electronics in Lifts", G0/VK2CFC), 23 ("Solar studies", G4SSN), 30 (Halloween df), 6 Nov (Annual dinner at the Belmore Hotel, Sale, 7.30pm for 8pm. Tickets available early Oct). 8pm. Sale Moor Community Centre, Norris Rd, Sale. Details G2AKR.

Morecambe (MBARS)—27 Oct (Visit by G3XSN, RR1), Tuesdays, 7.30pm. Trimpell Sports & Social Club, Outmoss La, Morecambe. Morse classes alternate Tuesdays. Details G4ZJL, tel 0524 52042.

Penrith (Eden Valley RS)—15 Oct (Guest speaker, G3BA), 7.30pm. Ullswater Centre, Sec G4FUI, tel Penrith 66728.

Rossendale (RARS)—21 Oct (Surplus equipment sale), 8pm. The Huntsman, Burnley Rd, Loveclough, Rossendale. Sec G4VVK, tel 0706 214076.

Thornton Cleveleys (TCARS)—5 Oct (Judging of construction competition), 12 (Informal), 19 (AGM), 26 (Informal), 7.45pm. 1st Norbreck Scout HQ, Carr Rd, Bispham, Blackpool. Club net Sundays 11am, G4ATH on 1-865MHz. Details G4BFH, tel 0253 853554.

Warrington (WARC G4CDA/G6WRC)—6 Oct (Novice construction awards), 8pm. Grappenhall Community Centre, Bell House La, Grappenhall, Warrington. Details G0BCN, tel 0925 444317.

Wigan (Douglas Valley ARS, G3BPK)—8 Oct (Annual hot pot supper, details from the chairman), 15 (Finalising arrangements for JOTA weekend), 8pm. Standish Conservative Club, School La, Standish, nr Wigan. Details G4GWG, tel Wigan 211397. New club chairman G0FIR, tel 0942 213325.

Wirral (WARS)—7 Oct (AGM), 21 (Surplus equipment sale), 30 (Dinner dance at Heatherlands), 4 Nov ("An antenna tuning unit", G3CSG), 8pm. Club Room, Ivy Farm, Arrowe Park. Sec G3VEB.

Wirral (W&DARC)—14 Oct (Quiz night), 28 (Equipment display), 8pm. Irby Cricket Club, Mill Hill Rd. Details G1VHO, tel 051-625 5490.

Wyre (WARS)—17/18 Oct (JOTA, GB4FS, Fleetwood Scouts. Details G1TTO), 8pm. Breck Squash Club, Breck Rd, Poulton. Sec G4UHI, tel 0253 854745.

I would like to thank Central Lancs ARC and NARC for the hospitality shown to me during my visits in July. Also to the clubs who have sent me their magazines and newsheets. A most enjoyable Sunday was spent at the Rolls-Royce Rally and I wish to thank them for inviting me. **RR1**

REGION 2—RR P Sheppard, G4EJP, 9 Elvington Crescent, Leconfield, Beverley, N Humberside, HU17 7LX. Tel 0401 50397

Goole (GR&ES GOGLE)—2 Oct (Natter night), 9 (Junk sale), 16 (Video evening and JOTA planning), 23 (Visit and talk from Hull ARC), 30 (Social evening at the Black Swan), 8pm. The Pavillion, West Park. Details G0GLZ, tel 0405 69968.

Halifax (H&DARS, G2UG)—20 Oct ("Evaluation of wire antennas", G3OTE). Running Man ph. Details G0DLM, tel 0422 202306.

Halifax (Northern Heights ARS G4NOK)—7 Oct (Talk Egypt on 2), 21 ("28MHz fm", G3SDY). Bradshaw Tavern, Halifax. Details G3UI, tel 0422 60574.

Kelighay (KARS RS84851)—10/11 Oct (Special event, G0ERH), 13 (Informal meeting), 27 (Junk sale), Victoria Hotel. Details G1IGH, tel 0274 496222.

Leconfield (RCTARS G4GGD)—15 Oct (Monthly meeting and Raynet get together), Normandy Barracks. Details G4EJP, tel 0401 50397.

Sheffield (SARC)—5 Oct ("Christian aid), 12 (AGM), 8pm. Firth Park Pavillion, Sheffield. Details G8ZHG, tel 0742 395287.

Todmorden (T&DARS, G4WYT)—5 Oct (Surplus equipment sale), 19 (Natter night). Queen Hotel. Details G1GZB, tel 0706 817572.

Wakefield (North Wakefield RC G4NOK)—1 Oct (Rally meeting), 4 (Wakefield Mobile Rally), 8 ("Micro-waves", G3PYB), 22 ("Space travel and satellites"), 29 (Monthly meeting). White Horse ph. Details G4RCH, tel 0532 536633.

Wakefield (W&DRS G3WRS)—6 Oct (Members on the air contest), 13 (Great egg race 2), 17/18 (JOTA), 20 (On the air), 24 (Jumble sale), 27 (Novelty project introduction). Ossett Community Centre. Details G4VRY, tel 0532 820198.

York (YRCA G4YRC)—13 Oct (Club night video), 22 (Photography with G4YXZ). Ashcroft Hotel, York. Details G3WQM, tel 0904 793672.

REGION 3—RR G Ross, G8MWR, 81 Ringwood Highway, Coventry, CV2 2GT. Tel 0203 616941

Atherstone (AARC)—12 Oct ("50 years of amateur radio", G3BA), 26 (Informal night at the Bull). Upper School, Long St, Atherstone. Sec G4IWA, tel 0827 713670/393518.

Birmingham (Midland ARS)—20 Oct (AGM). Unit 5, Henstead House, Henstead St (off Bromsgrove St). Sec G8BHE, tel 021-422 9787.

Birmingham (Mirfield ARC)—14 Oct (Natter night), Mondays, hf and construction. Tuesdays, cw tuition, G3MRP/G4SPY. Wednesdays, chat night. Thursdays, RAE tuition. Fridays, Morse class, 7pm. Mirfield Centre, Lea Village, Birmingham. Sec Ms K Field, tel 021-783 5898.

Coventry (CARS)—2 Oct (AGM), 9, 23 (Morse tuition and night on the air), 16 (Quiz night), 30 (Indoor df game), 8pm. Scout HQ, 121 St Nicholas St, Radford, Coventry. Sec G3UOL, tel 414684.

Evesham (ERAC)—1 Oct (Visit to BBC Pebble Mill), 30 ("The weather man", G3LYA). Details G4UXC, tel Evesham 831508.

Halesowen (Midland ES&SC, G4MEB)—13 Oct ("50 years of amateur radio", G3BA), 27 (General meeting), 8pm. MEB Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.

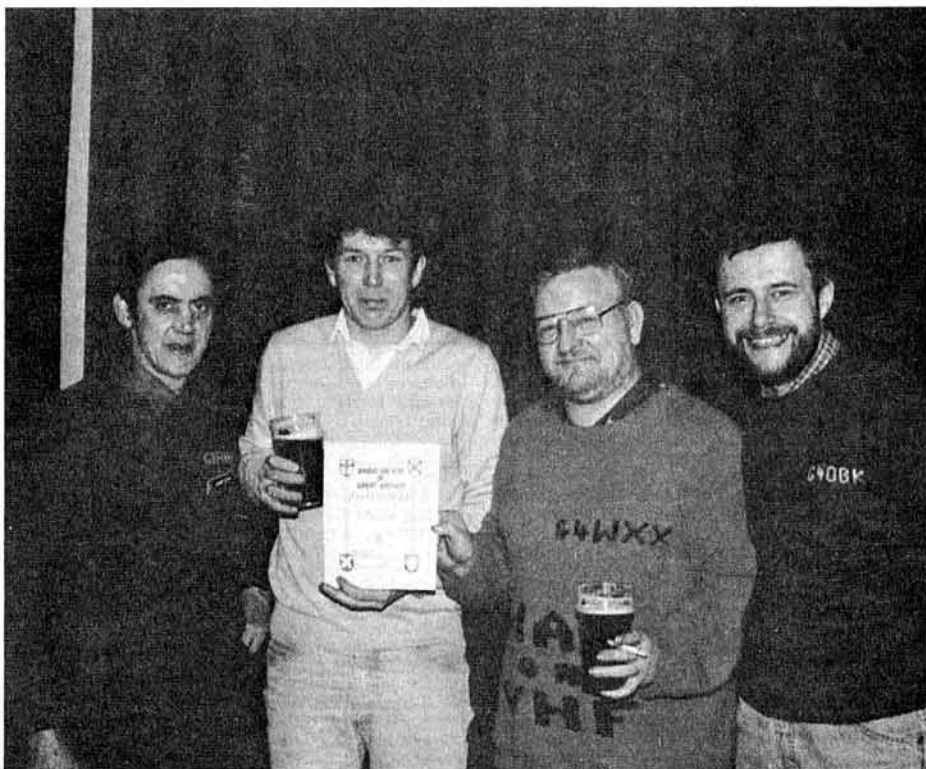
Hereford (Hars)—2 Oct ("Digital hi-fi", Ken Clegg), 16 (Audio-visual night), 8pm. All formal lectures take place at the Three Counties Training Centre, 12a The Cattle Market. All other meetings are held at the Civil Defence HQ, Gaoi St, Hereford. Sec G3WRQ, tel 0432 54064.

Malvern Hills (MHARC)—13 Oct ("Bermuda contests", G4CNY), 8pm. Red Lion Inn, St Anne's Rd, Malvern. Sec G4BVY, tel 06845 66822.

Rugby (RATS)—13 Oct (BBC talk), 20 (Construction night), 7.30pm. Cricket Pavillion, B Entrance, Rugby radio station. Sec G8TWH.

Shrewsbury (Salop ARS)—1 Oct ("Russian amateurs", G4CVU), 15 (Crime prevention), 22 (AGM), 29 (HF night on the air), 8pm. Old Bucks Head, Frankwell, Shrewsbury. Sec G0EYI, tel 0743 67799.

Solihull (SARS)—15 Oct (AGM) The Shirley Centre,



Zone A of the 1986 144MHz RSGB AFS contest was won by Central Lancashire ARC seen here showing off their certificate. L to r: Alan, G1AHM; Larry, G1PKE; Jack, G4WXX; Phil, G4OBK

Stratford Rd, Shirley, Sec G8AYY, tel 021-783 2996.
Stratford-upon-Avon (SuA&DRC)—12 Oct (Visit to BBC Pebble Mill), 26 (Technical topics: Nicads), 7.30pm. Baptist Church, Payton St, Stratford-upon-Avon. Sec G8OVC, tel S-u-A 750584.

Telford (T&DARS)—7 Oct (Construction and night on the air), 14 ("PCB manufacture", G8UPF), 21 (Club equipment display), 28 ("Fuses and fusing", Bill Crosbie), 8pm. Dawley Bank Community Centre, Dawley, Telford. Sec G1JNZ, tel 0952 592317.

Warwick (Mid WARS)—13 Oct ("The Eagle radio company"), 27 ("Amor", G4DF), 8pm. St John Ambulance HQ, 61 Emscote Rd, Warwick. Sec G0HHH, tel Marton 632370.

Willenhall (W&DARS)—7 Oct ("Genealogy", G4TVA), 14 (CW workshop), 16-18 (JOTA special event station), 28 (Project and natter night), 8.15pm. Cross Keys, Willenhall. Sec G0EGG, tel 0902 734475.

Wythall (WARC)—6 Oct (Committee meeting), 13 & 27 (Night on the air), 20 ("Operation Raleigh"), 7.30pm. Community Centre, Silver St, Wythall. Sec G0EYO, tel 021-430 7267.

REGION 4—RR M Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. Tel 0332 556875.

Derby (DADARS)—7 Oct (Junk sale), 14 (Visit by Birketts of Lincoln), 21 ("Airband monitoring, the jargon explained", G3VGV), 28 ("Beautiful VE7", G3BHT), 4 Nov (Junk sale), 7.30pm. 119 Green La, Derby. Sec G3KQF, tel Derby 772361.

Leicester (LRS)—5 Oct (Quarterly progress, open meeting), 12 (Committee meeting), 19 (Final prep for Leicester exhibition), 26 (RSGB video), 7.30pm. Gilroes Cottage, Groby Rd, Leicester. Sec G4PDZ, tel Leicester 871086.

Loughborough (LADARC)—6 Oct (AGM, 8pm), 13 (Audio visual with G0FTT), 20 (Direction finding), 3 Nov (Night on the air), 7.30pm. Hind Leys Community College, Forest St, Loughborough. Sec G0FTT.

Mansfield (MARS)—2 Oct ("Antennas for small gardens", G3BA), 20 ("Practical frequency measurement", G4GNC), 6 Nov (RSGB video). Victoria Social Club, Princes St, Mansfield. Sec G4AAH, tel Mansfield 642719.

Matlock (Tor ARA)—6 Oct (Night on the air), 13 ("My visit to China", G4MHB), 20 (Quiz night), 27 (Talk and demo by Microwave Modules), 7.30pm. Greyhound Hotel, Cromford, nr Matlock. Sec G0FWI, tel Matlock 3503.

Spalding (SADARS)—9 Oct ("Weather predictions", G3LYA), 7.30pm. The Ship Albion, Albion St, Spalding. Sec G4NBR.

REGION 5—RR J S Allen, G3DOT, 77 Rosslyn Crescent, Luton LU3 2AT. Tel 0582 508515.

Cambridge (C&DARC)—16 Oct ("Communications and navigation aids of the modern lifeboat", Cmdr Ken Wollan, RN rtd. The club invites members from other clubs to this talk; hopefully lifeboat models will be on show and a small donation will be made to the RNLI), 23 ("Propagation basics and hf prediction", G3LTP), 7.45pm. Coleridge Community College (visual arts room), Radegund Rd, Cambridge. Sec G4TR0, tel 0223 353664.

Dunstable (DDRC)—2 Oct ("Arran expedition", DPARG), 3, 4 (1-3GHz contest), 16 ("Satellite tv equipment"), 30 (Junk sale), 8pm. Room 3, Chews House, High St, South Dunstable. Sec G0COQ, tel 0582 508259.

Milton Keynes (MK&DARS)—12 Oct (AGM). The Meeting Place, Hodgelea, North Milton Keynes. Sec G0ERE, tel 0234 750629.

Northampton (NRC)—1 Oct ("Moonbounce", G0EME), 15 ("Cadcam", G4YJP), 22 (AGM), 8pm. Kingsthorpe Community Centre, Northampton. Sec G8EUX, tel 0327 51716.

Peterborough (GPARG)—22 Oct (Visit by G3DCJ, RRS), 7.30pm. Southfield Junior School. Sec G1UGA, tel 07332 30088.

REGION 6—RR N P Taylor, G4HLX, 87 Hunters Field, Stanford in the Vale, Faringdon, Oxon SN7 8ND. Tel 03677 503

Harwell (HARS)—20 Oct ("Weather satellite reception", by Maurice Brown and G8DVK), 7.30pm. Harwell Lab. Social Club. Sec G6LNU, tel Wantage 68453.

High Wycombe (Chiltern ARC)—28 Oct (Quiz night), 8pm. Sir William Ramsay School, Rose Ave, Hazlemere, Details G4XVP, tel 0494 35275.

Maidenhead (M&DARS)—1 Oct (Annual junk sale), 7.30pm. Red Cross Hall, The Crescent, Maidenhead. Sec G8RYW.

Oxford (O&DARS)—14 Oct (Natter night), 28 ("Computers in amateur radio", G4HLX), 7.45pm. Oxford Civil Service Sports Association Club, Govt Buildings, Marston Rd, Oxford. Sec G4PUU, tel Oxford 52859.

Reading (R&DARC)—13 Oct ("Trunked radio systems", G8CQR), 27 (Inter-club quiz), 8pm. Clubroom,



Radio Club of Thanet members operating GB2MLB from Margate Lifeboat house on 26 July in support of the lifeboat's open day. L to r: Doug, BR587268; Derek, G0DFI; Ken, G4RNU; Dave G1NLQ; Don, G0HMA; John, G4SBD. At the mic is Butch, G0CBY, with John, G0CHN, looking on. Photo: Isle of Thanet Gazette

White Horse ph, Emmer Green, Reading. Details G4YFB.

Slough (Burnham Beeches RC)—5 Oct (Surplus equipment sale), 19 ("PASCAL language", Tony Watson), 8pm. Haymill Community Centre, 112 Burnham Lane, Slough. Details G6EIL, tel Maidenhead 25720.

Oxfordshire RAYNET Group always welcomes new members; contact them on the weekly net, 144.825 MHz, Friday 8pm or contact G6NPP, tel 0235 35106.

REGION 7—RR R Sykes G3NFV, 16 The Ridgeway, Fetcham, Leatherhead, Surrey, KT22 9AZ. Tel 0372 372587

Ashford (Echelford ARS)—12 Oct (Natter night), 29 (Morse practice), 8pm. The Hall, St Martins Court, Kingston Crescent, Ashford, Middx. Sec G4VAZ, tel Sunbury 783823.

Coulsdon (CATS)—12 Oct ("Sussex Repeater Group Roadshow"), 29 (Informal), 8pm. St Swithuns Church Hall, Grovelands Road, Purley, Surrey. Sec G6HC, tel 01-684-0610.

Cray Valley (CVRS)—1 Oct (Surplus sale), 8pm. Progress Hall, Admiral Seymour Road, Eltham SE9. Details G3TAA.

Croydon (SRCC)—5 Oct (Surplus sale), 8pm. Mullard Social Club, Mitcham. Sec G8IYS tel 01-657 0454.

Crystal Palace (CP & DRS)—17 Oct (Surplus sale), 8pm. All Saints Parish Room, Upper Norwood, SE19. Sec G3FZL tel 01-699-6940.

Dorking (D & DRS)—13 Oct (Informal at The Falkland Arms), 27 (tba at Ashcombe School). Sec G3AEZ, tel 0306 77236.

Farnham (VHF Group)—12 Oct (Discussion evening), 26 (Natter night), 8pm. Farnham Central Club, Farnham, Surrey. Details G4EPX.

Guildford (G&DRS)—23 Oct ("Modern advancements in hf commercial radio"), 8pm. Model Engineers HQ, Stoke Park, Guildford. Sec G4VRN.

Kingston (KDARS)—21 Oct ("Computing", G3LFX), "Alfriston", 3 Berrylands Road, Surbiton. Details G3IMK, tel 01-397 6924.

Sutton and Cheam (S & CRS)—16 Oct (Surplus sale), 8pm. Downs Lawn Tennis Club, Holland Avenue, Cheam. Sec G0BWW.

Thames Valley (TVARTS)—6 Oct (ATU construction project judging), 8pm. Thames Ditton Library, Watts Road, Giggs Hill, Thames Ditton. Sec G3ENI.

Wimbledon (W&DRS)—9 Oct (AGM), 30 ("DX techniques", G3TFF), 8pm. St. Andrews Church Hall, Herbert Road, Wimbledon SW19. Sec G3DWW, tel 01-540 2180.

REGION 8—RR M Elliott, G4VEC, 20 Haysel, Sittingbourne, Kent ME10 4QE. Tel 0795 70132.

Burgess Hill (Mid-Sussex ARS)—1 Oct (Operating evening), 8 ("Contests", G3FXB), 11 (21/2MHz contest), 15 (Operating evening), 29 (Visit to Royal Observer Corps), 7.45pm. Marle Place, Leylands Rd, Burgess Hill. Details G0GNV, tel 04446 41407.

Dartford (DDFC)—2 Oct (Station night hunt), 13 (Pre-hunt meeting), 31 (Station night hunt, Mid-Thames), 3 Nov (Pre-hunt meeting). Pre-hunt meeting at Horse & Groom ph Leyton Cross, after 9pm. Details G8DYF, tel Greenhithe 844467.

Dover (SE Kent YMCA ARC)—7 Oct (Natter night), 14 ("Cell-Call", by Phillip Smye-Rumsby), 21 (Natter night), 28 ("144MHz fox hunting, G0BPS). Dover YMCA, Godwynhurst, Leyburne Road, Dover. Details John Dobson, Flat 3, 145 Snargate St, Dover CT17 9BZ.

Eastbourne (Southdown ARS)—5 Oct (Junk sale), 2 Nov (Construction evening), 7.30pm. Chaseley Home, Southcliff, Bolsover Rd, Eastbourne. Classes and meetings also held every Tuesday and Wednesday, 7.30pm. Hailsham Leisure Centre, Vicarage Lane, Hailsham. Sec G1UTH, tel Crowborough 63061.

Gillingham (Bredhurst R&TS)—1 Oct ("Home construction", G4VSZ), 8 (Construction and natter night), 15 (Construction contest), 22 (Inter club quiz), 29 ("Simple sideband", G3ROD) 7.30pm. Parkwood Community Centre, Parkwood Green, Wigmore, Gillingham. Details G0AMZ, tel Medway 376991.

Hastings (HEC)—21 Oct ("Junk auction"), 7.30pm. West Hill Community Centre, Croft Road, Hastings. Details G4NVQ, tel Hastings 420608.

Horsham (HARC)—1 Oct ("VHF and the history of 50MHz", G8VR), 8pm. Guide Hall, Denne Road, Horsham. Sec G4UDU, tel Hassocks 5517.

Kent (Kent Repeater Group)—Responsible GB3CK, GB3EK, GB3KN, GB3KS, GB3NK, GB3RE, GB3SK. New sec G0AMZ, tel 0634 30544.

Margate (Radio Club of Thanet)—13 Oct (AGM and natter night), 7.30pm. Grosvenor Club, Grosvenor Place, Margate. Sec G1HWG, tel 0843 42480.

Worthing (W&DARC)—7 Oct (AGM), 14 (Ragchew evening), 21 (Workshop evening), 28 (Guest speaker tba), 7.30pm. Lancing Parish Hall, South Street, Lancing. Details G4GPX, tel 0903 743893.

REGION 9—RR A H Hammett, G3VWK, Rosehill, Ladock, Truro, Cornwall, TR2 4PQ. Tel 0726 882 758

Axminster (Axe Vale ARC)—2 Oct (AGM). Details G3VW, tel Lyme Regis 5282.

Barnstaple (North Devon RC)—First Wednesday of the month, 7.30pm. Please note new venue. The Microcentre, Unit 1, Barbican Industrial Est, Barnstaple. Details G4LST.

Exeter (EARS)—12 Oct (AGM), 7.30pm. Community Centre, St David's Hill, Exeter, Details G3YBK, tel 0392 78 710.

Exmouth (EARC)—7 Oct ("Experiences of a BBC engineer"), 21 ("Interference", G8GON). Details G1ZG.

Redruth (CRAC)—1 Oct ("Transistors for the not so young", G1AJB), 12 ("Fibre optics in computing", G4RVP and G3VWK), 15 (Activity evening), 5 Nov (Surplus equipment sale), 7.30pm. Church Hall, Treleigh, Redruth. Details G4ZUI, tel Stithians 860 572.

Saltash (S&DARC)—16 Oct (Construction night), 6 Nov (AGM), 7.30pm. Toc H Hall, Warraton Rd, Saltash. Details G0AKH, tel Saltash 3277.

REGION 10—D H Phillips, GW4KQ, 17 Pentre Gardens, Grange, Cardiff S5 6Glam, CF1 7JQ. Tel 0222 35648

Cardiff (British Telecom S Wales District ARC)—It is proposed to start an amateur radio club as part of "Leisure and Sports Telecom". It is anticipated that the club will meet every second Wednesday. An invitation is extended to all, staff and non-staff, to the

inaugural meeting which will be held on 14 Oct at the BT South Wales District HQ, Coryton, Cardiff, starting at 7.30pm. Further details can be obtained from GW4ZVY, tel Cardiff 379732 weekdays 8am-4pm.

Cardiff (CRSGBG GW5BI)—12 Oct (AGM). Sec GWOCUM, tel 04463 3212.

Cardiff (Highfield ARC GW4LFO, GW1LFO)—1 Oct (Technical lecture with GW4HWR), 8 (Natter night), 15 ("BC's bits, local repeater logic", GW4HWR), 22 ("Brain of Highfields" quiz), 29 (Technical lecture with GW4HWR), 5 Nov (Bonfire night natter). Sec GW6ZHM, tel 0222 750315.

Carmarthen (CARS GW4YCT)—New venue. From 1 Sept CARS will meet at The Communication Rooms, c/o Gofor Glas, Maesybont, nr Llanelli, Dyfed. Meeting times remain the same. Sec GW4ZXL, tel 0267 231359.

Llanelli (LARS RS87700)—26 Oct ("Aims and objectives of the RSGB", GW4KQ, RR10). Sec GW1MGW.

Newport (NARS GW4EZW, GW1NRS)—19 Oct (AGM), 2 Nov (Eisteddfod meeting hopefully with a talk from a member of the Eisteddfod organising committee. We would like to invite members from all radio clubs in Gwent to attend as help will be appreciated in running the special event station at the Newport National Eisteddfod, Summer 1988). Sec GW4IED, tel 0633 280958.

Powys (PARC GW4HVN)—8 Oct (Home construction contest), 7.15pm. Sec GW4DWX, tel 0938 2068.

Rhondda (RARS GW2FOF)—1 Oct ("Aerial circus"), 15 (General meeting), 7.30pm. Sec GW4BUZ, tel 0443 432542.

Swansea (SARS GW4CC)—24 Oct (Coach trip to Leicester exhibition), 7.30pm. Room 303, Applied Sciences Bldg, University College of Swansea. Details GWOBBO, tel 0792 818100.

REGION 11—RR B H Green, GW2FLZ, 1 Clwyd Court, Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH.

Tel 0492 49288.

Colwyn Bay (Conwy Valley ARC GW6TM)—8 Oct (Visit to Electronics dept, University of North Wales. Meet 7pm in foyer, Dean St, Bangor), 8pm. Green Lawns Hotel, Bay View Rd, Colwyn Bay. New sec GW0DSL, tel Prestatyn 5529.

Deeside (Alyn & DARS)—6 Oct (Surplus gear sale), 20 ("North America", Ken Senar), 3 Nov (Construction contest), 17 ("Glass blowing", GW1MIK), 8pm. Shotton Social Club, Shotton La, Deeside. Sec GW1ILZ.

First North Wales Radio Rally is to be held in the Aberconwy Conference Centre, Llandudno Promenade on the 7 and 8 Nov. Opens at 11am each day (10.30am for disabled visitors).

Will club secretaries please send or phone details of their future events for December onwards. These are the only new reports received. **RR11**

REGION 12—RR M R Hobson, 17 Well Brae, Pitlochry, Perthshire PH16 5HH. Tel 0796 2140, Prestel 10796 2140.

Aberdeen (AARC)—2 Oct (Junk sale), 9 ("My experiences in the USA", GM4TEF), 16 (Beginners' night with GM3VEY), 23 (RSGB video night), 30 (Halloween party for all the family), 6 Nov (Junk sale), 7.30pm. 35 Thistle La, Aberdeen. Sec GM4GXD, tel Pitcairney 251.

Caithness (CARS)—14 Oct (Slide show "Aura contact"), 7.30pm. Loch Watten Hotel, Watten. Sec GM1VGZ, tel 0847 82632.

Some club news is arriving too late for inclusion. Please draw your club sec's attention to the new deadlines. **RR12**

REGION 13—RR Alex J Scott, 2 Manderston Grove, Duns, Berwickshire TD11 3PR. Tel 0361 83221.

Berwick-upon-Tweed (Border ARS GM0BRS)—2 Oct (Discussion on CQ contest), 16 (AGM), 7.30pm. Church St, Berwick-upon-Tweed. Sec GM1IRN, tel 0289 82491.

Edinburgh (Lothian RS GM3HAM)—14 Oct ("History of communications", Mr Matthews), 28 ("Malt Whisky", P Dryburgh), 7.30pm. Royal Ettrick Hotel, Ettrick Rd, Edinburgh. New Sec GM4DTH.

Any secretaries in Region 13 please contact me if you can participate in a club news net on hf/vhf twice a month for updates etc and save on postage. **RR13**

REGION 16—RR Alan Owen, G4HMF, 102 Constable Road, Ipswich, Suffolk IP4 2XA.

Bury St Edmunds (BSI EARS)—20 Oct (Junk sale), 7.30pm. County Upper School, Beetons Way, Bury St Edmunds. Details G1FUU, tel 0359 50271.

Chelmsford (CARS)—6 Oct (AGM), 3 Nov (Junk sale), 7.30pm. Marconi College, Arbour Lane, Chelmsford. Details G4KQE, tel 0376 83094.

Clacton (CARS)—14 Oct (BNOS visit), 7.30pm. Eldorado Club, The Broadway, Jaywick. Sec RS430466.

Colchester (CRA)—1 Oct (AGM), 15 (Equipment clinic, Marconi Instruments), 29 ("Shortwaves and beams", J Stanley Ward), 7.30pm. Colchester Institute,



Some of the operators and helpers for the Farnborough and District Radio Society cheering the end of VHF National Field Day 1987. Photo Garry Smith

Sheepen Road, Colchester, CO3 3LL. Details G3FIJ, tel 0206 851189.

Felixstowe (F&DARS)—5 Oct ("Knot tying for the radio amateur"), 19 (Social), 8pm. The Scout Hut, Bath Road, Felixstowe. Details G4YQC, tel 0473 642595 (daytime).

Ipswich (IRC)—14 (tba), 28 ("Steam locos", J James), 8pm. Rose and Crown ph, Norwich Road, Ipswich. Details G4IFF, tel 0473 44047.

Leiston (LARC)—6 Oct ("Valve linears", G3HYA), 3 Nov (AGM and surplus sale), 7.30pm. Sizewell Sports & Social Club, King George's Ave, Leiston. Details G0CJX, tel Saxmundham 3222.

Loughton (L&DARS)—9 ("Home brew ale", G8AB), 8pm. Debben Community Centre, Loughton Hall, Rectory Lane, Loughton. Details G4FKI.

Norwich (NARS)—14 Oct (Anniversary celebrations at Norfolk Dumping ph), 7.30pm. New Cattle Market, Norwich. Details G4RKK, tel 606979.

Vange (VARS)—1 Oct (Junk sale), 8 ("VLF", G6PAE), 15 (Home brew), 22 ("Oscilloscopes", G3ASH), 29 (Mini lectures). Details Mrs D Thompson, tel 0268 552606.

Essex Repeater Group—5 Oct (AGM), 8pm. Danbury Village Hall.

REGION 17—RR T M Emery, G3KWU, "Wilverley", Old Lyndhurst Road, Cadnam Southampton SO4 2NL. Tel 0703 812435

Basingstoke (BARC)—5 Oct (AGM), 7.30pm. Forest Ring Community Centre, Sycamore Way, Basingstoke. Sec G1OQU, tel 0256 59644.

Bournemouth (BARS)—2 Oct ("Old Maps", G3CPN), 16 (AGM), 8pm. Kinson Community Centre, Kinson, Bournemouth. Sec G4DJG, tel 0202 526793.

Christchurch (Plessey ARS)—Results of recent AGM; Chairman G6WPU, Treasurer G8RXX, Plessey Social Club, Grange Road, Christchurch. Sec Barry Drinkwater, tel (wks) 0202 486344.

East Dorset UHF Repeater Group (GB3DT)—Please note new location of GB3DT at Bulbarrow Hill. For information or to join the group and help support the repeater, please contact G1VIP, tel 0202 735005.

Eastleigh (Ilchen Valley ARC)—9 Oct ("Equipment reliability", G0GFD), 23 ("Early days of radio", G3ABA), 7.30pm. The Scout Hut, Brickfield Lane, Chandlers Ford, Eastleigh. Sec G1IPQ, tel 0703 736784.

Fareham (F&DARC)—14, 28 Oct (Natter night), 7 ("TM1000 ATU", G4JEV), 21 ("Warlike experience in the RSS", G3AUV), 7.30pm. Porchester Community Centre, Portchester, Hants. Sec G3CCB, tel Fareham 288139.

Farnborough (F&DARS)—14 Oct (Film night to be held at the Farnborough 6th Form College [opposite the RAE]). 28 (Surplus equipment sale), 8pm. Railway Enthusiasts' Club, Access Road, off Hawley Lane, Farnborough. Details M C Graffius, The Paddock, Diamond Ridge, Camberley, Surrey, GU15 4LB.

Horndean (H&DARS)—1 Oct (AGM), 7.30pm. Murchiston Hall, London Road, Horndean. Sec G4RLE, tel 0705 755274.

Liphook (Three Counties ARC)—14 Oct (On air night), 28 ("Brewing", Friary Meux), 8pm. The Railway Hotel, Liphook. Contact G4VKC, tel Liphook 723415.

New Forest Repeater Group (GB3NF)—For informa-

tion or to join the group and help support the repeater, please contact G6DLJ, tel 0703 847754.

Portland (SDRS)—6 Oct (Preparations for JOTA), 7.30pm. The Pennsylvania Castle, Portland, Dorset. Please note new meeting place. Sec G0FIT, tel Dorchester 67596.

Portsmouth Hill Repeater Group (GB3PH)—For information or to join the group and help support the repeater, please contact Mr A L G Price, tel 0329 281852.

South Dorset Repeater Group (GB3SD and GB3DP)—For information or to join the group and help support the repeaters, please contact G3VPF.

Southampton (SARS)—Results of recent AGM; Chairman G8WBN, Treasurer G3VSL, 7.30pm. Millbrook Community School, Green La, Southampton. Sec G4VKB, tel 0703 737892.

Trowbridge (T&DARC)—14 Oct (Natter night), 28 Oct (Junk sale), 8pm. Territorial Army Centre, Blythsea Rd, Trowbridge. Sec G0GRI, tel 0380 830383.

UK FM Southern Repeater Holding Group (GB3SN)—For information or to join the group and help support the repeater, please contact G3KWU.

Winchester (WARC)—16 Oct ("ORP", G2PS), 8pm. Durngate House, Winchester. Sec G1XCT, tel Winchester 880605.

I hope all clubs that are providing JOTA stations this year have an enjoyable weekend on 17/18 October and that lots of young people will be attracted to the hobby as a result of your efforts.

Congratulations to Flight Refuelling ARS for the fine effort in organising Hamfest '87. Congratulations also to Plessey Club on their splendid new club house. **RR17**

REGION 18—RR Ian Gibbs, G4GWB, 61 The Gables, Widdrington, Morpeth NE61 5QZ. Tel 0670 790090.

Hetton-le-Hole (Houghton le Spring ARC G1NMD, G3NMD)—21 Oct (Special event, GB6HF, operating from Houghton Kepier Hall, celebrating the Houghton Feast. The station will operate on 3.5-144MHz), 21 ("Film: 'Computers, first generation and projection through to fifth generation'", Hettondowns Hotel, Hetton. Sec G0ABF, tel 091-584 4673.

Newcastle (Tyneside ARS G3ZQM)—7 Oct (Informal), 14 ("Direct conversion receivers"), 21 ("Making a crystal set"), 28 (tba). Scout Centre, Harbottle St, Byker, Newcastle. Sec G4KOT, tel 091-234 1148.

Washington (W&DARC G4YGW)—The club will hold a video evening on the first Sunday of each month. Oval Community Centre, District 12, Washington. New sec G4GYF, tel 091-417 3483.

REGION 19—R J C Broadbent, G3AAJ, 94 Herongate Road, London E12 5EQ. Tel 01-989 6741.

Cheshunt (C&DARC G4MGC)—7 Oct ("Batteries and their uses and abuses"), 14, 28 (Natter night), 21 ("Emergency network", County council), 8pm. Church Rooms, Church Lane, Wormley, Herts. Sec G3OJL, tel Ware 4316. Morse classes held.

Chiswick (ABCARC)—20 Oct ("Demo of modern rty", G4JUL), 7.30pm. Chiswick Town Hall, High Rd, Chiswick, W4. Sec G3GEH, tel 01-992 3778.

The Maples, Kaisea, Bristol, tel 0272 636045.
Yeovil (Y&DARC)—8 Oct ("Trans match 1", G3AIK), 15 ("Trans match 2", G3AIK), 22 ("Antenna radiation patterns, how & why", G3GCG), 29 (Natter night), 5 Nov ("Simple hf antennas", G3GCG), 7.30pm. The Recreation Centre, Chilton Grove, Yeovil, Somerset. Details G1MNM, tel 0935 79804.

PART EXCHANGE

Members' Ads

The Conditions of Acceptance are published below the Member's Ad form circulated with every issue of *Radio Communication*.

The current rate is £2.30 for 40 words or less: advertisements containing more than 40 words will cost an additional £2.30 for every additional 40 or less words. Each advertisement must be accompanied by the correct remittance, either as a cheque or postal order made payable to Radio Society of Great Britain.

FOR SALE

YAESU FT726R, 2m SP10Z immac condx, hardly used owing to business commitments £600; BNOS 25A pwr supply £140; BNOS linear amp LPM 144-10-100 £140; Daiwa meter NS660P £70. Tel: 05827 66077 after 6pm

ICOM 3200 dual-band vhf/uhf fm mobile compl, boxed incl mobile aerial £450; Icom HS-155B boom mic +PTT switch box £30; Dual-band mobile aerial 2m/70cm 70N2DX, as new, boxed £22.50; 7/8 mobile aerial boxed £15. G1GQL, QTHR, tel: 0425 54946.

SONY HVC3000P COLOUR VIDEO CAMERA with transit case, vhs adaptor, service and instr manuals £250; IVC 871 1" editing video recdr, needs alignment £50 with manual and tapes. Chris, G4RBR, tel: 01-397 5133 extn 309 day 01-891 1263.

HF BEAM 3-ELE MOSLEY TA33jnr, gwo £90; 1/new 4CX250R £15; 2/new Amperex DX553 £15ea; Yaesu FT290 chgr nicads etc, gwo £250. WANTED: 2m/fm rig abt £150; 2m txvtr 28MHz i.f. Ted, G4MID, nr Bury St Edmunds, Suffolk, tel: 0359 31520 after 6pm.

MICROWAVE MODULES MTV435 atv tx plus MMC435 receive cvtr, little used, only 18mths old £110. COCKLE, QTHR, tel: 0424 444376.

TR2200 CX 2m/fm cvtr, full xtalld £60 ono; also Memotech 512 280 computer £50 ono or £100 pair. CBYOS, QTHR Ruislip, tel: 0895 631825.

KW2000B C/W SHURE 201 mic, psu and manual, gwo £175. GDDLS, Ashbourne, tel: 0335 44573.

YD148 DESK/MIC £15; Reyco traps 15m/20m £7 pair; Benchmer ZA-1A balun £7, all unused; HK708 key £9; 12 rolls grade A teleprinter paper £12; Polaroid SLR680, used once £45. G4BCE, tel: 0344 421502.

ANTENNA TUNER UNIT Yaesu FT7700, tunes BC bands to 30MHz, dipoles or end-feds £15. G3TDW, Exeter, tel: 0392 70936.

PSU/MODULATOR ZA11688 Mk1* for WS36 in oak case, gd condx c/w mic +all plugs £30; Pair PT15s £25; txfmr 7"x7"x8" 240/36V about 20A(12G,Sec) 30 taps primary, 8 secondary £20; Excellent CR100 S-meter int/LS modulator aligned, resprayed £40. G3HGM QTHR.

KENWOOD AT230, vgc, orig pkg £190. G4UNM, QTHR, tel: 0983 402273.

ATLAS 215X, 100W mobile hf rig, ssb/cw incl mobile mic, seven mobile whips, with gutter mount, spkr, handbook, excellent mobile rig £300, no split; also 10m multimode, full-coverage usb/lsw/am/cw/fm £110 May swap Century 22 or WHY? GOAYZ, QTHR, tel: 0705 589560.

YAESU FT780R 70cm multimode, 10W o/p, as new, manual, box etc £335; Icom IC260 2m multimode, 10W o/p, manual, gd condx £230. WANTED: Trio SP71 spkr also Trio VF0120. G6CMQ QTHR Beeford, N Humberside Tel: 026 288 330 evenings.

MICROWAVE MODULES 4001 rtty tx wired for 290R, recent manufacturer's service, possible exchange, WHY? £180. G1HIA, QTHR, tel: Bristol 422702.

LARKSPUR C11stn comprising C11tx, R210rx, acpsu (t/r) ac/dcpsu(rx) atu, JBox, leads, comprehensive info £195; C13stn comprising C13tx/rx, 24Vpsu, leads, handbook £95; army w/shop acpsu, 2xht, 2xlt o/p/s, all variable and metered, portable £30; WW2 USNavy portable tx/rx type CR143007 £20; Creed 444 STS rtty tx £35; Pye SSB125T, acpsu, info £35; F27rx on 120.5 £15; auto atu, 30-76MHz, 50W, 50ohm £50; R1475, psu £25; 12V/10A psu £20. WANTED: Portable airband rx, also Wisam etc, B-band(130MHz). Martin, G4NCE, QTHR, tel: 021-357

6139.

JUNKER KEY £15; Heathkit HD-1234 coaxial 4-way switch £10; KW low-pass filter 52ohm 1kW £10; Heathkit HN-31 Cantenna dummy load £12. G4BVI, QTHR Ipswich, tel: 0473 688770.

YAESU FRC9600 SCANNER, psu, video unit installed, boxed, 6mths old, in as new condx, c/w antenna. Exchange for Yaesu FT902DM or FT101ZD Mk3 plus FCR902 or WHY? Please ring daytime Stalham 82075, ask for Ian.

TR10 TS120V hf cvtr, mobile/base use, immac condx £175; CTE mains powered linear amplifier, 26-30MHz o/p 70W am 140W ssb p.e.p., min-max drive 2W-20W, as new £50. G1NEO, QTHR, tel: Nottingham 264533.

TR10 TS700S, vgc £380; MM144 100S 2m PA £80; MM 2m cvtr 28MHz i.f £23; Yaesu FT227R 2m/fm cvtr, vgc £130; hb 70cm cvtr 28MHz i.f £40. PLEASE NO TIME WASTERS! Grant, G4ILI, QTHR, tel: 0452 855339 eves

LINEAR 2m homebrew 2x4CX250B 1kW £100; Marconi universal bridge £35; AVO transistor tester CT537, manual £40. All equip is wkg, linear is heavy and the size of a small fridge. A G Heys, G4GEB, 32 Priorsfield Road, Liverpool L25 8TN.

SHACK CLEAR-OUT: FT790R £300; Heathkit RA1 hf/rx, DX40U hf/tx £70; Marconi uhf s/g 450-1200MHz £80; Labgear LC300 hf/tx 2off, non-wkg, one partially complete, enough parts to build worker with CTS5. Offers? Pye Pocketphone tx/rx xtalld RB6 £10; lightweight rotator £20; misc box of valves £5; ZX81 16k RAM £15. Martin, G4HVV, tel: Newmarket 720084 after 6pm.

YAESU FT-209RH with FBM-4 and chgr, little used £198; Weltz SP-15 1.8-200MHz, 200W pwr/vswr meter, mint £50; Spectrum Plus computer, i/fce, two microdrives, Timex thermal printer, software, books, vgc £120. M Porter, G4TJK, tel: 025672 6558

HEATHKIT DX40U 75W tx £20 ono; Jaybeam 8 over 8 2m beam, new £20. G3VSL, QTHR, tel: 042129 2125.

YAESU FRC7 rx £120, vgc. Cash only. RS53602, tel: 0202 881384.

SONY ICF2001 hf/mf/lf/fm synthesized rx £70 ono. 3x10ft lattice mast sections £40. Buyer collects. G4UOG, tel: 08926 62540.

HF YAESU FT980 tx/rx plus g/c rx, narrower fm filters fitted, incl technical supplement £1100; Yaesu auto-atu FC757AT £235; both incl special connection lead £1300; Teleguipment dual-beam scope D54R plus case £150. All in ex condx/ovno. G4ITF, tel: 0705 386184.

IC260E 2m multimode cvtr, little used £260; Glider purchase forces shack clearance: Gelofo G209 amateur bands rx, needs attn, £40 (handbook/copy wanted); MM26/28MHz tx to 144MHz cvtr £20; 70MHz to 144MHz cvtr, built "Spectrum" kit £10; 144MHz fm tx, 6-chann (4 fitted), boxed module £20; 6-digit BCD thumbwheel switch £10; ICs (new): 2764s and 27128s £1ea; INS8250 £3; MC146818 £2; 78540 £1ea. G8KGV, QTHR Didcot, tel: 0235 811123.

ICOM IC211E 10W/2m base, boxed, manual, vgc £315 ono. Henry, G0BLO, QTHR Bedfordshire, tel: 0525 384384.

ALTERNATOR 2.5kW 110V trans 240V 5hp B&S petrol mobile garaged in full wkg order when last used 7yrs ago, £80; Command rxs 0.19-9MHz +2m spares racks/mains/240/12V pwr supply etc. Offers? WANTED: Comp set. GOGDN, QTHR, tel: 061-445 6628.

YAESU FT208 144-148MHz c/w base chgr/psu spkr/mic, case and aerial £185 ono; Trio R1000 gen/cov rx with fm £245; FT730 70cm/10W/fm, boxed £195 or swap FT208+ FT730 for FT101ZD. WHY hf? Ian, G1HOK, QTHR, tel: 01-517 8277.

TS430S WITH FM BOARD and AT130 atu £725 ono; LF30A low-pass filter £20; TR2400 handheld 2.5W £140 c/w chgr etc; MMC144/28 cvtr £20; MMA144 2m preamp £20 All in vgc. G4TVO, QTHR, tel: 02993 6035.

ICOM 251E NOT muTek c/w SM5 mic, also Icom S05, as new, £375 and £395 respectively or swap hf rig. WHY? G6MSM, QTHR, tel: 0323 840209.

YAESU FT102 TCVR fitted am/fm board, standard, technical manuals, new SP102 spkr filter model, all superb £565. Prefer buyer collects - moving shortly. Various other items, also extensive amateur radio library to split. G3MIN, QTHR West Sussex, tel: 0273 453552.

MICROWAVE MODULES 1296MHz tvtr (less attenuator) * gone homebrew, £150; Tonna 21-ele 432MHz Yagis, 3off £25ea; WG16 choke flanges, new & unused £5ea; G4AEZ, NOT QTHR, tel: 01-360 7100 after 6pm.

STRUMECH 40ft tower and ground post, gd condx, buyer collects, £250. G4AEZ, NOT QTHR, tel: 01-360 7100 after 6pm.

DATONG MORSE TUTOR D70, also RSGB instr book "The morse code for radio amateurs". Tutor is as new, includes battery. It got me my "A" licence, £45ono Howard, tel: 0394 460 474.

STRUMECH VERSATOWER 30ft plus 15ft extension triple-section lattice mast, tilt-over with winch, base mount and bearings, no rust, ex condx, house move forces sale, £300. Buyer collects. G4OLE, QTHR Wolverhampton, tel: 0902 23105.

FT101ZD, fm, mic, fan, matching spkr, homebrew Zmatch linear with pwr, two 4CX250B passive, vfo, spare new 6146B 4CX250B, comp stn with aerials, as lot £500; Teleguipment D43 DB scope £40, probes, books. G3KPM, QTHR Camborne Cornwall, tel: 0209 717612.

2m LINEAR 30W microwave modules MML144/30 with rf amp and manual £50. G4UPJ, QTHR.

FT290R, mint condx, case, nicads, chgr, 1/4-wave helical ant £250. G4ZUE, tel: 0203 346819.

KW2000B, needs attn; VF04B, psu, some valves and manual £100, buyer collects. G0AXZ, QTHR, tel: Bardon Mill (049 84) 467.

MORSE TUTOR DATONG D70 £33; Welz SP220 swr/pwr meter, new £50; Kenwood AT130, mint £70; Icom HM9 spkr/mic, mint £12; LC3 overcoat for IC2E £3. All items plus postage. Norman, G0AES, QTHR, tel: 0622 685443.

B2B MARCONI CR100 £45; SMC Qthar 2, £40. Both gwo c/w manuals. GOFHC, QTHR, tel: 0794 23259.

TR10 R2000 VHF CVTR fitted, mint £485; Rascal 12m telescopic mast, full military specs, locking clamps, bubble level etc, suitable small beam (used for H01), mint £175, prefer inspect/collect. WANTED: AOR2002, FL21002. John, G4TEN, QTHR Blandford, tel: 0258 53075.

SCANNER FRC9600, mint condx, with Withers hf conversion (internal), covers 100kHz-950MHz manuals, box and mains psu, Icom AH7000 super wideband discone. Datong outdoor active antenna, new cost £810 - will sell for £550. Peter, tel: Exeter 79179.

BASIC SS105S £130; BNOS 13.8V 25A pwr unit £65. G3NSU, QTHR, tel: Leeds 630661.

QRO - pr new 3CX2500A3 tubes with chimney. Swap for new 3-500Z tubes; TNC-1 £60; 150pF vacuum variable £25; pr new uhf 4CX250B bases £20; Farfisa VIP400 dual-manual organ plus Sharma cabinet £250 ono plus p&p. G3LDI, QTHR, tel: 0508 70278.

TET HB340 triband 4-ele beam £275. G4ZWR, QTHR, tel: 0527 46075 after 6pm.

YAESU FT101ZD Mark3, fitted narrow cw filter +fm module, FCR902, SP901, vgc £575 ono; 2m Trio TR7800 fm mobile +7/8 mobile ant+mount £135 ono; Yaesu YD148 desk/mic £16. Brian, G4SUA, QTHR, tel: 01-474 5688 after 6.30pm.

VHF GEAR: FT290R, 100W linear preamp, 14-ele beam with pole clamps, cable etc; KR600RC rotator, comp sale, no splits £575 ono. Sale due to other commitments. Tel: Deeside, Clwyd 822798

STANDARD C58 all-mode 2m tcvr, instr book, case, nicads, chgr, similar to FT290R £230 ovno; BC221 freq meter, psu charts £20; 80m direct conversion rx in case, runs off dry batteries £25 ovno. GODFN QTHR, anytime.

TRIO TS811E 70cm base stn, as new, used twice, under warranty, all-mode, 2-25W, dual vfos, scan, 1F shift, RIT, dcs, memories, the best available. New £1065 - selling £790 incl Securicor, bargain! C4UKL, QTHR Cornwall, tel: 0326 40595.

ICOM 740 hf tcvr, fitted fm marker, boxed as new £550 ono; Tasco 4.5" telescope on equatorial mount with flexible controls, boxed, new, unused, all mint condx. GW1IEF, QTHR, tel: 055 934 892.

TRIO TS430S, fm board, YK-88A am filter, handbook, service manual, pristine condx, boxed £675. Will deliver 50miles. G3RDC, QTHR, tel: 01-455 8831.

BBC 'B' COMPUTER, green screen monitor, data rcdr, £185; BNOS 25A pwr supply £95; dx-tv converted Bush, 1-V pos/neg vision etc. Offer please! C4UGV, tel: Fairseat (Kent) 823662.

FT709R 14mths old, FNB3 batt pack, small and large soft cases, aerial, slow chgr, NC15 quick chgr and dc pwr supply £190 ono. G3TFM, Somerton, tel: 0458 73967 evenings.

TWO VERY LARGE MINISTRY txs, twin 813s and twin QY4-250, both ideal linear projects, one with 2.5KV psu £60ea; Eddystone ear rx £90; Racal 117, sideband and 1f units in case £120; T1154M £40; Solartron variable 0-500V psu £10; two hf sig/gens Offers?; AMT1 terminal unit with VIC20, Offers?; 70MHz 4-ele beam £10. Birmingham area, tel: 021-353 3896.

YAESU FT757GX tcvr £650; Drae 24A pwr supply to suit, £85. Both never used, mint condx. George, tel: 0292 268055.

SX200N SCANNER in fair condx and gmo, c/w antenna, psu and instrs. No mods made to scanner but list of mods available, £160 incl postage or £150 if buyer collects. No offers. G1LSK, QTHR, tel: 0522 46145.

TRIO 9130 multimode, boxed, manual £335; Datong Morse tutor £40; both in first class condx. GMOGON QTHR, tel: 0586 52496.

ICOM 2900 TCVR, all-mode, mint, boxed, best offer? 35A SMC stabilised psu, also mint condx, best offer? Pwr press and tools for making variable condenser blades, best offer? GW1IEF, QTHR, tel: 055 934 892.

AMT2 TU RTTY AMTOR ASC11 c/w ICS, ROM, software cables, overways TTL/232 1/face £150; freq measuring model LM7 (BC221) with modulation comp with stabilised psu, phones £30. G4VMP, QTHR, tel: 021-707 3376.

YAESU FT790 70cm multimode, mint condx, orig box and manual £295; Quartz16 fm mobile rig c/w 35W linear, gd condx £20. G1EGL, QTHR Norfolk, tel: Wymondham (0953) 604019.

TRIO TS-130V with cw filter and MC-30S mic, AT-130 antenna tuner and PS-20 psu £500; brass 'GW' slate-based key £20. WANTED: Clandestine and para-military sets, eg Mk128, Mk123, Mk122, B2 etc Any condx considered. G4TMO, tel: 093-287 3892 after 6pm.

YAESU FT ONE, ex condx, c/w all filters, fm keyer memory £950. C4RMD, QTHR, tel: 07072 64342.

VERSATOWER 2-section with winches, steel wire rope cap topmast, all vhf and uhf beams and low-loss cables; CD44 rotator and control unit. Must sell due to house move. £200 the lot, bargain! G8BJP, QTHR, tel: 0843 31069 evenings.

YAESU FRC9600 SCANNER, psu, video unit installed, boxed, 6mths old, in as new condx. Exch for Yaesu FT207 plus FC707 atu or WHY? Tel: Stalham (0692) 82705 daytime, ask for Ian.

COLLINS 75A2 hf rx 1.8-30MHz covers 1MHz at each ham band, gmo £125. G3BX1, QTHR Trowbridge, Wilts, tel: 0373 830804.

LOWE SRX30 rx, 500kHz to 30MHz, vgc £80. G3C00, QTHR Havant, tel: 0705 483676.

STANDARD C5800 2m multimode 25W with Adonis FX1 boom/mic, 7/8-wave whip plus gutter mount and coax Also 80ver8-beam, new in box, £275 the lot. Arthur COEDV, QTHR London, tel: 01-701 9734.

PRO2002 SCANNER, boxed with manual plus SMC Discone and cable £140 ono. Malcolm Gregory, GIUIJ tel: 0329 844233 office hours only.

ICOM IC-251E +muTek board, ex condx £420; Yaesu FT790(1) incl nicads, chgr +case, absolutely immac only 4mths old, boxed +bagged £325 ono; Standard C5800 25W multimode 144/148MHz, ex condx, 10A psu, 5/8-wave homebase antenna £345 ono; Datong FL2 audio filter, gd condx, boxed £65; PG Electronics 10m mains amp, 10W 1/p 50-100W fm, 100-200W ssb o/p £45; Tandy TRS-80 model 1, levels 1+2, 16k RAM with monitor +manuals £75; Colecovision video games +lots of cartridges +Atari cvtr +pole position steering wheel, boxed, immac £60; Vectrex video game with Vector graphics screen, 3 cart-ridges, boxed £60; 10m 5/8-wave vertical antenna £15. Prefer buyers collect. Mike, Essex, tel: 04023 45969.

TRIO 7800 25W fm mobile with 7/8 whip £190; Trio 2500 fm h/h with chgr +mobile chgr etc £180; Yaesu FP707 20A psu £180. WANTED: Something completely different, WHY? Will swap or haggle. Phil, G4LIR, QTHR, G4VAG Staffs.

MML 144/30LS new, unused £75; Yaesu spkr/mic for FT290 etc £15; Jaybeam 16ft portable mast £15; new 4-ele 2m Yagi £9; MM 7dB attenuator £5; prefer buyer collects. Huddersfield, tel: 0484 666497.

KW2000E tx/rx used regularly, recently serviced by KW, incl manual spare PA valves £200 ono. G3VYI, QTHR, tel: 0252 722663 evenings.

HEIL PRODUCTS. SS-2 L/S especially made for amateur market. 2x5W amplifiers 3.5in-woofer, 1.5in-tweeter with 12dB per octave crossover £39; BM10 headset fitted special dc insert £35. Carr extra. G4CHP, QTHR, tel: 0508 470365.

WESTERN ELECTRONICS 5-ele monoband antenna, stored for 3yrs, never used £125 ono; prefer buyer collects as carton is 8ft in length. G4CHP, QTHR, tel: 0508 470365.

DAIWA coax switches, very low-loss handles, very high pwr, unused positions grounded, high class product; CS401 4-positions out £37; CS-2 2-positions out £10, postage extra. G4CHP, QTHR, tel: 0508 470365.

ICOM IC505 6m multimode, boxed, mint £395; Icom IC225FM 10W synth £85 ono; TW4000A dual-bander, 25W o/p, boxed, etc £325; FT708R spkr/mic and 12V pwr lead £165, p/exch considered, WHY? Dennis, G6HKD, tel: 0305 814196 after 6pm or w/ends.

SONY ICF2001D super portable rxd, little use, cost £329, require £245 ono. G6FJA, tel: 092572 2879 after 6pm.

FT102 FM BOARD 600kHz cw filter £450; 2xSpaceMark ETH4C keyers 1kLPH 4-mem £60; 2-mem £50; 2-reel 3-speed tape-rcdrs £10pr; PH2000 3.5-30MHz 2kW p.e.p. wattmeter £35; homebrew 144MHz 4CX250B linear psu spare valves £60; 10-ele/2m/parabeam £10. G4DSC, QTHR, tel: 0765 2230.

B400 FULL WKG ORDER plus manual £60; DX200 240/12V £60. G0BMY, QTHR West Yorkshire, tel: 0535 607869.

COMP 70cm STN: FT790 mobile-mount £265; Yaesu 12A psu £40; MET ele £20; rotator 10m cable £35; h/duty brkts 9ft pole £20; mobile antenna gutter mount £10; accept £360 comp +carr. Poss deliver London S/E. Alastair, G4RUL tel: Eastbourne 503618

SWAN 100MX hf tcvr, 120W with mobile mounting brkt mic, orig pkg, w/shop manual, perfect mechanical and electrical condx, never used mobile £295. G4RDT, QTHR, tel: 0983 65106.

YAESU FT901DM £300; FC901 antenna tuner £75; YP150 wattmeter £50; CDEHAM3 £30. G2BW, Bournemouth, tel: 0202 761381.

ALTRON 3-ELE 4-BAND space saver beam ant, vgc £120 G4VEW, QTHR, tel: 07816 5020.

FT902DM, FC902, SP901, YD148 mic, all-modes, Curtis keyer, filters. Com stn, £650. Prefer buyer to collect and inspect. Will pay half towards petrol. Ron, G4WJJO, QTHR Holyhead, North Wales, tel: 0407 2330.

YAESU FRC9600, mint condx with Withers hf/vhf conversion, covers 100kHz-950MHz, c/w manuals, mains psu, Datong outdoor active antenna, Icom AH7000 super wide-band Discone. New would cost £810 - will sell for £550 ono. Peter, RS90767, tel: Exeter 79179.

YAESU FT-73R handheld with FNB-10 nicad, NC-28C battery chgr, PA-6 car adaptor and extra Trio whip aerial. As new, cost £300 - sell for £200. Mike, G4HLT, tel: Reading 693766.

R1000 TRIO GEN/COV rx 100kHz-30MHz £200, in orig pkg, little used, c/w instr manual and service manual. G3JBU, QTHR Northampton, tel: 0604 401800.

TS-430S WITH am and cw filters, vgc, with orig pkg Sensible offers invited. Tel: 02407 4461 extn 285 daytime or 049481 3115 evenings.

BBC-B ISSUE-7, disk 1/face, with 40-track 100k disk-drive, ROM board, WW +processor ROM, disk doctor ROM, Morse ROM, mint £350; Philips 12in green screen computer monitor £50. Buyer to collect/inspect, pay cash. G6ADL, QTHR, tel: Kettering 710004.

YAESU FRG-7 gen/cov rx, gd condx £75 ono. Carr at cost. Prefer buyer to inspect/collect. G3NTH, QTHR tel: 0784 56567 after 7pm.

ICOM IC720A gen/cov tcvr, ICPS15 psu, mobile brkt, SM5 mic, all boxed £700 ono. G0ATB, QTHR, tel: 01-311 0332.

G0BSX TNC £50; Spectrum 48k 1/face1/RS232/micro-drive with TNC driver prg £80; Panasonic DR31 gen/cov +fm rx dig display mains/battery £80; am Cambridge 70.26 £18; Cushcraft A3 2kW 3-ele beam £80. C4KMG, Fareham, tel: 0329 41921.

IC505, mint, warranty to Feb '88, HM11 scan/mic £350. WANTED: Argo 515, Argosy 2, Omni-D, 51J3/4, Heath HW16, all unmod with h/books. G3ICH, QTHR, tel: 0823 680234.

WHITE STICK BROTHERS EP22, new £100; Sony ICF6700W reconditioned by Sony, as new £100; Datong indoor active antenna, new £40; 2xWharfedale spkrs, new £50. Bruce Taylor, G6KPI, Hillside, Ebbesbourne Wake, Salisbury SP5 5JB, tel: Salisbury 780396.

TRIO TS780 dual-band 70/144 base stn £750; TS9300 6m tcvr £350; ICOM4E 70cm handheld £240, all new this year. Yaesu FT208 2m handheld, spkr/mic etc £150; GSRV full size, unused £14. Deliveries possible, extra. G4RJH, QTHR, tel: 0260 278691.

WW2 BC348 rx, offers? Linear FT2100Z fitted with fan £475 ono; 3-ele Yagi TH3 jnr £100; rotator AR40 £40. Shack clearance of many useful items, £40 the lot. G2CC, tel: 0924 257476.

HEATHERLITE LINEAR 2m CX350A, 4mths old, incl preamp, perfect £470 ono. G4YXV, QTHR, tel: 0234 855131.

TEN-TEC ARCOSY hf tcvr with xtal cw filter, audio filter and calibrator, perfect condx with orig boxes, plus Ten-Tec atu psu for above rig, trap dipol, 80-10m, comp stn for £450 ono. G4CWE, tel: Milton Keynes 511129 evenings.

3kW KUBOTA petrol generator, c/w all accessories. Has run only 30hrs, still for sale due to two of the world's biggest timewasters, £350. G6JHS, QTHR tel: 0905 620041.

YAESU FT-757GX hf tcvr £660 ono; Trio AT-230 £160 ono; both immac condx, both 15mths old; Yaesu FT-209R with two FNB3 nicads, spkr/mic, Vox h/s, chgr, case, instrs, PA3 adaptor £300 ono. G4WHA, QTHR, tel: 0768 67655.

LINEAR AMPLIFIER, very high pwr, 2.5kW p.e.p. with spare Pentode PL8295, 1kW anode dissipation £250 ono; Swan 350 tcvr, 200W o/p, all-bands incl 10m £125 ono. G3LBS, NOT QTHR, tel: 052786 393 or 0836 506 357 (24hr).

AR2002 SCANNING RX, mint condx, boxed £350; ARA500 active antenna, never used £70, boxed. J Cox, 100 Gwendoline Street, Treherbert, Rhondda, Mid-Glamorgan, South Wales. Tel: 774053.

BREAKING, DISPOSING: B400, CR100 Hartley scope 13A Taylor audio osc, many obsolete valves, crts etc, HRO valves. Send requirements with sae. G8MLH, QTH as pre-1987 callbooks. Tel: 083 82 304

TW4000A DUAL-BAND fm 2m/70cm and GPV-7 colinear 3 steps £380; Spectrum 128+2 joystick, 16 games progs £65. Tel: 0226 289578 after 6pm.

13cm AMPLIFIER FOR 2C39 - accept £60 or p/exch for 13cm pwr measuring equip. G3ZTR, QTHR, tel: 0262 674337 after 6pm.

TRIO TS130S £500; Cushcraft A3 tribander £80; Daiwa rotator DR-7500R £60. Buyer collects. G4IME, QTHR, tel: 020488 5964.

YAESU FL2100Z, very little use, boxed with manual £525; pr brand new Cetrion 5728 spare valves £130; above, if purchased together £645; one used but AT1 5728 £25; MM 2m preamp £25. G4FFU tel: 0707 320741

FT1012D fm Mk3 fan/mic, manual, ex condx £485; FC902 atu £85; FT480R, base scanning mic, mobile mount, vgc £325. Prefer buyer inspects/collects. G4VSS, QTHR, tel: 0925 66352.

30FT WIND-UP MAST ex-W/D £70; G4MH mini-beam with balun £40; driven ele for G4MH can be used as third ele or as compact dipole £10. Buyer collects G4UZZ, NOT QTHR, tel: 0952 584831.

AMSTRAD PCW8256 computer and printer plus documentation and the following software: Wordstar, DBase2, chitchat, cardbox, CP/M, Fortran, Pascal, Macro-80 assembler, Newword2, Multiplan, Supercalc

plus a supply of blank disks E300. Will deliver reasonable distance. Stuart, tel: 021-743 7425 evenings.

SILENT KEY SALE: Kenwood TS820S £375; Datong morse tutor £25; Datong filter FL2 £45; Datong filter FL1 (AF) £40; Yaesu FL2000B £200; Ancom AR2002 £300; Daiwa CNW518 tuner, Scopex Scope 14D-10 £125 Vibroplex Bug £35; Drake filter tv 3300LP, Heathkit keyer HO-10, Heathkit swr bridge, Mosley ant TA33TR & rotator mast £100; Daiwa electronic keyer items as seen - reasonable offers? c/o G3CDA, tel: 0993 4433.

SHACK CLEARANCE: TS780 2m/70cm 10W, brand new, in perfect condx £820 ono; MM 70MHz tvtr, 144MHz 1.F £90; homebrew QOV06-40 2m amp with part-built psu £25; large selection components in two 64-drawer cabinets £35; 2m/70cm car battery £10; Pye Westminster (am) 70.26MHz £30; army 450MHz discone £5; twin swr meter £5; s/hand car battery £5; SO239 coax switch (Daiwa) £6; 12V 1A psu £10; variable voltage 10A psu £65; 20ft portable mast £15; CPO phone £5; part-built W&D 70cm preamp £5; four coax connectors £2; CPO morse key £4; 6yrs "Rad Com" E8 PFI rx £4. All ono, sale due to lack of antenna space and spare time. David Dodds, G4WLL, tel: 091 514 4122 office hours.

EDDYSTONE 880 rx 0.5-30.5MHz, ex wkg order £85; Teleguipment S51 5MHz oscilloscope, wkg £20; both above buyer collects with cash. 200 IRCs to clear 20p ea plus s&c. P Reed, 20 Horton Road, Brighton, Sussex, tel: 0273 540793.

DATONG D70 morse tutor, boxed £35; high-mount HK704 key, new, boxed £10; Tonna 432/19-nle beam £10; Channel Master 9502B rotator and support bearing with 100ft cable £45; collect or post extra. Mike, G6MHU, QTHR tel: 0722 23500 after 5pm

HITACHI VIDEO COLOUR CAMERA RCDR E650; also BBC computer datacarder, games, joystick, £200; AMT1 microprocessor rtty Amtor c/w etc £125; parallel i/face, for VIC64 computer £12; grid dipmeter £20. G3XMA, QTHR Coventry, tel: 0203 410208 anytime.

YAMAHA ELECTONE ORGAN A-55H, two keyboards, immac condx incl Yamaha keyboard, dust-cover and stool. Space urgently needed £399 ono. G4XSM, QTHR, tel: 0284 68084.

DATONG D70 morse tutor £35. G08BH, QTHR, tel: 074 488 4453.

KW ATLANTA tvtr with psu and spares £130; Drake R4 rx, spares, £140; HalliCrafter HT37 tx, see G3OSS review on this, £150; Class D wavemeter £10. Tel: Stafford 44755 after 6pm.

2X4CX250B 2m WISL +psu 400W o/p, well-made £280; 4x9-ele +pwr splitter +stacking frame, gd condx £80; Mirage MP2 vhf pwr meter 1500W 2m £80. Johnson, tel: 0778 425367.

COMPLETE HF STN: Trio TS180S tvtr, with PS30, SP180, VF0180, ATU180 (similar to AT230), MC50 base/mic fitted narrow filters and mem unit. All in vgc, sell £675 or exch lcom 271 or Trio TS711. Buyer collects or pays carr. Ray, G4VKE, QTHR, tel: 0229 65351 evenings.

ICOM IC745 tvtr gen/cov rx +fm 2yrs old with Yaesu FP707 psu in as new condx, £750 or would straight swap Yaesu FT102 tvtr +fm FC102 atu in vgc with new PA valves. G4WRLP, QTHR, tel: 0286 5322 eves.

TRIO TS711E 2m multimode base stn, 3 to 25W, 40 mode/repeater shift memories, vgc £650 plus carr. G43MSU, QTHR, tel: 04468 261.

SHACK CLEARANCE: All in gd condx. AR88D £60; HRO £40; Eddystone B34 £40; Eddystone EC10MK2 and mains pack £60; sig/gens Marconi TF1066B £175; TF995 £75; TF801D £40; TF867 £45. Tel: Cambridge 0223 861354 after 6pm.

HEATHKIT HW101, matching/spkr, homebrew psu, PAs rarely used £150; two 5.25in double-sided disk drives in chassis incl psu, psu needs attn £80; Stolle "through"-type rotator +alignment bearing £25; 12V Invttr +ccat diag, o/p 800V, 300V, -100V £30; S/V for 144MHz colinear for 432MHz, mounts, one magmount £25; 46-ele parabeam for 432MHz, used gd condx £15; 1296MHz quad-loop Yagi, one-ele broken £15; G3LUB sbs tvtr ("Rad Com" March '68) modified for 1.8MHz, rx OK, tx incomplete £15; QWERTY keyboard in metal/wood case £10; thermostatically-controlled soldering-iron incl spare bits £10; Motorola "RF Device Data" info and applications, offers? Two and half yrs complete "Microwaves and RF" magazine, offers? All items buyer collects. G3ZWK, QTHR, tel: Crowthorne 775316 after 6.30pm.

KENWOOD R2000 communication rx 100kcs/30MHz am/fm/ssb c/w 12V leads, h/book, boxed, list £637, new condx £425; BNOS 6A psu metered/stabilised crowbar protected as new £42; Daiwa crossed-needle atu CNW419, new, boxed, list £217 - £150 ono. G3IES, tel: Bristol 500742.

FT1012D, WARC, fan, ex condx, used very little, orig pkg £500 ovno. G4KYD, NOT QTHR, Cheshire, tel: 0625 33705.

ORGAN Technics U40, 2-manuals and pedals, rhythms, accompaniment, walking bass, automatic lower to upper chord coupler etc, sounds perfect, suggest £549 or offers; Acorn Atom computer, nominal price WANTED: Anything aeronautical, charts, instruments etc. Godfrey, G4GLM, tel: 01-958 5113.

YAESU FT290R 2m multimode c/w nicads, chgr, case, helical, carrying strap, etc, recent service £250, NO OFFERS; microwave mods 30W linear £60; both boxed and in vgc, both only £300, ideal beginners pack, 10-ele Tiger £20. G0GRA, Lincs, tel: 042771 739.

HF LINEAR pr 813s c/w 2.2kW psu, built to commercial standards, exch for TS520SE, linear builders! 2.5kV 40MFD caps £10ea; 350pF wide spaced cap £10; fans £5; Amperex 4CX250F/C £10ea. All post extra. G3RB, QTHR Whitley Bay, tel: 091 2530504.

STRUMECH 40ft tower £250; rotator KR400 £75; TB3 tri-bander £75; 2m/8-ele beam £15; vertical 10-80m £20. G4PWT, QTHR, tel: 061-881 2970.

FDK750E MULTIMODE 2m tvtr 10W, with FDK430X 70cm 10W expander, gd condx, no split £330. Buyer collects, North Manchester. G6CLX, QTHR, tel: 061 766 6100 evenings.

FRG7 RX +Circuit asb/am filter, vgc, optional timestep readout £125; Lincat £50; Century Data 20MHz hard-disk units, heavy, buyer collects, £50ea. WANTED: Y0901 monitor scope Datong FL3. G0DLF, QTHR Northants, tel: 0604 770835.

UHER 4400 report stereo IC prof tape/rcdr c/w mains supply, ccts 1hr use only, as new £100 ono. Buyer must collect. G6HXB, QTHR, tel: 0895 32601.

COMP STN: TS830S, AT230, SP230, MC50 mic and microwave module 144MHz tvtr £1000 ono. G1DFN, QTHR, tel: 0388 774427.

YAESU 757GX, little used tx £670; FP707 psu £100; FC902 atu £130; FT290R, case, chgr £260; FT 70cm 73R adaptor/chgr in warranty £200. All orig pkg. G0EMI, NOT QTHR, tel: 051-639 3294.

FT790R WITH MATCHING 10W FL-7010 linear amplifier, both boxed and in vgc, very little used and never used portable or mobile, £275 the pair. Rod, Kenilworth, tel: 0926 53393.

COLLINS R392-URR hf/rx 0.5-32MHz, c/w 240V ac to 24V dc psu and 10W amplifier with LS, hermetically sealed and ruggedised, very sensitive and very stable, exterior gd, interior as new, £200 with circuit. Buyer collects if poss. G4JMF, QTHR, tel: 051-355 3854 home or 051-339 4181 extrn 336 office.

FT902DM dc-dc cvtr, all new bands £550 ono; FL-21002, as new £600 ono; Datong Asp £50 ono; Datong FL3 £90 ono, plus all manuals. Jim, G0BCY, QTHR, tel: 01-949 5549 after 6pm.

RACAL RA17 rx 500kHz to 30MHz, absolutely immac condx (ex-lab) £195. G4BUW, QTHR, tel: 0344 420503

STANDARD C58 multimode 2m portable/mobile nicads, chgr, mobile-mount, h/book, helical, boxed, slight fault £125; Standard C78 70cm/fm, gmo complete as above £150; Heathkit RA1 rx with new spare valves, manual. Buyer collects. G6TAH, QTHR Avon, tel: 0761 53053.

70cm STANDARD C78 portable/base in perf wkg order, c/w nicads, mic etc, also free CM88 mobile unit, new in box. Everything boxed with manual, ready to go on 70cm, £139. Ken, G0HRR, Harlow, tel: 0279 26647.

TRIO 201A 2m, in mint condx, only 7wks old, under guarantee, boxed. Has to be bargain of a lifetime at £195. NO OFFERS. Ken, G0HRR, Harlow, tel: 0279 26647.

SOMMERKAMP SRC-8600 as new, boxed, c/w hf cvtr 0-60MHz, psu, etc £350; Amstrad 6128 pc c/w green screen, 80-col printer, 1/0 lead, disks, manuals, all new, boxed £220 ono. Peter, G1ELK, QTHR, tel: 01-804 4565 after 6pm.

WORD PROCESSOR AMSTRAD PCW8256 twin disk-drives, RS232 i/face, loads of extra software, 3 boxes paper, 15 blank disks, with printer, cpm digital research h/books. Cost £750, 12mths old, will take £500. Philip, tel: 0270 761978 after 6pm.

YAESU FT902DM tvtr hf all bands, dc leads, mic, unmarked, boxed, mint condx, manual, £675. G4ZLT, QTHR, tel: 0202 519693 after 7pm.

P60 H/DUTY TELESCOPIC TOWER, separate raising luffing winch, head unit, ball-bearing collar and stub, 12ft mounting column, rotator motor KR400 Kenpro remote indicator, cable, 4-ele beam. Total

£650. Ready for collection. G3ISC, QTHR Bristol, tel: 0272 565860.

TRIO 811E 70cm base tx in perf condx, unused on transmit for 18mths, boxed £800. Beam antenna free with above. G1EUG, QTHR tel: Wellingborough 226009 or 76197.

ICOM 290E 2m 10W multimode tvtr £300; SMC reg 13.8V 8A psu £30; mutek 2m switched preamp £25; swr/pwr meter £10; 2m colinear grd plain ant £10; 9-ele Tonna £15; rotator £30; 5/8 magmount £15. G4VGT, QTHR, tel: 0304 372834.

VHF COMMUNICATIONS MAGAZINES, comp bound set, vols 1-14 (56 issues) 1969-82, best offer secures; rotators, Channel-Master £40; Stolle £45; 48ft very strong portable mast, professionally designed comp £85; 24GHz Plessey Gunn diode module £25. G4BBR, QTHR, Cheltenham, tel: 0242 527588.

TRIO TS430S c/w fm board and optional cw ssb and am filters, PS430 matching psu and MC-425 mic. All in ex condx and boxed £895. Tim, G4YBU, tel: 01-393 9691.

YAESU FRG7700 FRV7700 118-150mcs FRT7700 £300; Belcom AMR217B scanner £100; all in ex condx. RS86601, tel: 0409 253165

TRIO TW4000A, 2m/70cm fm mobile tx/rx, 25W both bands, as new, boxed, with dual-band antenna and diplexer £400 ono. G4REO, QTHR North Staffs, tel: 0538 722825.

PYE VANGUARD AM25T am/fm 4m 70.26MHz, solid-state rx and modulator, self-contained £22; Super Lynx cctv camera, needs std "C" mount lens, video o/p £20; Airtec oscillator 304A 50kcs-100Mcs cw only £36. G4ULR, QTHR Norwich, tel: 0603 51656.

FT790R 70cm multimode portable, ex condx, never used mobile £265 ono; Ferguson colour camera incl Canon lens and electronic viewfinder, gmo, ideal for atv £225 ono. Walters, G8JCF, QTHR Ripley, Derbys, tel: 0773 862289.

TS-120V HF RIG £290; plus PS-20 matching psu £35. Both items very little used and as new, boxed with all accessories, manuals, etc. Prefer no split. G0BII (ex-G8CCI), QTHR, tel: Oxford 880229.

YAESU FT101EE with fm, gmo £280; KW Vespa 300W p.e.p 160-10m, gd condx £85; National NC81X, amateur band rx, vgc £65; Trio 2200GX, 12-chann, new nicads, chgr £75 vgc; Cambridge, 6-chann, Toneburst, vgc £40. G4JXX, QTHR Hampshire, tel: Fareham 230737.

FT77 WITH CW FILTER, fm board, freq marker fitted; also FP700 psu and FC700 atu, all mint condx, boxed, c/w manuals. NO SPLIT, £560. Mark, G13YDH, QTHR, tel: Belfast 795783.

SILENT KEY SALE: Star Communications rx, SR-550 10 valves with spkr, mains i/p 240V, 1.8MHz-50MHz, 3.5/7.0/14/21/28 50-54MHz, £50 ono. Contact: Mr D A Parsons, Farthing Corner, 2 Chapel Lane, Otterbourne, Winchester, Hants SO21 2HX, tel: Winchester 254329.

YAESU FC757AT auto atu £195; NATO 10m/fm converted tvtr £25; Yaesu FL2010 2m linear £48; Yaesu SP980 spkr filters £40; Kenwood SP230 spkr filters £35. G0CAM, QTHR, tel: 0761 415746.

FT101, FT480R, FT790R BNOS LPN 144-10-100 lin m/m 70cm 30W 1in 1296MHz tvtr 7W o/p KR600RC rotator 20A psu plus loads of spares, aerials etc. Offers? G6VXB, QTHR, tel: 0981 23633.

DRESSLER 2m Masthead PA with psu (handle 500W), as new, cost £120, accept £65; Plustron TVR50 tv-dx-rx 5in screen L-M-vhf built-in radio with tuneable BIPA 3yrs old but the best commercial tv-dx-rx available £60. Richard Hill, tel: 0970 4226, 6pm-10pm.

FLDX400/FRDX400 hf tvtr, 5-bands, cw filter, YD148 desk/mic, ex condx £220 ono; Katsumi EK121 keyer with mains adaptor £10; rty comp setup-Scarab MPTU-1, Spectrum i/face, software, Spectrum 48k, tape rcdr. Will split. Offers? G0AHI, tel: Orpington 39410.

IC4E vgc, c/w spare nicad, chgr, soft case, dc-dc adaptor £200 ono; Mullard CL8300 Gunn oscillator new £10; Radiospares TNC connectors 75ohm, new £1.25ea. WANTED: Bird coax switch, Varactor diodes WHY? Small glass or quartz trimmers, attenuators. G6DER, QTHR, tel: 0226 296108.

KW TEN-TEC OMNI C, WARC, all filters fitted, matching psu plus extras £675; PFI pocket fones R80 £30; Newbury terminal for spares, free. G4BJM, QTHR, tel: 0908 567362.

PF2UB, FITTED G83CR, LI, SUB +Toneburst works FB £80 ono; pair of TRW PF9785 devices, build 150W linear! New, unused, plus data £50 ono. Tel: 051 256 9814.

IC2E 2m HANDHELD TCVR c/w chgr, rubber duck ant and manual. Boxed, as new £150; also two 813s, new with holders £25. NO OFFERS. G3HHR, QTHR.

PHILIPS N1502 VIDEO RCDR, Tanberg (Series 15) reel-to-reel tape rcds (2off); Philips auto reel-to-reel tape rcd. All above ex-school equip and wkg. Reasonable offers accepted. Buyer collects or pay extra for carr. G3UXH, QTHR, tel: 0634 250562.

TR10 TR9500 UHF MULTIMODE c/w 80-9 stn base unit, mobile mount, manual, mic, £400. Stab: mains psu available. C8LT, QTHR, tel: 0327 860321.

KW2000A WITH ACPs h/book gd condx, spare valves £165; Shure 444 mic £20. Would consider swap for FT208. Buyer collects. G3YHR, QTHR, tel: Chesterfield 74603 weekends.

TR10 9000 2m multimode with mobile mount £300. G4EUL, Sandwich, Kent, tel: 0304 611040 evenings.

TL922A WITH ACCESSORIES, operating manual, service manual. First class condx. Will cover 10m, £700. C3CCX, 117 Sea Lane, Rustington, West Sussex, tel: 0903 784584.

KENWOOD TR9130, boxed, mint, mounting brkt, h/book £350, NO OFFERS; Drae slow-scan rx, boxed, h/book, fault on tape socket, otherwise mint, £150 ono. Dave, RS84478, tel: 0980 42419.

TR10 TR751, used 1hr, 2mths old, condx as supplied by Lowes, c/w packaging, £495; psu to suit above £45. G4LTM, tel: 061 338 3787.

ATU - "CAPCO" SPC300 £180; mic "Astetic" 531 4-pin £10. Both as new. "Durst" professional M800 photographic enlarger poa. GOCOD, tel: 01-423 6159

MICROWAVE MODULES 432/50 70cm linear/preamp, mint, practically unused £85; 12XY 70cm crossed Yagi with harness, new £45; hf Balun 1Kw ratio 1:1, vgc £12; Unadilla 2Kw traps 40/20m, as new, each pair £12.50. G2FZU, QTHR Notts, tel: Southwell 813847.

ICOM 1271E 23cm base stn multimode 10W, also matching AG1200 preamp, both mint condx, boxed with manuals £850. G1LCC, QTHR, tel: Runcorn 68914

FT202R, BASE CHGR, mic/spkr, 6-chann, case £75 ono Datong ASP707 £35. G4WUJ, tel: Aberdovey 367.

TR10 TR7500 2m/fm tcvr with 5/8 whip and magmount £125. G8ATA, QTHR, tel: 04484 4671.

GOING QRT. Yaesu FT102 hf comp stn, many extras. Yaesu 290R 2m car mount linear chgr, nicads, case, many extras. Allen, G4YGB, QTHR, tel: 0843 293853.

DATONG MORSE TUTOR, first-time pass, as new £35; Class "D" wavemeter 6V ac with manual £10; HS-HF5 vertical antenna 80m-10m, hardly used £45. G0HFB, NOT QTHR, W Lankshire, 57 St Georges Road, East Looe, Cornwall PL13 1ED, tel: Looe 2823.

HOMEBREW 28XC 16-ele 2m beam, soundly constructed, works well, 14'6" long so requires plenty of room. Must be collected from South London. Available for much less than cost at £12.50. John, tel: 01-857 8096, evening preferred.

LITTLE USED TR10 R1000, boxed £225 ono; Belcom Liner2 modified to cover 14.100 to 14.530, fair condx £50 ono. WANTED: KW2000 A or B, will do swap if interested. Manchester area, tel: 061-775 3395 anytime.

CLEAROUT: Trio TS830S, YK88CN fitted £745; VF0230 £195; ATU230 £135; KR600RC unused, £150; Datong FL3 £85; AMT-1 cw receive fitted and EPROM for BBC.B £135. Many accessories and test gear; see for list. Graham, G4VUX, QTHR, tel: 0923 248331 evenings.

TS930S TCVR AT930 atu matching spkr, mint condx, mainly used for listening. Save approx £600, bought new, asking price £1350. Buyer inspects and collects. G4YIJ, QTHR Birmingham tel: 021-747 3303

2m-70cm QRP TVTR 'SSB Products' TV144-432 £60; SMC 70cm triple 5/8-whip, gutter-mount £25; Sonim 2m 9-ele crossed Yagi £18; Kenwood SMC-30 spkr/mic £12; Sony AN1 active antenna with fet preamp £25. Tim, G4YBU, tel: 01-393 9691.

ICOM 25E, the best 2m/fm mobile rig. 25W, twin vfos, 5-men, scanning mic, programmable band scan, priority chann, rx 141-148MHz £180. David, G4JLU, QTHR, tel: 01-954 9180 evenings

FT480 2m tcvr, fm and ssb, immac £300; RAE course, spotless, comp £20. G3OAR, QTHR, tel: Wakefield 270024.

STANDARD 2m MULTIMODE portable c/w two mobile brkts, case, chgr etc £225 ono. Tel: 0709 541277 evenings.

TR10 TS830S c/w MC35S mic £790; AT230 £120; HF5 vertical c/w radial kit £65; FT290R, nicads, £270;

Alinco 2m/30W linear £45. All as new, used few hours only. G0EKK, tel: 0704 67577.

SLOW-SCAN TV Robot model 400 scan cvtr, gmo £250 ono. G3BXL, QTHR Wiltshire, tel: 0373 830804.

TR9130 2m MULTIMODE in orig box with all accessories plus mobile antenna, ex condx £325. G4XCT, QTHR Ipswich, tel: 0473 712573.

PYE POCKETPHONE 70, PF2UB c/w nicad, rubber duck and spkr/mic, ideal for 70cm/3-chann, £35; also some spare batteries £10ea. G4HXB, QTHR Uxbridge, tel: 0895 32601.

KW ATLANTA TCVR, recent factory overhaul, fan, mic manual £175; Eddystone EA12 tx, vgc £135; both plus carr. G3JSV, NOT QTHR, tel: Berriew 388.

YAESU FT709R 70cm handheld with spkr/mic, FNB3, FNB4, chgr £229; Yaesu FT708R 70cm handheld with spkr/mic, chgr £149; Yaesu FT290R 2m multimode with nicads, chgr, mobile brkt, M&D linear, mobile antenna £269. Bruce, G4WVX, QTHR, tel: 06286 64415

UHF MOBILE. Standard C7900 super-slim, tiltable display c/w all accessories and packing, vgc £200 ono. G8PRR, tel: 01-340 4139.

TR10 TS711E, as new, very little use, orig pkg, buyer inspects and collects, £650; FU200 rotator with control unit £30. G1PUC, NOT QTHR, tel: Abingdon 23610 evenings and w/end.

SOLARTRON-SCHLUMBERGER professional radio test set £2700; Yaesu xtal control 2m mobile £40; damaged TA33 beam £25. G3WUW, tel: 0734 744545.

GALAXY R-530 with spkr and manual, 0.5-30MHz am/cw/ssb/rtry, recently inspected, in vgc, ideal for beginner. May be seen wkg and collected or carr extra £OD, £150 ono. Leeds area, tel: 0532 656628.

ICOM AT100 ATU, as new and boxed £195; muTek 70cm switched preamp TLN44325 £50; Daiwa CN620A pwr/swr meter 1.8-150MHz £40. G4SWT, QTHR tel: 091 2581110

MHL 144/50-S 50W/2m linear with preamp, ex condx, £80 incl post; Vibroplex mech bug key, ex condx but nameplate missing, genuine £60, a beauty! G4HZF, QTHR, tel: 0472 71215.

ICB1050 10fm, vgc £40; Hallicrafters R274FRR 540kc 54MHz US army signal corps rx £50; Sony Earth Orbiter CRF5090, vgc £40; PF2UB case spkr/mic for repair/spares, xtals SU8 RB6 £15. G4JTK, QTHR, tel: 051 356 1757.

YAESU FT23 Handie with two FNB-10 nicads, NC28C chgr, belt clip, soft case, 5/8 telewhip, YH2 headset/mic, h/b dc/dc cvtr for 12V supply, PTT switchbox and MM821 mobile mount, with packaging, £275, no splits. Paul, G4XTA, QTHR, tel: 09313 359

KENWOOD R1000 gen/cov communications rx with wide, narrow, usb, lsb, cw, ex condx with orig box, instr manual and ac cable, dc pwr kit also included, £210 incl carr. G4WUTC, QTHR, tel: 031-664 2099 evenings.

FT208R 2m and FT708R 70cm Yaesu fm handhelds, soft cases, helicals, h/books, orig pkg, NC9C chgr, £310 the lot. G8MRQ, QTHR Lowestoft, tel: 0502 731640.

FT609R Mk1, c/w nicads and 3-ele antenna £275 ono; Dragon 32 ideal for BMK packet £35; BC348R £20; old Avometer need attn to resistance ranges £5. Buyers must collect. G8EHU, QTHR, tel: 0283 790454

YAESU FT902DM hf rig, all bands +fm, new set of valves this week with receipt. Perfect order and condx, boxed, manual etc £550. NO OFFERS. Ken, G0HRR, Harlow, tel: 0279 26647.

FULL LEGAL POWER LINEARS for 144 and 432. K2RIW design using pr 4CX250B, c/w dual psu capable of running both simultaneously, professionally built, contest proved. Linears £250ea, psu £350 ono. Buyer collects and inspects. G4WIM, QTHR, tel: 0604 862803.

SWAN 350A TCVR, American rig with valves, 12SW, spare PA little used £125 plus carr. WANTED: G2DAF rx, any condx. G3MDQ, tel: 021-354 9972.

FT102 TCVR, perf order, orig pkg and manual; R600 Trio rx, excellent KW trap dipole, one week use, combined swr and field strength meter, new meter for KW109 atu. WANT Vibroplex bug. Offers? G3CBA, QTHR, tel: 0446 741520.

VENTEK DATAPOINT 1500 computer, twin 8in floppy drive, Data Dynamics type 33 teleprinter, 8-hole perforator, believed serviceable, manuals. Offers? G4JLG, QTHR, tel: 061-790 4749, 6pm-7.30pm.

CBM2001 COMPUTER, 40k RAM c/w cassette, monitor, Computhink dual disk-drive, CBM4023 printer, manuals, books, disks, tapes, £315; new timer relays 3-30 seconds variable delay, 12V dc, octal

base, remote reset, contacts 5A 240VAC, £5; used computer equip: Cyclon sealed lead acid batteries, 12V 5AH, £3; 120mm axial fans, 115VAC, £3; Farnell psu, 12V 5A o/p, current limit, remote current sense, £20; Coutant psu, +5V, -12V, +12V, crowbar protection, cooling fan, £20. Carr extra or collect. Nick, G4MKV, tel: Selby 618358.

ST5MCD RTTY TERMINAL UNIT £70; Yaesu FT207R handheld chgr spkr/mic, spare nicad pack £120 or exch. WHY? John, G0BZP, QTHR, tel: 021-553 0531.

COLLINS KWM380 hf tcvr with gen/cov rx and 360Hz cw filter, mint, boxed, £2,150; Late Collins S. line, as new, boxed with many accessories 7553B, 32S3, PM2, 312B4 etc. A dream stn! £1,250. Round emblem. Tel: 0247 455162.

DAIMA AUTO ATU Model CNA-1001, covers 80-10m incl WARC bands, two antenna 1/ps and dummy load, will handle 500W p.e.p., £120 ono. Prefer buyer inspect/collect or plus postage. G4UHM, NOT QTHR, tel: 0245 468149 after 7pm.

AMT-2 £135; disk prog for AMT-2/IBM or clone £10; FL2000B, spare new valves £195; Epson RX80 printer incl cable for BBC.B £130; Labgear/TW setup for 160m £25; all plus carr or collect. G3XOF, QTHR, tel: 0332 367806.

TR10 TS130S hf tcvr with external vfo, in gd condx £450 ono. G0CVB, QTHR Notts, tel: 0623 758329.

BROTHERS COPIER new £100; Datong indoor antenna £30; Sony Communications dual-conversion rx £100. Bruce, G6KPI, tel: Salisbury 780396.

SAIT D72 VHF MARINE, PLL synth, 156-162MHz, full duplex/simplex with duplexer box, control pcb and front missing, hence £100; KF430 70cm 10W 12-chann 11 fitted £90; Burndepth uhf handheld 3-chann £40; CTVR40 46MHz modifiable 50MHz £70. Tel: Watford 224752.

FT290 ALINCO 30W linear, boxed as new, 8-ele quad, 6-ele crossed Yagi, rotator, slimjim ant, comp 2m stn. Going comp hf. £360 the lot! Steve, G0FLN, tel: Billericay 651313.

DATONG GC RECEIVING ADAPTOR, adds 50kHz to 30MHz to 2m rig £80; Amstrad computer PCW8512, 20 disks, 10 books, value £900 - £500 for quick sale; Polaroid image camera, cost £135, £100. Barratt, G4GHG, QTHR, tel: 0803 37050.

TR10 TS130S, vgc £425; Yaesu FT480R, vgc £265; Belcom LS102L 10m/fm/ssb £165; HROX rx homebrew psu, 9 coils £50; HROX rx psu 9 coils £65; 4x155S w/set52 rx/type88; rx107, vgc £45; CR100 £20; Hallicrafters rxS27 vhf £30. G0AUI, QTHR, tel: Haywards Heath 458390.

TR10 9130 IN GD CONDX and c/w orig accessories and pkg, £365 ono; also FT290 mobile mount £19 ono. G6JNS, QTHR, tel: 0905 620041 - leave a message with Charles if I am out.

COLLINS NARROW BAND fm adaptor 148C-1 to suit Collins rx 75A-2. G8WYU, QTHR.

NASCOM 2 or 3 with RAM card, also microwave module rtry to tv cvtr. G8YQS, QTHR Ruislip, tel: 0895 631825.

R5GB HANDBOOKS third and fourth editions; pre-1963 Bulletins. FOR SALE: Yaesu FRDX400 rx and HMT 70/144 tvtr. G4WZL, QTHR, tel: Chester 675794.

BOOKS: "How to use them, how they work" by Ian Hickman; "Troubleshooting with the oscilloscope" (new edition) by R G Middleton. Reply to Mike, E15FZ, QTHR Tralee, tel: 066 25970.

FOR ICOM hf tcvr filters: FL-44A, FL-45, FL54; also fm board marker and keyer modules; SH30 mast, or similar, from Altron; AR2002 vgc, or wanted. Terry, tel: 0634 64962.

MOUNTING BARS FOR T1154 tx type 209 10A/13787, last items required to complete set. Your price paid! Phil, G6MOJ, QTHR, tel: 0483 572653.

KENWOOD AT230 atu or KW Ezee-match in nice condx. G1HUH, QTHR Worthing, tel: 0903 36780.

KW107 or KW109, also KW1000 linear. G4IUI, QTHR, tel: 02572 62988 evenings.

CRT P31/SE5/2A for Solartron scope type CD1400 or U/8 main unit with tubes; also Muirhead 50Hz magalip 3inch transmitter or would consider tx/rx pair. G3CBU, QTHR, tel: 0256 58921.

HELP! AVIONICS PRESERVATION GROUP REQUIRES: T1083, T1115, TR1133, T1138, R1084, TR1091, A1134, df loops and minor parts; also FUGIO items: E10K, S10K, EBL/3H, EZ4, NS2 manuals for above. Will buy or exch. Mr Baker, 71 Sunnyhill Ave, Derby DE3 7JR.

CB RADIOS. Have you given up CB? Why not donate your set to CB For The Blind Scotland regd charity no 286044. Tel: 041-429 6921 9am-5pm Mon-Fri or write to: PO Box no 8, Falkirk FK2 8YB. CMQETC.

WARTIME SUITCASE RADIO A Mk3 (B2 minor) and Mk123 set or any other clandestine and Resistance-type radios incl modern for collection, any condx welcome. Manuals and accessories are of interest. G40FO, QTHR, tel: 01-949 2317.

EARLY WIRELESS AND XTAL SETS: particularly WW1 sets or parts, early valves, horn spkrs, bound volumes "Wireless World", catalogues, prewar tv, also interested tinplate trains and gd hf tcvr. C4ERU, Jim Taylor, 5 Luther Road, Winton, Bournemouth. Tel: 0202 510400.

DRAKE C-LINE tx/rx. G3LDO, QTHR, tel: 0903 770804.

KWM-2A USERS HANDBOOK, main tuning knob and 100kC calibrating xtal, also manual. G4RKB, QTHR, tel: 0206 870683.

YAESU FT101ZD, any reasonable condx; also 2m multimode base stn. London area, tel: 01-672 3372.

KW2000 OR ATLANTA wkg c/w mic, circuit diagram, also circuit diagram Hammarster HM2010. G0HBC/G1RSU QTHR, tel: 021-745 1000.

SSB FILTER FOR FT102 2.9kHz XF-8.2HS. G3TJW, QTHR, tel: Exeter 75051 after 6pm.

NINETEEN TWENTIES OR THIRTIES wireless parts, (radio components) and short wave or amateur rxs, magazines etc of same vintage. G2ADR, QTHR, tel: 0904 794680 most times.

BOUND VOLUMES RADCOM pre-1976; also early SWM volumes. G8VR, QTHR, tel: 0843 601845.

YAESU FT7 or sim 10W hf rig, Daiwa CN630 pwr/swr meter, Yaesu FC902 atu or KW107 Supermatch atu. G4IDF, QTHR Worcester, tel: 0905 351568 evenings or w/ends.

TR10 TS670 MULTIMODE with gen/cov if poss. Good price pd for good example. Will travel 200m radius Newcastle-on-Tyne. Write G4OLC QTHR Northumberland or tel: 0670 855953.

TR10 TS780, must be in mint condx and c/w leads and manual. G4CI, tel: 01-337 9401.

MUTEK CMFA144E masthead preamp c/w ATCS500 sequence controller only fine condx considered if in time controller only purchased SMC had PA in stock. John, tel: 01-857 8096 preferably evenings.

YAESU FT202, FT404, wkg or not. Garrey, G4XDA, QTHR, tel: Bishopton 862875.

DRAKE R4C and T4XC with accessories in gwo; also cased BC221 plus mains psu. Hugh, G1AUR, QTHR, tel: 01-281 0896.

STUDENT SEEKING hf atu, SEM Tranzmatch or similar, consider homebrew, reasonable price paid. G0FYG, QTHR Cambridge, tel: 0223 63684.

GERMAN WW2 ex-service equip, parts, literature for museum purposes. Wkg condx not required. Also WS65/66, WS11, T1190, AD67, Marconi RC37, YQ, 5G, SZERT for Norwegian museum. Will Collect. Rag Otterstad, LASHE/OZ8RO Vejdammen 5, DK-2840 Holte Tel: 010-452-801875.

IC251E OR FT221R, must be in gd condx and have muTek board fitted. G6JNS, QTHR, tel: 0905 620041.

TR10 KENWOOD TS940S with atu, cash waiting. Tel: 04712 594.

TEST SET CT501 and/or manual/diags, also Racal ssb adaptors RA63 and RA121. Non-workers OK if comp. Pete, G8BBZ, tel: 0442 69544.

KW200E PSU, KW Atlanta psu, remote vfo, in fact

anything manf by KW Electronics, in pristine condx for collector WB2PTI. Tel USA 516 766 9230 or 0743 884858 giving comp details. Thanks!

WW2 B2 set in gd condx, also 123 set wkg. G4L10, QTHR, tel: Cosham 373320.

URGENTLY: Info on crt scope tube SE5JP31 (SE5UP31) Sylvania/Brimar, valve data book for AVO tester CT160, vhf command rx R28, ext vfo for FL50/FR50 tx/rx. G4MMLH, QTHR, tel: 083 82 304.

MANUAL FOR MARCONI TF995/A5 sig/gen to buy or borrow for copying, all costs met. G4YZG, QTHR, tel: 0636 71387 after 6pm.

SONY 2001D radio for newcomer to swl. Tel: 0202 697395.

RETIRING AMATEUR, wishing to get away from "Yuppie Land", seeks QTH with existing tower or planning permission for same. Desired areas: North Dorset, Wilts, East Somerset, Avon, Glos, Herefordshire, Worts. Not over £50,000. G3VIE, QTHR, tel: 0734 784048.

NASCOM 2 with or without RAM board. G8YQS, Ruislip tel: 0895 631825 evenings or w/ends.

STIRLING TYPE hot-air engine, wkg or not, castings parts etc. G8AEN, QTHR.

ACCESSORIES FOR MY FT101 Mk2 FV101 vfo SP101 spkr, YG601 display, Shure 444 mic. Must be in gd condx. G4SLG, QTHR, tel: 0522 751920.

DYNAMCO OSCILLOSCOPE side panels, amplifier and timebase to suit 7100, 7210 and 7110 display units G4OMT, tel: 0324 483153.

FT790R. Will swap qty of fishing equip, rods, reels, landing and keep-nets, hooks, weights, box seat etc worth £150-£200, most new, plus cash or have B-flat clarinet if required. G1WTM, QTHR, tel: 04203 5300.

MUTEK IC251 front-end board, new or s/h. G4XBT, QTHR Norwich, tel: 0603 665738 after 6pm.

YAESU FRG7 or equivalent in gd condx, fair price pd. G4KFC, QTHR, tel: Cheltenham 44188.

MANUALS FOR TELEQUIPMENT S32A oscilloscope and Tektronix 1A1 plug-in unit for 545A oscilloscope, borrow or purchase. All costs repaid. FOR SALE: 2x4X150A ITT, brand new E10ea; Tektronix plug-in type 80 (545 series) £5. G4IPR, QTHR, tel: 0992 717185 after 7pm.

SK620A BASES NEEDED. I need a pair of these bases Please! If you can help me with a pair or just one then phone Peter, G4URT, Eastbourne, tel: 0323 411192.

KW107 OR E-ZEE MATCH or equivalent hf Z-match and swr bridge. Homebrew considered if well-made. G3SQX, QTHR, tel: 0425 54371.

COMMODORE PLUS 4 computers, wkg or not, as strip-down spares for my own 44. Also require service manual and circuit diag. All replies acknowledged. Pat West, SB4PW, Apt.18 Pantheon Building, 40 Evagoras Avenue, Nicosia 136, Cyprus.

STORNO 700fm mobile tcvr, preferably gd condx, but anything considered. Must be complete. Also 13.8V psu 10A or greater, any condx accepted. Tony Kempton, G1BYS, QTHR, tel: 01-462 7051.

ICOM ICR7000 used (from UK) or info regarding self-import new from anywhere in world to give a price to me in range £700-£750. Cash waiting. G3ROZ, 13 Abbey Grove, Sandy, Beds SG19 1QP.

PHILIPS ELECTRONIC ENGINEER construction kit (EES/A20) for junior op. Tim, G1HHA, QTHR, Cirencester, tel: 0285 5613.

EXTERNAL VFO FV101Z to match FT101Z tcvr. Tel: Buckley 545177.

30-40FT ALUMAST TOWER and 60ft Versatower or similar. G3FEV, QTHR, tel: 061 764 8845.

EXTERNAL VFO FOR KW2000B, any condx considered. G3UNH, QTHR Maldon, Essex, tel: 0621 56286.

AVO VALVE TESTER manual and board for UK/US 5-plus pins and octals VR150/3 or S130 regulators 8A rf ammeter large US 5-pin bases for 803 large capacity high voltage paper/oil-filled condensers. G3JCL, QTHR, tel: 01-647 7373 evenings.

TELEFUNKEN M23/24/26 tape rcdrs. Good home offered to examples of the above or spares for same. RS20353, tel: 01-560 4776 evenings.

HRO ANY CONDX, parts, WHY? Also CT212 or similar sig/gen, CR100 gearbox, Command rx. G4WMD, QTHR, tel: 0222 761813.

WREN EXECUTIVE - Can you help? I need circuit diag maintenance or programming manual to copy, bank switching software, Winchester details. Any offer considered, reasonable expenses paid, also software swap. Richard Chapman, G4JIB, 185 Carlisle Road, Blackwood, Lanarkshire ML11 9SB Scotland.

YAESU FT707 100W hf tcvr, must be in ex condx. Will exch Trio TR9130 2m 25W multimode little used Now wanting to go hf mobile. Bob, COAZX, QTHR, tel: 0905 423878.

AMTOR Mk2 BOARD. Prefer cheap/tatty but wkg unit to expensive well-made unit. Tel: 0563 34383.

HEATHKIT HW101, mods and improvements ie new bands 160m, freq counter etc. Also HW100 or HW101 wanted for spares or repair, also Hi-Z mic. All costs reimbursed. G4WNI, QTHR, tel: 09405 728.

MAINS TXFMR for oscilloscope Elmac 4810, o/ps 250-30-0-30-250, also 530V, also 6.3V. URGENT. G3XHC, QTHR, tel: Dartmouth 3621.

HEATHKIT RIGS circa 1965-1975 for spares, any condx. Will collect within 100 miles Cardiff. Appropriate value paid. John, G4KVJ, QTHR, tel: 0443 813100.

16mm BELL HOWELL GSAP gun camera 50ft magazine load, ex-govt surplus item; 10mm Switar-Angenieux 'C' MT cine lens, H16 Bolex outfit. G1YST, Melksham, tel: 0225 706795 evenings.

HAMMARLUND HQ180 or HQ170. Top price for rx in mint condx. Senior, G4MIB, QTHR, tel: 01-675 0280.

VICWRITER OR SIMILAR word processor program for 16k VIC20; Television magazine back issues 1980-86 fair price paid plus postage or will collect. G4MXC, QTHR Corby, tel: 05363 201697.

VALVE TUNING INDICATOR type EM4, side contact base G3HZO, tel: 01-642 4093.

SENSIBLE BIDS FOR ZENITH trans-oceanic portable rx model L600, chassis 6L40. Equip is comp and wkg. H/book available. Buyer to collect or arrange transport. G8U2C, QTHR.

YAESU FC902 atu SP901 spkr FV101Z vfo FV101DM or FV901DM vfos with cables etc. Will travel within 150 miles Newcastle-on-Tyne. G4OLC, QTHR, tel: 0670 855953 or write, all letters answered.

AUDIO AMPLIFIER 2W o/p required to modulate low pwr rig. Tel: 01-486 4376.

GEN/COV SOLIDSTATE RX FRG7 or similar. G2BK0, QTHR

GRUNDIG SATELLIT 1400 rx, circuit diag wanted to buy or borrow for photostat. Will pay all costs. G3IMI, QTHR Wellingborough, tel: 0933 680181.

YAESU FT301, any model, plus any matching accessories. Must be in gd condx, non-wkg units wanted as well for repair or spares. Tel: 0453 811454 after 6pm - ask for Pete.

FT209 or FT709 handheld or gd vhf scanning rx. Swap for Amstrad CPC 464 computer plus colour monitor. Ted, G1RQV, QTHR, tel: Cannock 3064.

SCOPEX 4S6 or similar oscilloscope, or new tube D10-260-GH. G4FEN, QTHR, tel: 0424 210177.

RF BRIDGE 916A or rf bridge type 1606A by General Radio; rf bridge type Hatfield LE 300A. G3HCT, QTHR, tel: 05642 2176.

**ALL MEMBERS' ADS RECEIVED UP TO 27 AUGUST
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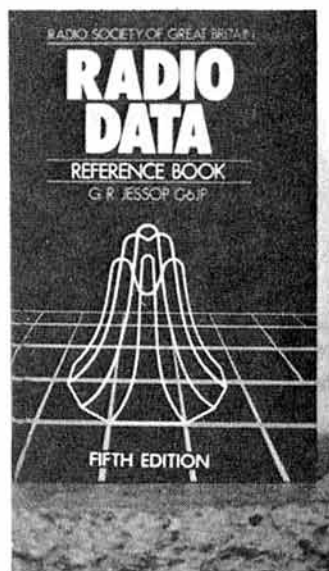


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The *Amateur Radio Operating Manual* contains a wealth of information on all aspects of operating an amateur station. Examples include Q codes, cw abbreviations, operating in foreign languages, beacons, repeaters, QRP techniques, locator systems, meteor scatter procedures, contest operating, mobile and portable operation, satellites, rtty, sstv and special event stations. There are also numerous maps, notes on reciprocal licensing, prefix and countries lists, time zones, tables of frequency allocations, standard frequency stations, and much more. The *Amateur Radio Operating Manual* contains 204 pages and costs £5.81 to RSGB members by post.

The *Radio Data Reference Book* should be in the shack of all technically-minded amateurs. Just some of the data provided are units and symbols, conversion factors, physical constants, circuit symbols, electrical formulas, resonant circuits and filters, inductor design, coupling circuits, basic transistor circuit design, heatsinking, valve and transistor amplifier design, power supply design, antenna and transmission line characteristics, designation of radio emission, transmission standards, UK broadcast radio and tv stations, meteorological data, properties of metals and insulating materials, dimensions of screws, nuts, wire and drill sizes, characteristics of ferrites, and mathematical tables. If you want all this and more the *Radio Data Reference Book* costs £8.15 to members by post. 244 pages, hardback.



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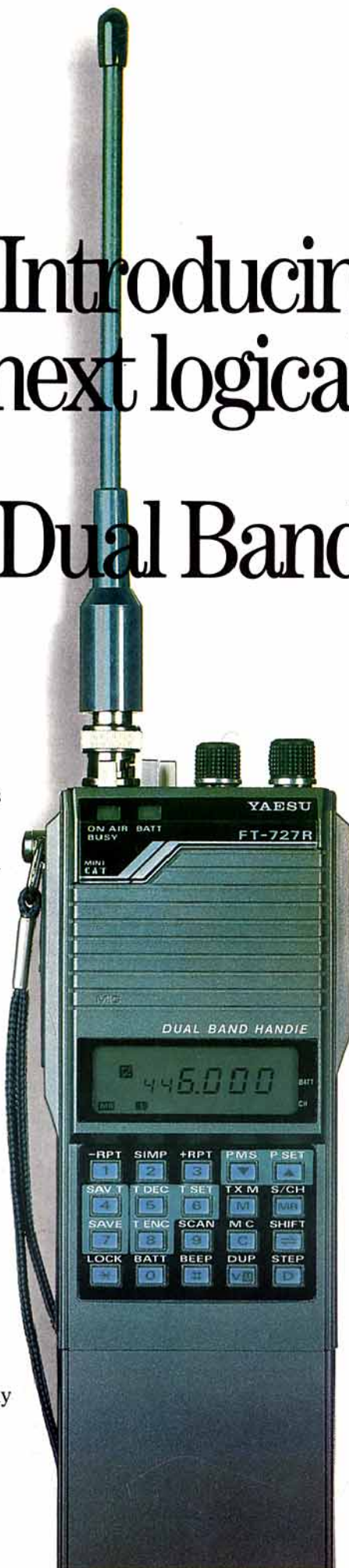
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