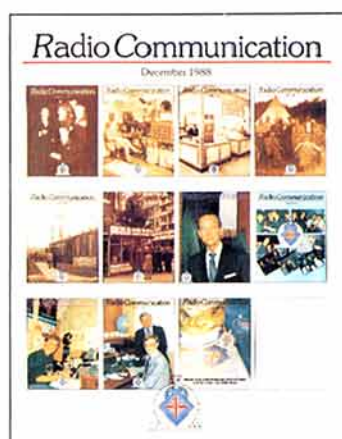
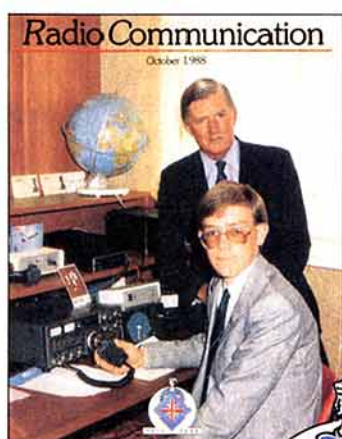
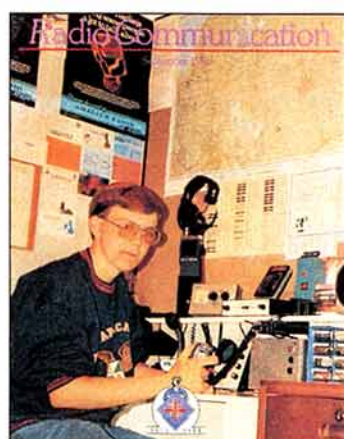
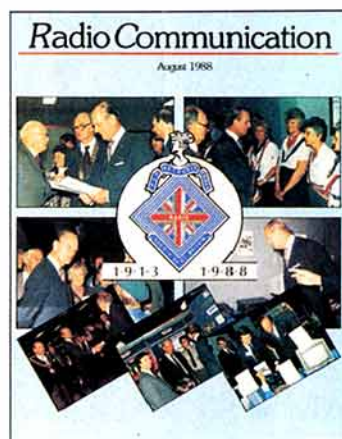
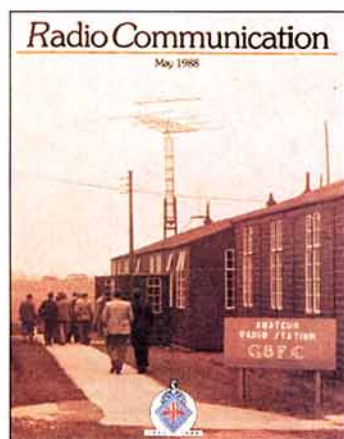
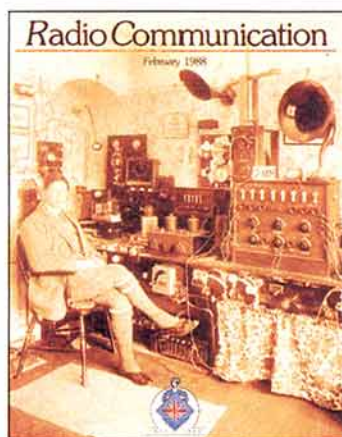
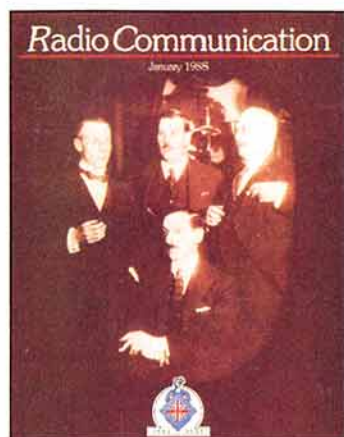


# Radio Communication

December 1988



# KENWOOD



## TM-221E/421E. Mobile magic in miniature.

The TM-221E (2m) and TM-421E (70cm) are rated by amateurs everywhere as probably the best FM mobile transceivers on the market, and sales figures confirm that judgement. These two mini marvels combine all the performance needed to master crowded bands, and are equally at ease in home station use as they are in your car.

With 45W output (TM-221E), or 35W (TM-421E), and a receiver second to none, the receive and transmit performance are perfectly matched. Operating the transceivers is simplicity itself due to Kenwood's expertise in presenting all essential information in easy-to-understand form.

The back lit amber display has outstanding readability under all ambient light levels, and the up/down controls on the microphone allow you to move around the band without taking your eyes off the road.

As for flexibility, these rigs have most things covered, including all channel spacings from 5 to 25 kHz including the increasingly important 12.5 kHz., repeater shifts, tone burst, memories, scanning (even programmable band scan) – all included.

Shown here with the amazing RC-10 controller, the TM-221E and 421E represent the very best mobile FM transceivers you could have, and if you don't believe me just send for a fully descriptive brochure or call in at your nearest approved dealer for a look.

TM-221E £317

TM-421E £352

RC-10 £169

Matching car from £5000 to £65,000 (depending upon specification).

## LOWE ELECTRONICS LTD.

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

**Sole Appointed UK Distributor for KENWOOD Amateur Radio**

DECEMBER 1988

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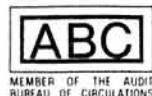
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75TH ANNIVERSARY  
OF THE RSGB



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# Radio Communication

## CONTENTS

- 933 Presidential Address. – From the secretary's office
- 935 News Bulletin – David Gough, G6EFQ, and John Nelson, G4FRX
- 957 Technical Topics – Pat Hawker, G3VA
- 963 Equipment Review: 2m Mobile Transceivers – Peter Hart G3SJX
- 966 Snakes & Ladders with R F Byrne
- 969 Guidelines for the Design of semi-conductor VHF Power Amplifiers Part Two – John Mathews G3WZT
- 973 News & Views
- HF – John Allaway, G3FKM
- 975 UHF/VHF – Ken Willis, G8VA
- 978 Microwaves – Mike Dixon, G3PFR
- 979 QRP – George Dobbs, G3RJV
- 980 Data Comms – Ian Wade, G3NRW
- 981 Satellites – Ron Broadbent, G3AAJ
- 982 SWL – Bob Treacher, BRS32525
- 984 Contest News
- 985 Contest Calendar
- 987 VHF NFD – John Quarmby, G3XDY
- 992 Obituaries
- 993 Members' Ads
- 1013 The last word . . .

Technical articles on subjects of amateur interest are always welcome and should be sent to: The Editor, *Radio Communication*, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

All articles received are reviewed for technical merit by the RSGB Technical & Publications Committee, or an acknowledged expert on the subject, before acceptance. Payment at high competitive rates will be made for all articles published.

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The editor will be pleased to send intending authors a manuscript preparation guide and to give any other advice and assistance requested.

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GREAT BRITAIN 1988

# The TS-790E from Kenwood



The Kenwood tradition of multi band VHF/UHF base stations goes back to the original TS-770, which created a real sensation when it appeared for the first time in September 1979. As with most Kenwood designs, the TS-770 represented a significant step forwards both in design and performance, and again in Kenwood tradition it presented the operator with a wide range of operating facilities which were perfectly engineered for ease of use.

The TS-770 was eventually superseded by the TS-780, which also set new standards in performance and operating convenience, and the TS-780 has gained a reputation for being the very best multi band VHF/UHF station one could wish for. However, in the very nature of electronic technology, advances continue to be made, and the time has come to introduce the all new multi band base station from Kenwood; the TS-790E.

It goes without saying that the TS-790E will once again improve on standards of RF performance, because the design draws on all Kenwood's experience in the use of advanced assembly techniques and the latest semiconductor devices. The real excitement comes from the operational features of the TS-790E which include full duplex operation, two band simultaneous monitoring, cross band repeater operation (for those allowed to use it), and the fact that the TS-790E comes as a two band transceiver for 2 metres and 70 centimetres, but can be fitted with an internal 23 centimetre unit making it into a three bander.

In line with current demands, the power output is 45 watts on 2, 40 watts on 70, and 10 watts on 23: with all mode USB, LSB, CW, CW (narrow), and FM. The CW (narrow) facility includes a fitted 500Hz CW filter as standard.

At this point I should perhaps mention that I too have seen the advertising for a model known as the TS-790G: the significance of the "G" suffix rather than the "E" is simply that the "G" model is the one produced for the Japanese home market and has only 10 watts output on 2 and 70. The "E" model is the European version with the higher power. No doubt the importer of the "G" version will be able to explain the Japanese handbook and the lack of any connection with the Kenwood factory appointed UK sales and service network.

For use with satellites, the TS-790E provides full facilities, including Doppler shift correction (an industry first), and the 23 centimetre band has automatic frequency shift correction.

As one might expect these days, the TS-790E can be fitted with an interface to allow computer control via any RS-232C control

system. Packet radio has not been forgotten, the TS-790E having a dedicated "packet" port.

Add to these features all the memory and scan facilities at which Kenwood excel, the provision for fitting a voice synthesiser to help partially sighted operators, direct keyboard entry of frequency as well as the usual "nice feel" Kenwood tuning control, IF passband tuning, speech processing, noise blanker, and so on and so on. You then have what must be the finest multi band VHF/UHF all mode base station it is possible to build today: the TS-790E from Kenwood.

At the time of writing this text, the descriptive brochures for the TS-790E had not arrived. However, if you send a stamped addressed envelope requesting further data, we will certainly let you have a detailed summary of the TS-790E. If you send £1 we will send back the full Kenwood catalogue and the current complete product listing. We handle a great deal more than people realise, and try to select our products so as to give you the best that money can buy. What we also give you is that all important level of service and backup which is acknowledged to be probably the best in Europe.

Finally, I have had a hectic year and I am looking forward to spending Christmas peacefully with my family. In this first year back in the advertising saddle, I have written the text as I see things. Sometimes it has been controversial, but I hope always honest and sincerely felt. On behalf of all of us at Lowe Electronics may I wish all our friends out there a Christmas marked by peace, love, and harmony.

73

John Wilson  
G3PCY/5N2AAC

## LOWE ELECTRONICS LTD.

Chesterfield Road, Matlock, Derbyshire DE4 5LE Telephone 0629 580800 (4 lines)  
Sole Appointed UK Distributor for KENWOOD Amateur Radio

**TH-205E**  
**£215**

**TH-215E**  
**£252**

**TH-25E**  
**£258**



## What's the difference...

between Kenwood hand held transceivers and those from other makers? Simple quality; in design, in concept, in manufacture, in use, and in sheer enjoyment of ownership. Strangely enough this all comes at competitive prices, so there is little reason to choose any other handheld than one from Kenwood.

Kenwood scored a real hit with the TH-205 and TH-215, which give you high power in a handy size with a choice of facilities, but the new TH-25E really opened up the choices available because of its small size (shirt pocket), high power (up to 5W), and wide range of accessories including a vox operated headset. Frequency readout is by LCD on the top face, and despite everything including car dashboards having keypads, the TH-25E uses a friendly tuning knob to cover the band in 12.5 kHz steps.

As always, I advise you to ask for brochures on these sets because it is impossible to list all the features in this small space.

Funny thing about Kenwood equipment; it always 'feels right', and this applies to everything they make from the TS-940S to the smallest accessory. Why not call in at your nearest APPROVED dealer and ask to see (and hold) a Kenwood hand held. You will not be disappointed.

If you care to send £1 to us at Matlock, we will be pleased to return the full Kenwood catalogues and detailed information on any rig you mention.

## KANTRONICS NEWS BULLETIN



Packet radio has recently been an area of fast expansion in Amateur Radio. There now exists a national and international trunking system for automatic forwarding of information. Personal 'mail' from one Radio Amateur can be sent to another Radio Amateur around the globe in a matter of days or even hours in many cases. 'Bulletins' and items of general interest can be sent and received, they are very diverse in content and range from club activities on a local basis to the AMSAT, RSCB and ARRL news. Real time communication is still available so you can conduct a QSO just like RTTY and AMTOR. Kantronics has remained at the head of the search for new ideas.

Many UP-GRADES have been released by Kantronics to keep the range at this forward position. These are in the form of plug-in EPROMS with accompanying addendum and range in price between about ten and thirty pounds, a fraction of the cost of the new unit.

All units now come with a standard 32K of RAM. In the case of the KPC4 this may be expanded to 64K at extra cost. WE-FAX is a standard fitting on all units, this means that you can receive those wonderful Met forecast pictures off-air. A special program is required for WE-FAX reception but is available for a wide

range of computers. the KA-NODE facility allows other operators to not only digipeat through your station but to connect to you and let your KA-NODE handle the acknowledgements, creating more efficient message handling. the personal mailbox (PBBS) allows people to leave messages for YOU at your station even when you are doing something else. It is now possible to add a battery-backup to keep your messages even if you switch off or have a power cut. Multi-connect allows you to talk to more people than you could possibly want to at the same time! There are over 100 user commands which you can use to personalise your station, you can in fact ignore most of them too if you want to! All are TTL and RS232 compatible. The range is fully MBL software compatible including YAPP, do remember to set your software to type one. All units are metal cased.

KPC2 £159 inc. VAT (carr £8)

Single port for HF/VHF/UHF 300 and 1200 baud operation.

KPC4 £225 inc. VAT (carr £8) ★ NEW LOWER PRICE ★ Dual port for HF/VHF/UHF 300 and 1200 baud operation. Simultaneous operation on two bands using one computer. Gateway facility between bands.

KPC2400 £197 inc. VAT (carr £8) ★ NEW MODEL ★ Single port for HF/VHF/UHF operation. 300,1200 and 2400 b.p.s. operation. 2400 b.p.s. is achieved by using bi-phase operation thus giving a much faster rate of traffic between two users of KPC2400. A special file transfer program for the PC is supplied to extend the use of this special feature. Of course normal 1200 baud packet is still available.

KAM £265 inc. VAT (carr £8) Dual port for HF/VHF/UHF operation.

Simultaneous operation on two bands using one computer. ALL

MODE operation through the HF port: PACKET 300 baud max,

AMTOR, ASCII, RTTY, CW, WE-FAX. Up to 1200 baud

packet through the VHF/UHF port. Of course there is

nothing stopping you plugging the HF lead into a

VHF/UHF transceiver for ALL MODE operation on 2m

and 70cm. Gateway facility is available between

ports. The incoming tones are optimised by a

superb digital filter.

Richard Hillier

G4NAD

## LOWE ELECTRONICS LTD.

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R.C.

# ICOM

## IC-3210E Dual Band FM Mobile



- Full crossband duplex.
- 20 double-spaced memory channels.
- Built-in duplexer
- 4 priority watch functions.
- 25 watts output.
- Programmed, memory and selected band memory scan.
- Variable LCD backlight intensity.
- Tone squelch and pocket beep functions (optional).

If you are newly licensed or just undecided about which band to operate first, then the new ICOM IC-3210 is just the answer. This dual band FM transceiver is ideally suited for the mobile operator. Transmit on one frequency and receive on the other and you're operating full duplex. It's just like talking on the telephone.

The simple and well laid-out front panel ensures quick and easy operation of all its many functions. A great convenience when driving. Optional accessories available are the UT40 tone squelch board, HS15 + SB mobile microphone and switch box SP8 external speaker and PS45 AC power supply.

**Icom (UK) Ltd.**

Dept RC, Sea Street, Herne Bay, Kent CT6 8LD. Tel: 0227 363859. 24 Hour.

# Seasons Greetings to you all

## "75" Series Transceivers



ICOM have a winning line-up for fixed, portable and mobile operations. The deluxe "75" series of transceivers offers a new standard of excellence from VHF to UHF communications. Each compact all mode unit delivers maximum performance, reliability and ease of operation. The "75" series transceivers feature 99 tunable memories, twin VFO's, pass band tuning, I.F. notch, noise blanker and CW break-in. The scanning modes include memory scan, mode scan, programmable scan and frequency skip. These transceivers can be used in a variety of ways, for propagation experiments, satellite communications, moonbounce, D'xing or straight rag chewing contacts. When high speed digital systems such as PACKET or AMTOR data communications are used then the ICOM DDS system provides a lock-up time of just 5msec.

### 2 Meters

ICOM's 25 watt IC-275E is a superb transceiver for contest operating and for general DX working. This prestige

144MHz multimode is also available as a IC-275H 100 watt version, which requires an external AC supply.

### 70cms

Enjoy 430MHz operation with the 25 watt IC-475E, or go high power using the IC-475H. An optional CT-16 Satellite Interface Unit is available for combining ICOM "75" transceivers for easy tuning.

### 6 Meters/10 Meters

The 10 watt IC-575 covers 28-30MHz and 50-54MHz and includes the AC supply. Join in with the recent openings to the U.S.A. with this superb transceiver. Also to be released soon is the IC-575H 50/100 watt high power version, which will operate with an external AC supply.

With the introduction of the "75" series you now have all the technical quality you'll need to enjoy VHF and UHF communications. For more detailed information on these transceivers contact your local ICOM dealer or ICOM (UK) Ltd.

**Helpline:** Telephone us free-of-charge on 0800 521145, Mon-Fri 09.00-13.00 and 14.00-17.30. This service is strictly for obtaining information about or ordering Icom equipment. We regret this cannot be used by dealers or for repair enquiries and parts orders, thank you.

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# HRS Electronics Plc



## COMMUNICATIONS DIVISION

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#### BUTTERNUT ANTENNAS

##### Verticals

|                |  |        |
|----------------|--|--------|
| HF6V           | 6 Band 26ft high   | 159.00 |
| HF2V           | 80/40M 32ft high   | 142.00 |
| A18-24         | HF6V 17/12M add on kit                                       | 30.99  |
| STR11          | HF6V Stub Tuned Radial Kit                                   | 33.49  |
| MPS            | HF6V Mounting Post Sleeve                                    | 5.99   |
| 20MRK          | HF2V 20M add on Kit  | 33.49  |
| 30MRK          | HF2V 30M add on Kit  | 33.49  |
| TLK            | HF2V Top-Loading Kit   | 13.84  |
| RMK-11         | HF2/6V Roof Mounting Kit (includes radials and tripod tower) | 51.49  |
| T2             | Tripod Tower 2ft Roof Mounting                               | 14.79  |
| TBR-160SHF2/6V | 160M add-on Kit  | 53.99  |
| SC3000         | 30-512 MHz Scanner Ant                                       | 63.99  |
| 2MCV           | 2M Colinear 9.8ft 3db gain                                   | 53.99  |
| 2MCV-5         | 2M Colinear 15.75ft 5db gain                                 | 63.99  |

##### Compact HF Beam

|      |   |        |
|------|---|--------|
| HF5B | 10-12-15-20M Butterfly (wingspan 12'6" Boom 6') | 235.00 |
|------|---|--------|

#### CUSHCRAFT ANTENNAS

##### Multiband Beams

|      |                                     |        |
|------|-------------------------------------|--------|
| A3   | 3 Element 20-15-10M                 | 262.99 |
| A3SK | Stainless Steel Hardware Kit for A3 | 35.51  |
| A4   | 4 Element 20-15-10M                 | 353.35 |
| A4SK | Stainless Steel Hardware Kit for A4 | 42.64  |
| A743 | Add-on Kit for A3 giving 40M or 30M | 90.39  |
| A744 | Add-on Kit for A4 giving 40M or 30M | 90.39  |

##### Monoband Beams

|        |         |        |
|--------|---------|--------|
| 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 |

##### Verticals

|     |                          |        |
|-----|--------------------------|--------|
| AP8 | 8 Band 25ft high         | 164.35 |
| AV3 | 3 band 14, 21, 28 MHz    | 56.02  |
| AV4 | 4 band 7, 14, 21, 28 MHz | 104.58 |

AV5 5 Band 25ft high

##### VHF Antennas

|                             |   |        |
|-----------------------------|---|--------|
| 124WB                       | 4el 2M w/Band Beam                        | 36.98  |
| ARX450B                     | 435-450MHz Vertical                       | 42.73  |
| ARX2B                       | 134-164MHz Vertical                       | 42.95  |
| 4218XL                      | 18EL 2M Boomer                            | 106.59 |
| 215WB                       | 15EL 2M Boomer                            | 85.26  |
| A50-6                       | 6 element 50 MHz                          | 116.54 |
| A561-SK                     | Stacking kit for A50-6                    | 33.62  |
| <b>Lightening Arrestors</b> |   |        |
| LAC1                        | PL259 to SO239                            | 6.58   |
| LAC2                        | PL259 to PL259                            | 6.58   |
| LAC4H                       | Lightening Arrestors 2KW PL 259 to PL 259 | 22.73  |

#### MFJ ENTERPRISES

##### Antenna Tuners

|          |  |        |
|----------|--|--------|
| MFJ989B  | 3KW Roller Inductor built-in dummy load. Cross needle SWR/PWR meter, 6 way antenna switch and built-in balun | 368.16 |
| MFJ962B  | 1.5KW Versatuner MK III. Cross Needle SWR/PWR Meter, Built-in balun  | 241.95 |
| MFJ949C  | 300W Deluxe Versatuner built-in dummy load, cross needle SWR/PWR meter, 6-way switch and balun               | 157.75 |
| MFJ941D  | 300W Built-in SWR/PWR Meter, 6 way switch and balun  | 105.13 |
| MFJ901B  | 200W Versatuner  | 63.07  |
| MFJ16010 | Random Wire Tuner  | 42.02  |
| MFJ1701  | 6-way Antenna Switch 2KW SSB   | 30.72  |
| MFJ910   | Mobile Antenna Matcher   | 20.42  |

##### Accessories

|         |   |        |
|---------|---|--------|
| MFJ250  | 1KW Dummy Load (Less Oil)   | 50.66  |
| MFJ260  | 300W Dummy Load   | 28.35  |
| MFJ1040 | All Band Receiver Preselector                                       | 99.40  |
| MFJ931  | Artificial RF Ground  | 79.53  |
| MFJ1274 | Packet Radio Terminal (with tuning indicator)                       | 203.73 |
| MFJ1224 | RTTY/ASCII/AMTOR/CW computer interface Vic 20, TRS80, apple, CBM 64 | 111.82 |

|         |  |        |
|---------|--|--------|
| MFJ1225 | Universal Receiver only version of above   | 78.25  |
| MFJ752C | Dual Tunable SSB/CW Filter with peak/North | 104.16 |
| MFJ723  | CW Filter Switchable 80 to 180Hz           | 52.04  |

##### Noise Bridges

|         |  |       |
|---------|--|-------|
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| MFJ202B | RF Noise Bridge measures resonance and reactance to 100MHz | 63.10 |

##### Wattmeters/SWR Meters

|        |  |       |
|--------|--|-------|
| MFJ815 | 2KW Cross Needle SWR/PWR Meter                           | 57.32 |
| MFJ840 | 2M Power Meter 5W, 50 Ohms Load built-in (BNC Connector) | 20.97 |
| MFJ841 | 2M In Line 5W BNC Conn. Switchable SWR/PWR               | 42.02 |

#### HY-GAIN MULTIBAND BEAMS

|          |   |        |
|----------|---|--------|
| TH7DX    | 7 Element 20-15-10M                     | 669.00 |
| TH5 Mk2  | 5 Element 20-15-10M                     | 575.00 |
| EXP 14   | 4 Element 20-15-10M                     | 449.00 |
| QK710    | Add on kit for EXP 14 giving 40M or 30M | 115.00 |
| TH2 Mk3  | 2 Element 20-15-10M                     | 249.00 |
| DISC 7-2 | 2 Element 40M                           | 486.62 |
| DISC 7-3 | Yagi Director Element 40M               | 305.70 |

##### Monoband Beams

|        |                 |        |
|--------|-----------------|--------|
| 105BAS | 5 Element 10M   | 187.00 |
| 155BAS | 5 Element 15M   | 288.00 |
| 205BAS | 5 Element 20M   | 524.17 |
| 204BAS | 4 Element 20M   | 357.00 |
| BN86   | Balun           | 30.05  |
| 18AVT  | 5 Band Vertical | 146.00 |

##### Rotators

|        |                     |        |
|--------|---------------------|--------|
| T2X    | Heavy Duty Rotator  | 399.00 |
| HAM4   | Rotator             | 329.00 |
| AR40   | Lightweight Rotator | 168.72 |
| CD4511 | Rotator             | 219.00 |

##### Antenna Accessories

|          |                      |           |
|----------|----------------------|-----------|
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| CC1 6285 | Coax cable sealant   | 2.50 each |



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| MFJ422B & MFJ422BX | Delux MFJ/Bencher Keyer/Paddle Combo. America's most popular keyer in a compact package for smooth easy CW. | 422B - 133.16<br>422BX - 76.46 |
| MFJ401B            | Compact Econo Keyer   | 47.77                          |
| MFJ407B            | Delux Electronic Keyer  | 66.90                          |

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| LK550   | Three 3-500Z Tubes   | 2132.65 |
| LK800A7 | Three 3CX800A7 Tubes | 3087.81 |

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Tribander Performance

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| KT34XA | 6 Element Tribander | 579.00 |

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- ★ 21 memories & 2 "call" channels.
- ★ Programmable Scanning & Priority channel
- ★ 12.5kHz & 25kHz steps.
- ★ Includes microphone & mobile mount.
- ★ Bright LCD display
- ★ Reverse repeater etc.

Designed for optimum performance combined with small size, the ALINCO ALR-22E reaches new heights in both technical performance and value for money. We've managed to keep the price down to a level that cannot be matched by any other manufacturer although we believe that a small increase will shortly be made to the price. What better time therefore, than now to purchase one of these super rigs. You won't see prices like this again! Technically it's superb and inside it looks very much like some of its more expensive competitors! Measuring only 5.5" x 6.5" it will fit into most places and if you ask, we will extend the frequency range to cover 140-170MHz on receive. We could bore you with the specification but frankly it's the same as all the others (apart from the price of course). We could tell you about all the various features it has, but again it's not much different from the competition. Let's be honest, apart from being some £100 cheaper than some of its competitors and having an extended receiver coverage, it really is like most other rigs. So if money is no object and you only want 144-146MHz coverage, you probably won't be interested in the ALR-22E. If on the other hand these things are important to you, why not send for the full colour brochure today.

2m FM Mobile ALR-22E



Order now to  
beat the price rise

£249

- ★ 2M FM 144-146MHz
- ★ RX 140-170MHz!
- ★ 3 Watts output
- ★ Battery Saver
- ★ 10 memories
- ★ LCD Readout
- ★ S-meter
- ★ Tone Burst
- ★ Priority
- ★ 12.5KHz steps
- ★ 12v DC operation!

DJ-100E 2M FM

NEW

IN STOCK



£219

Another winner from ALINCO. A true handy transceiver with no extras to buy! Unlike its competitors, you get the nicad pack (500mAh) AC charger, and provisions for direct 12v DC charge. Measuring 168 x 61 x 30mm it's a beauty! Optional accessories include speaker-mic, mobile bracket and high power packs. Get the facts today!

ALD-24E 2m/70cm Dual Band FM

See colour photo on front cover



£449

- ★ 2m/70cm. Full duplex operation.
- ★ 25 watts FM on both bands.
- ★ Single antenna socket output.
- ★ 21 memories & 2 "call channels".
- ★ Programmable scanning and priority.
- ★ 12.5KHz & 25KHz steps.
- ★ Includes all hardware & microphone.
- ★ Bright LCD readout.
- ★ Reverse repeater operation.
- ★ 12 months warranty parts & labour.

## QRP & AERIALS!

We are about to introduce a range of compact single band hf rigs (80/40/20m) for the QRP enthusiast. Each one provides SSB/CW output of 2 watts. Features include VXO tuning, RIT, optional noise blanker and break-in module, built-in Morse key, internal dry cells or external supply, analogue power/S-meter, good dynamic range, excellent IF rejection and ultra stable. Send SAE for further details, prices and availability.

The GLOBAL, LF-80/40 dipole kit is now in stock and gives you a two band antenna for 80 & 40 metres with a total length of 70ft. £29 + £1.50.

GLOBAL Mini G5RV kit. We can now supply a trap kit that will enable you to turn your half-size G5RV into one that covers 80 metres. Total length becomes 66ft approx. (80-10m). £17.95 + 1.00.

## NEW AZDEN PCS 2M FM rig in stock! Fitted Airband 25w FM plus AM/FM 118-180MHz rx. 12.5/25/50kHz steps (Airband 5kHz) Send for gen. £329

### DIAMOND AERIALS etc.

|                                    |         |
|------------------------------------|---------|
| X50 2m/70cm 4.5/7.2dB              | £59.00  |
| X500 2m/70cm 8/12dB                | £129.00 |
| D130N Discone 26-1300MHz           | £82.00  |
| CLP5130 1.50-1300MHz beam 12dB     | £179.00 |
| CLP5130-2 105-1300MHz beam 13dB    | £89.00  |
| CP22J 2m 6.5dB base antenna        | £49.95  |
| M265 2m Mobile 5/6th PL259         | £14.95  |
| EL770H 2m/70cm Mobile PL259        | £30.00  |
| NR72M 70cm mobile 5.5dB PL259      | £27.00  |
| GLS Gutter mount/cable for mobiles | £14.95  |
| D24N Duplexer 2m/70cms             | £26.95  |
| CP4 40-10m vert + radials          | £149.00 |
| CP5 80-10m vert + radials          | £189.00 |

### VSWR METRSetc (New Design)

|                            |        |
|----------------------------|--------|
| SX100 1.6-60MHz 3KW        | £65.00 |
| SX200 1.8-200MHz 5/20/200w | £65.00 |
| SX400 140-525MHz 5/20/200w | £79.00 |

|                            |         |
|----------------------------|---------|
| SX600 1.6-525MHz 5/20/200w | £119.00 |
| MS1 Monitor Scope Pep etc  | £269.00 |

### MISC

|  |        |
|--|--------|
| ADONIS AM303G Base mic   | £49.95 |
| ADONIS AM503G Base mic   | £65.95 |
| ADONIS FX-1 Mobile Goose Neck  | £55.00 |
| 2m 5/8th BNC telescopic ant  | £12.95 |
| LF 80/40 70ft dipole kits  | £29.00 |
| 'Limpet' Rubber mag base. It won't move!   | £19.00 |
| VHF/UHF Airband Guide 2nd Ed   | £5.95  |
| UK Confidential Frequency List   | £6.95  |
| Secret of Learning Morse Code  | £4.95  |
| Complete Guide To VHF/UHF Frequencies  | £5.95  |
| Pocket Guide to RTTY & FAX Frequencies   | £2.95  |
| Oceanic Airband Communications   | £3.50  |
| PLUS HUGE STOCKS OF KENWOOD, YAESU, ICOM, DATONG, JAYBEAM, TONNA etc. If its in this magazine we have probably got it! |        |

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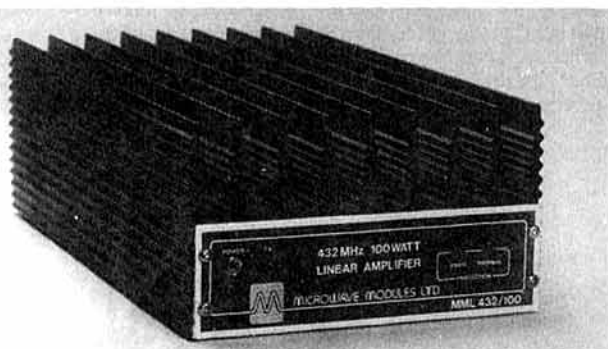
# MICROWAVE MODULES LIMITED

## THE COMPANY...

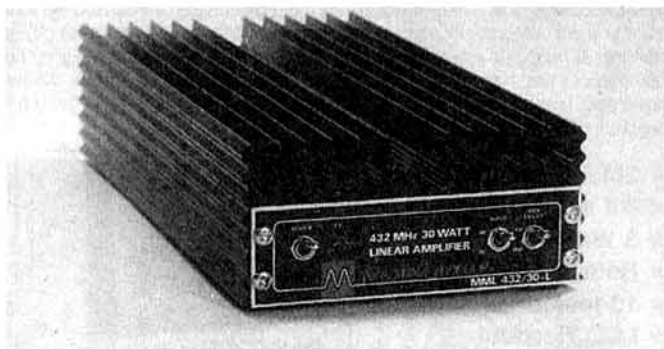
MICROWAVE MODULES LIMITED is a British manufacturing Company, established over 18 years ago, and currently employs over 40 staff in its two modern factories. The Company currently manufactures on an annual basis more than £1,000,000 of radio equipment, all of which has been designed and manufactured in the UK.

## AND ITS PRODUCTS...

The Company offers what is probably the widest range of amplifiers and transverters available from any single manufacturer. The range of amplifiers and transverters is listed below, together with the other popular items manufactured by the Company such as preamplifiers, converters and amateur TV equipment.



MML432/100



MML432/30 L

**CATALOGUE...** A copy of our latest catalogue is available free of charge upon request.

**AVAILABILITY...** Our products are normally ex-stock, from ourselves or our dealers.

**GUARANTEE...** All products are fully guaranteed for 12 months.

### PRICE LIST

|               |                                  | TOTAL<br>INC VAT | POST<br>RATE |               |                                 | TOTAL<br>INC VAT | POST<br>RATE |
|---------------|----------------------------------|------------------|--------------|---------------|---------------------------------|------------------|--------------|
| MML114/30-LS  | 2m 30W Linear, 1 or 3W input     | 105.00           | B            | MMT70/28      | 10m to 4m, Transverter          | 149.00           | B            |
| MML144/50-S   | 2m 50W Linear, 10W input         | 107.00           | B            | MMT70/144     | 2m to 4m Transverter            | 149.00           | B            |
| MML144/100-S  | 2m 100W Linear, 10W input        | 149.00           | C            | MMT144/28-R   | 2m Linear Transverter, 25W o/p  | 295.00           | B            |
| MML144/100-HS | 2m 100W Linear, 25W input        | 159.00           | C            | MMT144/28     | 2m Linear Transverter, 10W o/p  | 149.00           | B            |
| MML144/100-LS | 2m 100W Linear, 1 or 3W input    | 169.00           | C            | MMT432/28-S   | 70cm Linear Transverter         | 199.00           | B            |
| MML144/200-S  | 2m 200W Linear, 3, 10, 25W input | 379.00           | D            |               |                                 |                  |              |
| MML432/30-L   | 70cm 30W Linear, 1 or 3W input   | 189.00           | C            | MMK1691/137.5 | 1690 MHz WX Satellite Converter | 169.00           | B            |
| MML432/50     | 70cm 50W Linear, 10W input       | 155.00           | C            | MMG1691       | 1690 MHz GaAsFET Preamp         | 129.00           | B            |
| MML432/100    | 70cm 100W Linear, 10W input      | 389.00           | D            |               |                                 |                  |              |
| MMC435/600    | 70cm ATV Converter, UHF output   | 38.00            | A            | MMR3/25       | 3 dB 25 Watt Attenuator         | 19.00            | A            |
| MTV435        | 70cm ATC 20W Transmitter         | 215.00           | B            | MMR7/3        | 7 db 3 Watt Attenuator          | 19.00            | A            |
|               |                                  |                  |              | MMR15/10      | 15 db 10 Watt Attenuator        | 19.00            | A            |
| MMT50/28-S    | 10m to 6m Transverter            | 295.00           | B            |               |                                 |                  |              |
| MMT50/144     | 2m to 6m Transverter             | 295.00           | B            |               |                                 |                  |              |

Postage/Packing Charges (inc VAT): A = £2.00; B = £5.00; C = £6.00; D = £8.00



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# ARE COMMUNICATIONS

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### YAESU FT747GX "ECONOMY" HF TRANSCEIVER

An HF transceiver with built-in general coverage receive. All mode, including FM as an option, for less than the price of a 2m multimode?



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Also available with one or all VHF modules fitted at a discounted price.

**PHONE**  
**01-997-4476**

## KENWOOD



Kenwood TS680S HF and SIX metre Transceiver

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Kenwood TS440S HF Transceiver

Now available once again from ARE Communications the excellent Kenwood TS440S. General Coverage Receiver 100W output between Top band and 10m. FM fitted as standard. Auto Tuning Unit optional extra. Offered at a discount price of £1,039.00 or, with ATU £1,199.00.

## ICOM

### Icom IC32E Dual Band Handie

Direct competition to the STANDARD C500, the ICOM IC32E offers excellent facilities utilising all existing ICOM accessories. Ideal for the IC2E/O2E owner. Similar specification to the C500. Frequency range: 138-174MHz (RX only) and 410-455MHz (RX only).

Price: £389



### Icom IC3210E Dual Bander 2m/70cm

Easy to use, easy to look at, the new Icom IC3210E. Just compare the uncluttered front panel lay-out with other dual banders, to see how simple it is to operate. Look at these features:

- \* Frequency VHF: 138 to 174MHz (RX Only)†
- (Track tuned better than .3uV)
- \* Frequency UHF: 400 to 479MHz (RH Only)†
- \* TX/RX 144-146/430-440MHz
- \* 12.5/25KHz Channel spacing
- \* Full dual band duplex
- \* Stand alone repeater operation (For Raynet)
- \* Pocket beep via optional cts
- \* Programmable cts UT40 (optional)
- \* Priority watch
- \* No duplexer required
- \* 20 Double spaced memory channels
- \* 25 Watts output on both bands
- \* † Modified free if specified during order.

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at only £499.00

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REMEMBER! A.R.E. can also offer competitive prices on Cellular Telephones and 2-Way PMR. Why not introduce your company and receive a minimum £25 intro-bonus!

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| FT 757GX MKII         | 869.00   |
| FT 747                | 595.00   |
| FC 757 ATU            | 329.00   |
| FP 757HD              | 219.00   |
| FT 767 2M module      | 149.00   |
| FT 767 6M module      | 149.00   |
| FT 767 70cm           | 199.00   |
| FL 7000 Lin Amp       | 1,439.00 |
| FT 23R                | 199.00   |
| FT 73R                | 219.00   |
| FT 790R               | 449.00   |
| FT 690R               | 359.00   |
| FT 290R               | 389.00   |
| FT 212RH              | 319.00   |
| FT 712RH              | 339.00   |
| FRG 8800              | 575.00   |
| FRG 9600              | 459.00   |
| FT 736 2M 70cm 1.2Ghz | 1,689.00 |

All Accessories Available  
All Units Add Carriage £6.50

## BNOS AMPS & LINEARS

|                            |        |
|----------------------------|--------|
| L50 6mtrs 3 in 25 out      | 74.75  |
| LP50 6mtrs 3 in 50 out     | 138.00 |
| LP50 6mtrs 10 in 50 out    | 138.00 |
| LPM 6mtrs 10 in 100 out    | 235.00 |
| L144 2mtrs 3 in 25 out     | 74.75  |
| LP144 2mtrs 3 in 50 out    | 138.00 |
| LP144 2mtrs 10 in 50 out   | 138.00 |
| LPM144 2mtrs 3 in 100 out  | 235.00 |
| LPM144 2mtrs 10 in 100 out | 205.00 |
| LPM144 2mtrs 10 in 180 out | 355.00 |
| LPM144 2mtrs 25 in 180 out | 305.00 |

UHF also available

|                  |        |
|------------------|--------|
| TL50/28/25 watt  | 316.25 |
| TL50/144/25 watt | 299.00 |
| TL70/28/25       | 316.25 |
| 12/25 amp PSU    | 193.20 |
| 12/12 amp PSU    | 129.95 |
| 12/16 amp PSU    | 78.20  |
| 12/40 amp SU     | 423.20 |
| 12/5E amp PSU    | 57.50  |
| 12/10E amp PSU   | 91.75  |
| 12/20E amp PSU   | 132.25 |
| 12/30E amp PSU   | 195.50 |

All Units Carriage £3.00

## DATONG PRODUCTS

|   |        |
|---|--------|
| AD 270 Indoor Antenna 200Khz-30+Mhz         | 49.00  |
| AD 370 Outdoor Antenna                      |        |
| 200Khz-30+Mhz                               | 69.00  |
| D 70 Auto Morse Tutor                       | 55.00  |
| ANF Auto Notch Filter                       | 65.00  |
| FL3 Multi Mode Audio Filter with Auto Notch | 125.00 |

Add £2.00 P&P

## ICOM

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|------------|----------|
| IC 781     | 3,999.00 |
| IC 761     | 1,999.00 |
| IC 735     | 879.00   |
| IC 751A    | 1,349.00 |
| IC 2KL     | 1,189.00 |
| IC 2KLP5   | 429.00   |
| IC AT500   | 479.00   |
| IC AT150   | 299.00   |
| IC AT100   | 339.00   |
| IC R7000   | 889.00   |
| IC R71E    | 769.00   |
| IC MICRO 2 | 249.00   |
| IC 2E      | 199.00   |
| IC 2GE     | 239.00   |
| IC 290D    | 499.00   |
| IC 28E     | 329.00   |
| IC 28H     | 359.00   |
| IC 275E    | 969.00   |
| IC 275H    | 939.00   |
| IC MICRO 4 | 269.00   |
| IC 04E     | 289.00   |
| IC 490E    | 489.00   |
| IC 475E    | 1,069.00 |
| IC 475H    | 1,129.00 |
| IC 3210E   | 449.00   |

All accessories available  
All units add £7.50 carriage

## MFJ

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|---|--------|
| 989B 3Kw Fully Metered ATU all inputs   | 359.00 |
| 962B 1.5Kw Fully Metered ATU all inputs | 239.00 |
| 949C 300w Fully Metered ATU all inputs  | 149.00 |
| 941D 300w Fully Metered ATU all inputs  | 99.00  |
| 945E 300w ATU coaxial + Wire Inputs     | 69.00  |
| 901B 200 Random Wire Tuner              | 59.00  |
| 1Kw Dummy Load Dry                      | 28.35  |
| 1Kw Versaload                           | 50.66  |
| 204B Noise Bridge                       | 84.12  |
| 202B Noise Bridge                       | 63.10  |
| 752C SSB Tunable Audio Filter           | 95.60  |

All Units Carriage £3.00

## AMP PRODUCTS

NEW FROM USA: The Pile up Penetrator LK 5002C linear amplifier. Some of the features: Full QSK, HF tank coil and Centralab bandswitch are silver plated, Hypersil plate transformer and separate filament transformer. Computer grade capacitors. Amateur continuous duty in all modes. ALO: Auto Lock Out ceases amp operation if mistuned or over current appears on the pair of two 3-500z valves. Full coverage WARC Bands. 2 speed fan. RF output: SSB 1.5KW PEP continuous, CW 1.2KW average continuous, SSTV & RTTY 1KW average, 1.5KW PEP. Call now or write for full spec literature.

## MICROPHONES

|                                    |        |
|------------------------------------|--------|
| Adonis AM303G                      | 49.55  |
| Adonis AM503G                      | 65.95  |
| Heil HM5 Table Mic                 | 49.95  |
| Heil BM10 Boom/Headset Mic         | 49.95  |
| Icom SM8 All Icom                  | 79.00  |
| Icom SM10 Table Mic with Equaliser | 113.00 |
| Yaesu MD188 Table Mic              | 75.00  |
| Yaesu MH188 Hand Mic               | 21.00  |

Add £2.00 P&P



## VHF/UHF SCANNING RECEIVERS

|  |        |
|--|--------|
| Uniden H/Held 50XL 66-88, 136-174, 406-512 Mhz           | 99.00  |
| Uniden H/Held 70XL 66-88, 118-174, 406-512 Mhz           | 179.00 |
| Uniden H/Held 100XL 66-88, 118-174, 400-512 Mhz          | 189.00 |
| Uniden Base Rcvr 175XL 66-88, 118-174, 400-512 Mhz       | 179.00 |
| BJ200 H/Held 26-30, 60-88, 115-178, 210-260, 410-520 Mhz | 229.00 |
| AR2002 Base 25-500 Mhz and 800-1300 Mhz                  | 475.00 |

All £2.50 P&P + Insurance

## ROTORS

|  |        |
|--|--------|
| AR 200XL VHF L/W/Weight                        | 49.95  |
| Yaesu G400C Medium to Heavy                    | 139.00 |
| Yaesu G400RC Med/Heavy circular compass        | 169.00 |
| Yaesu G800SDX Med/HD 450° turn, variable speed | 325.00 |
| Yaesu G1000 SDX HD 450° turn, variable speed   | 368.00 |
| Yaesu KR5400 Elev/Rot HD Dual Control          | 279.00 |
| Yaesu G600RC Heavy Duty                        | 219.00 |

Carriage Included

## STOP PRESS—"KNOCKDOWN"

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|---|--------|
| Amtech 9000 ATU Wire, Coax, Tuned Feeders | 59.00  |
| Heil EM10 HQ Boom Mic                     | 49.99  |
| Heil HM5 Table Mic                        | 49.99  |
| FT 77 AM board                            | 7.50   |
| FT 1blanker mod kit                       | 5.95   |
| FT 709R 70cms H/Held c/w FNB3             | 169.00 |
| FV700 Ext VFO                             | 89.00  |
| XF8.9GA AM filter 901/702                 | 11.00  |
| XF8.2HCCW filter 102                      | 12.50  |
| XF550 CW filter 102                       | 23.95  |
| TET 10 Ele Yagi 2mtrs                     | 15.50  |
| TET 10 Ele X'd Yagi 2mtrs                 | 19.50  |
| TET 8 Ele quad 2mtrs                      | 19.50  |
| TET 8 Ele Quagi                           | 14.95  |

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# ICS Data and Image Transmission over Radio

This month, we are pleased to announce AMIGA-SSTV. This is a sister program to AMIGA-FAX and permits send/receive colour SSTV on the Commodore Amiga computer, which has extremely high resolution graphics and a full colour range. It is by far the most cost effective computer currently available for image work. They are priced from £399.95 inc VAT. Compare that with the cost of dedicated SSTV systems from the past! We still have a few brand new computer printers left at low cost. Once they are gone, that's it! The EEC recently slapped punitive duties on Japanese printer imports and prices are going up.

## PK-232



- ★ More PK-232s sold world wide than any other multi-mode controller
  - ★ Amtor, Packet, RTTY, CW, ASCII, Facsimile, Navtex and SIAM modes
  - ★ Excellent host mode PC software support including on-screen send/receive facsimile software for the IBM-PC and Commodore 64
  - ★ Excellent front end filtering ★ Full front panel status display
- Only £269.95 inc VAT plus £4.00 post and packing

## PK-88 VHF/HF Packet TNC



- ★ Replacement for the already well known PK-87
  - ★ Currently the best value Packet TNC on the UK market
  - ★ Compact size and attractive appearance
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  - ★ Superb documentation ★ Built in personal mailbox and HF modem
- Only £109.95 inc VAT plus £2.50 post and packing

## AMIGA-FAX AMIGA-SSTV

- ★ Superb high definition on screen grey scale facsimile and colour SSTV software
- ★ Photographic quality display
- ★ Mouse driven
- ★ Analogue to Digital Converter radio interface included
- ★ No further hardware of software to buy
- ★ Demo discs available
- ★ This is superb quality software at a bargain price. The same Analogue/Digital converter interface is used for both packages, which are available individually for £99.95 inc VAT each, or £159.90 inc VAT for the two. Post and packing is £2.50

## FAX-1



- ★ Demodulates Weather Facsimile, RTTY and Navtex
  - ★ Superb image definition
  - ★ Plugs into the extension speaker output of any SSB receiver and drives any Epson FX-80 or NEC P6 compatible printer
  - ★ Built in timer ★ Fully automatic ★ All leads supplied
  - ★ No computer knowledge required
- Only £279.95 including VAT plus £4.00 post and packing  
Complete system with printer, power unit and all leads available for £399.95 inc VAT plus £9.50 Securicor. Only while printer stocks last

## TOR-1



- ★ Ruggedised, water resistant construction
  - ★ Only 80 mA current requirement at 12/24 volts
  - ★ Both commercial and amateur selcal codes
  - ★ EAROM configuration memory
  - ★ User friendly host mode IBM-PC software support with on screen status
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## PRICE LIST

Prices include 12 months parts and labour warranty

| Product Code | Description                                   | Price (inc VAT) | P&P (UK) |
|--------------|---|-----------------|----------|
| PK-88        | Budget Packet Radio TNC                       | £109.95         | £2.50    |
| PK-232       | 7 mode Intelligent Terminal Unit              | £269.95         | 4.00     |
| HR1          | 144 Mhz Handheld Antenna                      | £14.95          | 1.00     |
| HR4          | 440 Mhz Handheld Antenna                      | £14.95          | 1.00     |
| ISOPole 144  | 2 Metre Base Station Vertical Antenna         | £39.95          | 3.00     |
| ISOPole 440  | 70 cms Base Station Vertical Antenna          | £59.95          | 3.00     |
| PC-PAKRATT   | IBM-PC Software for the PK-232                | £19.95          | £2.50    |
| PK-FAX       | IBM-PC Facsimile Software for the PK-232      | £19.95          | £2.50    |
| COMM-PAKRATT | Commodore 64/128 Software for the PK-232      | £59.95          | £1.50    |
| COMM-FAX     | Commodore 64/128 Fax software for PK-232      | £59.95          | £1.50    |
| COMM-FAX/CT  | As above, cartridge only                      | £39.00          | £1.50    |
| TN TERM      | Advanced Software for BBC, PK-232             | £49.95          | £2.50    |
| PK-232/BBC   | BBC Software for the PK-232                   | £26.95          | £1.50    |
| PK-88/CBM    | Commodore Software for the PK-88              | £59.95          | £1.50    |
| PK-88/BBC    | BBC Software for the PK-88                    | £26.95          | £1.50    |
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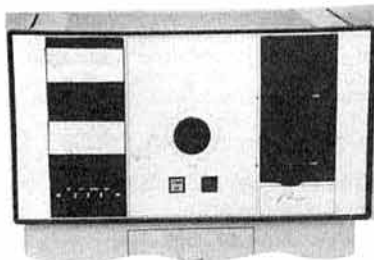
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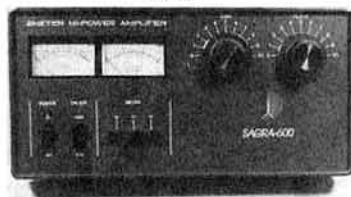
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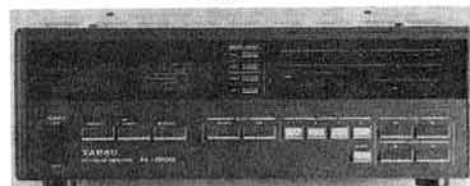
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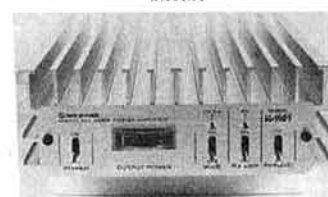
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## A SEASONAL MESSAGE FROM THE SOCIETY'S PRESIDENT

My year as President has taught me how much activity goes on within the Society, and to appreciate the challenges it faces in its task of leadership of the amateur radio movement in the United Kingdom and relationships with the World outside.

Increasing commercial and government use of the radio spectrum, new regulations and legislation from the ITU, the EEC, and the UK government need constant vigilance if the interests of amateur radio are to be protected.

The highlight of the year for me was the 75th Anniversary Convention in July, which was graced by the presence of His Royal Highness, The Duke of Edinburgh, Patron of the Society, who launched our 'Project YEAR'. This programme seeks to encourage 'youth into electronics via amateur radio' which we expect will substantially strengthen recruitment to the hobby and provide a pool of engineering competence on which industry can draw. I am glad to say that support from the membership for this initiative has been most encouraging.

The celebrations of the 75th Anniversary were supported by visitors from industry, government and youth movements, as well as from IARU and national societies throughout the World, demonstrating the very high esteem in which the RSGB is held for its work at home and overseas.

One of the pleasant things about being President is having the opportunity to meet so many of the people here and abroad who actively share in the enthusiasm for supporting and developing amateur radio, but not least the staff whose work is so important to the success of the Society.

To all RSGB members and to all those who have helped in 1988, I offer my sincere thanks and all good wishes for Christmas and the New Year.

**SIR RICHARD DAVIES, KCVO, CBE, CEng, FIEE, G2XM**



### EMC DIRECTIVE

Protection of electrical and electronic apparatus and systems from electromagnetic radiation is without doubt something which every radio amateur would welcome wholeheartedly. No more TV time-base radiation, no more noise from next door's computer, and none from nearby power lines.

This is, in fact, a goal which may eventually become a reality. The European Commission – which is the civil service wing of the European Community – has put forward an all-embracing proposal to the European Community Council of Ministers. This would become an EMC Directive that would aim to decrease unwanted radiation from all electrical and electronic apparatus and to protect adequately such apparatus from external breakthrough.

Translated into an amateur station environment, the Directive will aim to reduce unwanted radiation from your transmitter or any other electronic apparatus in the shack, and reduce unwanted radiation from electrical and electronic apparatus which you might hear in your receiver.

The Directive is far from complete, and at this stage poses more questions than it provides answers. The DTI have, recently been in consultation with the RSGB, along with other companies, trade associations and organisations which come within its scope, and are providing information and consultation on what can be expected in 1992 when the Directive is due to take effect.

Radio transmitters and receivers – and no doubt other apparatus in the shack – generally fall within the boundaries of the Directive. We are pleased to report, however, that following earlier discussions with the DTI, home-constructed amateur radio equipment will be exempt from the Directive. We know of no other equipment at all which will be exempt. Any other approach would totally nullify the experimental nature of amateur radio and its positive spin-offs into science, engineering and electronics.

At present, it looks as if commercial equipment will need to be self-certified by the manufacturer or importer, and as far as kits are concerned it appears that the onus of self-certification will be on the kit manufacturer and not the builder. The position with regard to the modification of commercial or surplus equipment, or the sale of equipment on a second-hand basis, is not yet clear.

As work on the Directive is far from finalised, over the next few months the RSGB will be talking to the DTI to clarify just how the amateur service(s) will be affected and how the necessary UK implementation of this EC legislation will take place.

Finally, and on behalf of all of the Society's staff, may I wish you all a Merry Christmas and a Happy New Year.

**David Evans, G3OUF**

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| 75 ohm Twin Feeder Light Duty per metre  |                                    | 0.20    | (0.10) |
| 300 ohm Slotted Ribbon Cable per metre   |                                    | 0.32    | (0.10) |
| ANTENNA TUNER UNITS                      |                                    | £       | (c&p)  |
| Yaesu                                    | FRT 7700 Short wave listening      | 59.00   | (2.00) |
| Yaesu                                    | FC 757AT                           | 349.00  | (—)    |
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# NEWS

## BULLETIN

### The 75th Anniversary — What a year!

As the 75th anniversary year draws to a close it's good to look back on the year's celebrations in retrospect. A number of people have asked us how and why we did some of the things we did, so here's a quick look at how it all came together.

Back in November last year, a group of about five or six people took on the task of planning the various events which would make up the 75th Anniversary Celebrations. The Society's Council had begun the task some months before, but it soon became apparent that - with all the other important and urgent tasks on their plate at any one time - they were a bit short of time to do it all. It was at this point that the decision to form a special '75th Anniversary Working Group' was taken. This consisted of Mrs Joan Heathershaw, G4CHH (in the chair), Mr Norman Miller, G3MNV, Chairman of the Exhibition & Rallies Committee, Mr Ron Broadbent, G3AJJ, Mr Warwick Hall, G4WMH and Mr David Gough, G6EFQ, HQ Senior News & Information Officer - with the occasional extra member to advise on or look after a particular part of the planning. Joan Heathershaw, G4CHH, takes up the story...

"The group's first task was to decide on the ways in which we could all celebrate this important milestone in the Society's history. Twenty-five years ago the 50th Anniversary was celebrated with a dinner attended by fewer than 200 members. This time we had to try to make the celebration more wide-ranging, and with this thought uppermost in our minds we set about planning an ambitious programme of events lasting two weeks. Naturally the 75th Anniversary was an opportunity to look back with nostalgia at the successes of amateur radio but, more importantly, it was an ideal opportunity of looking forward to the future of amateur radio

and where it might be going. The variety of events were chosen to reflect the past and plan for the future.

"The Society's biggest annual event, the National Convention at Birmingham's NEC, was moved from its traditional dates in spring to mid-July since it was felt to be the ideal main event of the fortnight's celebrations which was likely to involve the most members.

"It was also decided that the National Convention itself should be expanded to include some of the ideas suggested by members in the past - like social events in the evenings, a display of amateur radio through the ages, and specially-priced accommodation at one of the on-site hotels coupled with a season ticket for entrance to the exhibition on all three days.

"Norman, G3MNV, reported that arrangements were well in hand

with much of the stand space already 'pencilled-in' by the various traders, so we seemed to be on-line for a good show this year. Warwick, G4WMH, set about arranging the entertainment, as well as getting a team together to run the special demonstration station, GB75AC. Since this was, of course, the ideal occasion on which to invite our Patron, David Evans, G3OUF and the President - Sir Richard Davies - got to work arranging that side of things.

"One of our prime concerns - looking at previous National Conventions - was the cold and forbidding nature of the exhibition hall itself. Whatever the manifest virtues of the NEC's exhibition halls, adjectives such as "welcoming" or "festive" aren't the first to come to mind when seeking to describe them! We devoted an awful lot of time to thinking about ways of lightening the rather sombre atmosphere of our hall. We looked at the possibility of hanging bunting to give the impression of lowering the ceiling; this would have been nice but it was fearsomely expensive. We considered the idea of asking clubs to design banners depicting their own club and the part of the country it came from; unfortunately it would have cost a fortune to get them hung up. Ultimately we decided on balloons, which were at least affordable and reasonably easy to sort out.

"Although we were fairly certain at an early stage in the planning that HRH Prince Philip, Duke of Edinburgh and the Society's Patron would open the event, we were unable to release the news until the Palace issued its official press release. After all, we didn't want to run the risk of being slung in the Tower to cool our heels whilst everyone else was at the NEC!

(cont. over)

In this special  
14-page feature  
we look back on  
the RSGB's 75th  
Anniversary  
Celebrations  
in words and  
pictures.

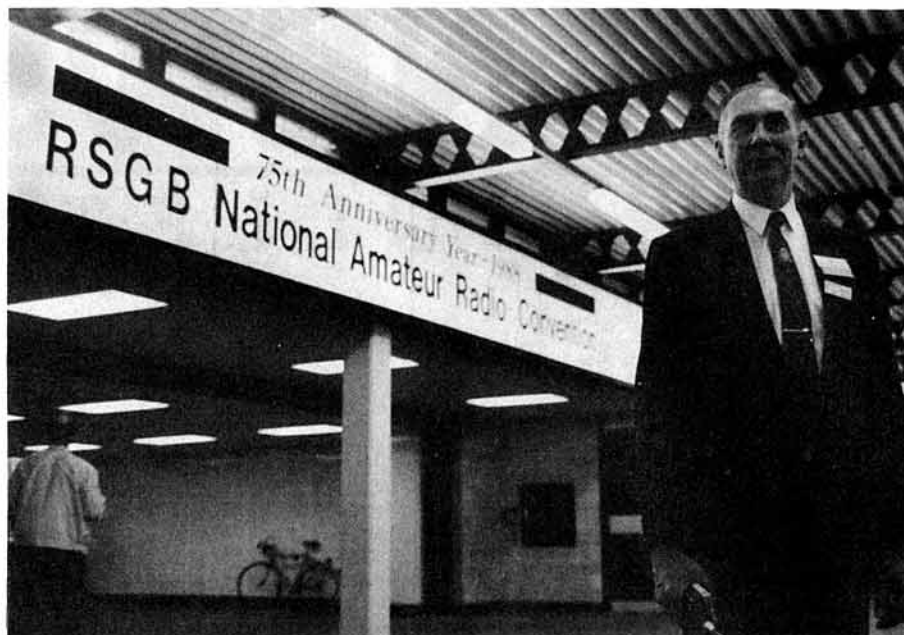
We look at why  
and how we did  
what we did  
and we ask  
the question  
"Was it worth it?"

Even so, we were able to set some of the necessary wheels in motion and make some initial plans about things like media coverage. Here the Central Office of Information was extremely helpful, and David Evans was in close liaison with both them and the Lord Lieutenant's Office in Birmingham. As might have been expected, security was quite tight for the event and we were unable to obtain permission to hold the official opening in the main hall. As a compromise we asked for and were given permission to relay the whole proceedings to the main hall by means of amateur TV - which was obviously a case of 'Cue BATC'. In their usual highly organised and professional way, they did a grand job for us which is discussed in more detail later. Ultimately, of course, HRH did tour the main hall for about 20 minutes and many members had the opportunity of seeing their Patron in the flesh both in the hall and on his arrival at the NEC. A large number of members also took the opportunity of purchasing tickets for the anniversary luncheon at which the Patron was guest of honour.

So what about the other events?

"It was clear from the outset that the 75th anniversary was an ideal opportunity to open Headquarters up to visitors and show them around the various departments. At first we wanted to run the open days for six days (three days a week over the fortnight) but it was felt that this would cause too much disruption to the day-to-day working of headquarters. In the end the open days were held on the Tuesday, Wednesday and Thursday after NEC. With hindsight it would have been better to have held them a week later - but we wanted to keep the momentum of the celebrations going.

"The precise nature of the next event was a little more difficult to decide upon. It was felt that we needed to do something which hadn't been done in this country before and which could become an annual event. What was new in amateur radio? Well, packet radio was fairly new and there had been a number of advances in digital techniques over the last few years. This seemed to be a fruitful field for consideration and we looked into the possibilities of something in this area very carefully. It quickly became clear that,



Mr Norman Miller, G3MVB, Chairman of the Society's Exhibition and Rallies Committee seen outside the entrance to the RSGB's 75th Anniversary National Amateur Radio Convention.

although there were many packet and digital groups dotted around the country, there had never been any opportunity for them to meet and exchange ideas and technologies. It was also felt that, if such a gathering was arranged, it might well prove to be a good forum for ideas which could be input to IARU. So a decision was made to hold a Data Symposium. The next question, of course, was 'where and for how long?' After some discussions and a few telephone calls by Ron, we managed to book no less a venue than Harrow School for two days (Friday and Saturday) after the HQ Open Days. BARTG was asked to put the lecture programme together - and the rest you know from previous reports in the Bulletin.

"Someone asked the question, 'what about the clubs that can't make it to any of the events?' Good point...what could we do about them? We talked about a radio chain message similar to the hilltop beacons we'd had for the Silver Jubilee celebrations in 1977; we talked about a series of contests linking clubs together; we talked about special rail trips and boat trips; then we came up with the idea of a 'Families & Activities Day'. It seemed to be the best solution because clubs could then decide on their own event and their own way of celebrating the 75th Anniversary.

"Finally, the last few events. Ron agreed that AMSAT-UK's annual Colloquium should be part of this year's

celebrations, so that filled the last weekend. Terry Carrell had asked the Society to host a meeting of satellite constructors and users to discuss the future of the amateur satellite services. The ideal time for such a meeting would be just before the colloquium, so Ron and David Evans set about arranging the International Satellite Seminar and inviting the various delegates. With the annual Woburn Rally falling on the following weekend (the first Sunday in August) we had a fairly tight and wide-ranging programme of events.

"At this point the really hard work of finalising the arrangements, packaging the events and selling the programme began. We had a number of new and ambitious ideas and events, and we didn't know how people would respond. However, we did feel that the membership as a whole would be proud to be part of a society celebrating 75 years of existence. After all, it was not the few people on the working group who were celebrating, and it certainly wasn't the 33 people at headquarters who were celebrating. It was you, the 37,000 people who make up the Society, who were celebrating; it was your event not ours.

In September this year, the same group sat down to look back on the 75th anniversary celebrations. Was it worth it? The answer must be yes, if only for the world-wide

acclaim that your Society received from other national societies, thankful for the lead which your Society has given during the 75 years of its existence. It was also worth it for the favourable TV and press coverage which amateur radio gained in the UK as a result of the visit of your Patron to the National Convention, and for the new ground which was broken in international and national co-operation with satellite and digital projects. Finally, it was worth it for the opportunity to launch "Project Y.E.A.R." in the company of representatives from industry, the DTI and the world's national societies. Your society was seen once again to take a lead in tackling a world-wide problem, that of the shortage of newcomers to our international hobby and of the shortage of well-trained RF engineers here in the UK.

What follows is an account of the 75th anniversary celebrations in the words and pictures of some of the people who took part and entered into the spirit of the events. In closing, we can only hope that many more will enter into the spirit of the Centenary celebration in 2013.....

#### GB75 ANNIVERSARY CONVENTION:

Warwick Hall, G4WMH, was the station coordinator for GB75AC, the demonstration station at the RSGB's 75th Anniversary National Convention. With the high number of overseas visitors expected at this year's event, Warwick and the team had a tough job on their hands ensuring that everything was up and running by the start. Here's what he has to say about it.....

"GB75AC succeeded in our aim of being the finest possible station comprising the best equipment from each of the main importers and antennas to provide good signals which would enable amateurs all over the world to join in the celebrations. Visitors were also given the opportunity to operate this premier station on behalf of the RSGB.

"Naturally, such an endeavour would attract the usual (and not so usual) problems, all of which were part of the fun. For instance, there was no power at the NEC during the first weekend of operation (9/10 July) because a new sub-station was being installed; the generator caused problems with the system clock in the computerised logging network and we had to back-enter over 6,000 QSOs manually; we spent most of the Thursday night doing engineering work to ensure

that the live GB2RS broadcasts would go out OK (see September's New Bulletin report); the sleeping accommodation (caravan) never arrived, we slept in the bath; and during all this we were operating 24 hours a day for nine days.

"Many of the overseas visitors had applied for special GV75 prefixes and made good use of these contacting their home countries in at least eight different languages. Many others poked their heads through the door to wish us well, leave a QSL card and, we suspect, to have a look at every man's dream station.

"All in all, the 22 station operators which made up the team experienced superb conditions, an overwhelming response on the air and a very enjoyable but tiring nine days. Some learned what it meant to be at the receiving end of a real pile-up! When is the next one?"

We have to say a big thank you to Warwick and the team for the thoroughly professional way in which they tackled the job of putting on an amateur radio demonstration station. Anyone who visited GB75AC will know what we mean.

## BATC: Purveyors of video by appointment to the RSGB

by Trevor Brown, G8CJS

"The day had been typical - overcast, dull and boring. The phone hadn't rung for days and I was beginning to wonder if there was anyone out there. When it finally did ring it was a guy from the RSGB asking 'had I heard of their outfit?'. I grunted 'don't they come a long way after BATC in the Yellow Pages?'. It seemed they were in need of some television coverage of the Royal opening of their convention at the National Exhibition Centre. At that time I needed a job in Birmingham like Custer needed more Indians! I gave him my standard reply - 'I'll get back to you'.

"The first thing to do was to locate some hardware, but that was where the simplicity ended.  
(cont. over)



The special event station GB75AC was located next to the Pendigo Lake at the NEC. The station was housed in a 'Terrapin' portable building and operated 24 hours a day for nine days. The two towers were loaned by Strumech and the West Bromwich club. They carried the HF beams with dipoles strung between them. The VHF and UHF beams seemed dwarfed by the towers but were about 30'-40' above the ground.



Trevor Brown, G8CJS Chairman of BATC, mans the camera whilst committee member Bob Robson supervises.

Hardware comes in many shapes and sizes all tailored for specific types of television work. The best choice would be a professional Betacam camcorder but one of these is likely to set you back £40,000 or so. This was not a job to be tackled alone so I let my fingers do the walking. My first call was to the City to Graham (the Yuppie) Shirville. By midday 'Taffy' Robinson and 'Gunn-Diode' Platts were also keen to add a little muscle to the act. The hardware was finally located at a respectable £200 per day hire charge, plus expenses. It seemed we were finally off the starting grid! I didn't like the odds though, there were too many Indians out there. What the hell, we still had more technical help than TV-AM, it was time to give Crazy Horse a run for his money!

"I found the RSGB guy in Yellow Pages and told him that recorded coverage was possible. 'How about some live pictures around the hall as well?', he said. Why did I feel like another tribe of Indians has just signed on? 'How about if we cable the pictures back to our stand, record them and distribute them live with replays throughout the event?', I replied. 'Just what I had in mind. Where is your stand?'. 'We don't have one, due to cash flow caused by being long on the dollar.' (We blew it a Dayton!). The phone went quiet....'OK', he said 'you now have a stand, but make it good!'.

"At this point I didn't know if we were winning or losing but the stakes had just been raised and I wasn't about to see his hand (enter Doc Holliday? - Ed).

"D-Day found us at the NEC. The hardware was short of an eyepiece, the sound mixer was playing up, the video cable had more reflection than a hall of mirrors and our stand was a DIY kit out of the Krypton Factor - apart from that things seemed OK. I asked my first question of the day, 'what time does the bar open?'. By close of play the mixer was under the screwdriver of Tom Mitchell, George Mayo had triumphed over the stand, and yours truly had found the cable fault - which, according to Murphy's Law, was the last joint I checked. I set off for the bar somewhat later than I had intended.

"Three hours to the shoot, and counting. We arrived at the Lucas Centre with two redheads (the kind you plug in, unfortunately). The camera was unpacked for the last time and lifed into place on its legs. The stage was lit and the camera 'white-balanced'. The iris on the auto sat at F2.8, the stand reported P5 pictures, the sound mixer would not produce sound on the Betacam audio meter but the cans were now working. As a back-up, I switched one of the audio tracks to the on-camera microphone since we were close enough to the stage to yield some results, even if interspersed with zoom noise. The tape path was cleaned and the first 20 minute tape was loaded.

"The moment of truth was approaching. Panic No.2654837, the volunteer professional cameraman had not turned up. I was resigning myself to this

task when Richard Gutteridge, a guy with the same day-time QTH, showed up a pitched in. By midday the camera was rolling. Central TV (who?) had sent an ENG (Electronic News Gathering) crew who seemed pleased with our lighting and BBC local radio arrived and plugged into our mixer.

"When the speeches had ended and the walk around the '75 Years of Radio' display was in the can, I hoisted the camera onto my shoulder, snapped in a new tape, switched on the battery pack and set off hot-foot to follow the Royal tour. The tour took in most of the stands including a long pause at the DARC stand where Karl Taddey, DL1PE, greeted Prince Philip. When the battery, the tape, and myself were finally exhausted I returned to the BATC stand to see what we'd captured on the back-up recorders.

"The pictures via cable were fine, but less sound - it should have been picked up via S21 and S23. The Royal walk-about was covered using a 24cm link and had some large holes in it. (I should point out at this stage that the Betacam has no replay facilities and, as the tape is run at high speed, a special replay machine machine is required and was out of our budget range.)

"The pictures recorded via the cable were kept running throughout the rest of the day and we ducked anyone from RSGB when they asked about the sound. In the meantime, Bob Robinson drove south to return the camera and I drove north to check on the Betacam recording at the work QTH. The bottom line was that the pictures were excellent



The British Amateur Television Club's stand at the RSGB's National Convention on which live TV pictures were shown of HRH Prince Philip's opening address.

but the only sound which was recorded came from the on-camera microphone.

"The following day (Saturday) found Bob driving north to pick up a U-matic copy of the Beta tapes then returning to the NEC to show the RSGB that we'd found the sound. Silly of us to lose it really! This copy, with sound, was left running all day Saturday and Sunday. On Monday Don 'The Sound' Atkinson set to work lifting the sound and removing the rumble and zoom noise. By late afternoon it sounded like a compact disc and editing could begin.

"The tape (in a rough-cut version) is now with the RSGB and, to quote David Evans, they are 'well pleased with the results'. It would seem that the Indians are in retreat and what happened to Crazy Horse?"

(Reproduced from CQ-TV No.144, with thanks.)

So there you have it, complete with Trevor's penchant for B-movie westerns (maybe the young Trevor was brought up on a strict diet of Tom Mix, Roy Rogers, Hopalong Cassidy and the Lone Ranger - who was that masked man?). It's an interesting tale - with a faint trace of truth buried in there somewhere! Seriously, we have to thank BATC for the tremendous effort they put into the venture which was quite a tall order. Some of the members of the team aged visibly over the weekend but, nevertheless, we hope that we can call on them again sometime in the future.



Guides from Carleton, Nottingham and Minety, Somerset on the Training and Education Advisory Group's stand at the NEC having a go at building some of the projects in the pilot issue of DIY Radio (see below) the Society's new magazine aimed at youngsters. (Photo by G8WWO)



Chief Scout, Mr Garth Morrison (left), visiting some of the scouts engaged in building projects on the RSGB Training and Education Advisory Group's stand at the NEC.





Guides and Guiders from Rugeley, Staffs and Shelf, nr. Halifax, W.Yorks making oscillators on the DARC stand at the National Convention in July. (Photo by G8WWO)



HRH Prince Philip visited the Scouts' stand to see some of the work being done to encourage youngsters to take up and interest in electronics via amateur radio.

## It's like doing a jigsaw without the lid

*by John Crabbe, G3WFM*

One of the things which made this year's National Convention a bit different was an exhibition in the Lucas Centre entitled "75 Years of Radio". The exhibition was designed by David Gough, G6EFQ but most of the real leg-work in finding the various exhibits was done by John, G3WFM. Here's what he has to say about it....

"When I was asked to help the Society put together an exhibition of historical radio equipment for the 75th Anniversary I wasn't at all certain what I should include, having seen the designs and the space available for the exhibition. Fortunately, at an earlier Council meeting, a list of likely items for inclusion had been drawn up. The list contained items which would best illustrate the state of amateur radio development of each decade, the most popular equipment and who might be likely to own such examples.

"After many telephone calls, a few visits and quite a few dead-end leads, I eventually managed to track down the equipment and assemble the basis of the exhibition. Many of the items were rather dirty and dusty so, with the aid of brushes, brass polish and boot polish - which does wonders for black crackle finish - I began to restore them to something like their original state. Quite early on we knew that the exhibition would form part of a likely Royal tour so it was important that the equipment should be in as good condition as possible. David and I thought it would be nice to have some of the exhibits actually working, so I had great fun doing some old-time servicing on valve circuits - remembering, of course, to keep one hand in my pocket! It was a chance to wallow in nostalgia and remember just how heavy some of those rigs used to be. Lifting 40lbs of solid steel chassis on to the bench brought it all flooding back!

"Piece by piece we started to bring all the exhibits to headquarters for storage until it was time to take them up to Birmingham. In the meantime we



George Jessop, G6JP (left) and Sir Richard Davies, G2XM (right) showing HRH Prince Philip some of the earliest examples of home-brew amateur radio equipment in the "75 Years of Radio" exhibition at Birmingham.

had been collecting as much information as possible about the exhibits so that David could produce the catalogue. Eddystone Radio, in Birmingham, had agreed to sponsor the catalogue and the exhibition as well as loaning some excellent examples of early Eddystone receivers. In thanks for their support and to give them an opportunity show what sort of things they were producing today, they were invited to put together a small exhibition within an exhibition. At this stage we have to thank Chris Pettitt, GOEYO, Managing Director of Eddystone Radio and his team of helpers for their very generous support and help throughout the exhibition.

"Two days before we were due to open, David Gough and I set off from Potters Bar up the M1 to Birmingham with a van-load of very heavy, very old and very valuable pieces of amateur radio history. Some of the items were so valuable that they were brought direct to the NEC by their owners and unpacked under their watchful eyes. We unloaded the van and began to assemble the exhibits within the custom-made shell and dress the displays. This went on until very late into the evening and all through the next day too. The last items to be put in place were the latest 'black-boxes' from each of the three main Japanese companies - Icom, Yaesu and Kenwood - as well as a number of UK-made items associated with the packet radio display, which was put together by John Theodorsen,

G4MTP and team. The black boxes came up to the NEC with the various traders the day before the convention and I took great delight in collecting them from the stands setting them up on display. That's the nearest I'll ever get to using anything as hi-tech as these rigs were.

"The night before we were due to open we realised that the FT101 which had been promised had not arrived. It was to have been delivered to SMC but it somehow went to the wrong branch. Fortunately it was the Birmingham branch at Alum Rock and I dashed over there first thing in the morning through the rush-hour traffic and arrived back with the rig and an hour to spare before the opening. We quickly put the trusty old FT101 in position and breathed a sigh of relief.

"After HRH Prince Philip, the Duke of Edinburgh had given his opening address and all the speeches were over, he was escorted around the exhibition by George Jessop, G6JP (now the Society's official archivist) who explained to the Prince what each of the various items was and what they did. His Royal Highness showed great interest in a number of the exhibits and when he arrived at the packet radio station he was invited to send his greetings message to the rest of the world by pressing a key on the computer keyboard.

"The last stage of the tour was to show HRH some examples of the latest amateur radio equipment, very different from

the home-brew rigs at the start. On approaching the last transceiver, Prince Philip received a message from GB75ER, located at Windsor Castle, and was invited to reply. This he did with great enthusiasm and to the delight of all who were listening both in the Lucas Centre and at Windsor Castle.

"When all the excitement was over, the next two days involved talking to visitors about the various items on show and keeping an eye on the many gifts presented to the RSGB by national societies around the world. Sunday evening came and we began to strip the whole thing down - it came down much faster than it went up - reluctantly return the black-boxes and carefully pack the items into the van for the journey back to Potters Bar. I arrived home later that evening very tired and able to appreciate the very hard work the staff of RSGB put into this exhibition and every show they attend. Finally, I'd like to thank all the individuals and companies who loaned their equipment and made the '75 Years of Radio' exhibition a success. At least next time I'll know where to go straight away."



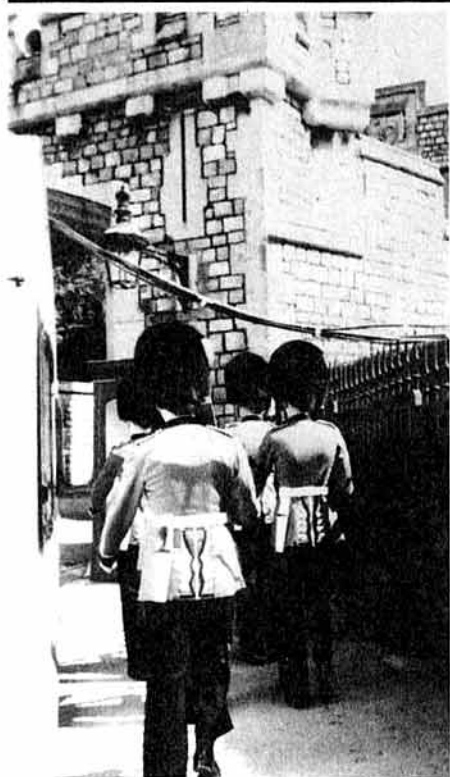
Joan Heathershaw, G4CHH, Fred Ward, G2CVV and Angus McKenzie, G3OSS admiring some of the beautiful gifts presented by national societies from around the world to the Society during the special 75th Anniversary luncheon, at which His Royal Highness Prince Philip, The Duke of Edinburgh was guest of honour.

# Windsor Castle Calling

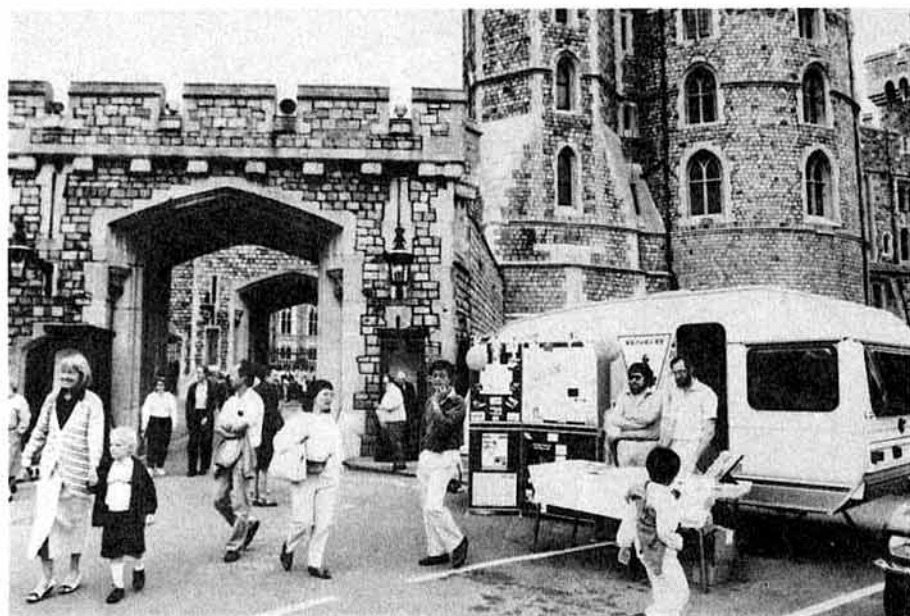
by Eileen Chislett, G6EIL

Given the great honour bestowed upon the Society by visit of His Royal Highness The Duke of Edinburgh to its 75th Anniversary exhibition and convention, the RSGB was keen to celebrate this royal connection by putting on a special amateur station to mark the 75th Anniversary in one of the Royal residences or parks. The first choice was, of course, Buckingham Palace but regrettably this was found to be impractical. However, it was suggested that Windsor Castle would be a good alternative. At about the same time, the Society received a letter from the Burnham Beeches Radio Club who were thinking along the same lines. Since they had done something similar several years before it was decided to give them first choice, and GB75ER was born. Eileen Chislett, G6EIL, tells us what happened next:

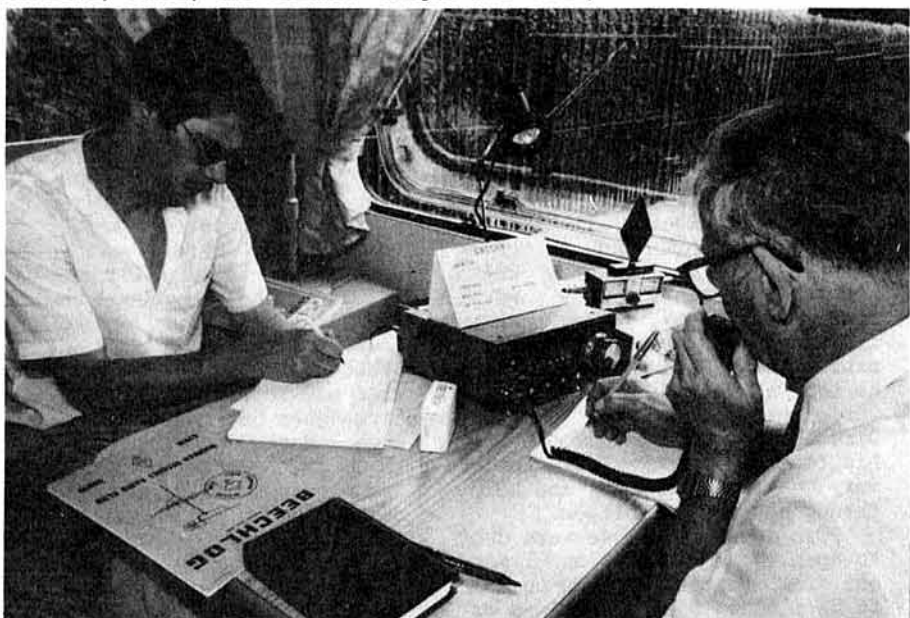
"Clearly it would be a great privilege to spend a week at Windsor Castle at any time. However, the Burnham Beeches Radio Club enjoyed exactly that privilege whilst representing the RSGB in its 75th Anniversary celebrations last July.



The Guards were instructed to duck under the cables when marching past the caravan.



GB75ER was located in the Castle Hill car park of Windsor Castle for nine days in July and attracted many visitors. Left to right by the door are Dave, G4XDU, the Station Manager and Peter, G6UDF.



The HF station was located at one end of the caravan with Jim, G3PBA on the mic and Dave, G4XOW keeping the log.

"Her Majesty The Queen gave permission for us to site a caravan in the Castle Hill car park and to erect aerials on top of the Edward III Tower - a process which kept the public entertained for hours. We had a station at each end of the caravan and a colourful display outside.

"We ran a successful HF station, mainly on 80m but with occasional forays into the 40, 20, 15 and 10m bands making a total of around 1,200 contacts in all five continents with just 100W into a loaded vertical. Sticking mainly to 80m allowed us to make contact with a large

number of G stations and give them the necessary start for the RSGB 75 Award.

"The VHF station made about 600 contacts. Not many, you might say, but 250 feet of coaxial feeder from the caravan to the antennas certainly doesn't help get a good signal out. In addition there was the necessity to keep our signals as clean as a whistle; the castle is a prime radio site which is used by a number of organisations. There was also the point that Her Majesty was in residence at the weekends and we didn't dare think about the consequences of causing any

TVI... As well as the VHF station, there was a packet radio station in the tower itself running a bulletin board and mailbox for GB75ER.

"On Friday 15 July, all our hearts were thumping as the countdown began for the contact with HRH Prince Philip at the NEC. Dave, G4XDU, clutched the mic for about an hour while comms were going back and forth by radio and telephone back-up. Everyone stood with bated breath while we listened to the live GB2RS commentary from the NEC. At 11.31 GMT we received the coded message 'Cue David': G4XDU called the station at the NEC and passed the greetings

message to His Royal Highness. The Royal Reply came back loud and clear, to the accompaniment of sighs of relief from the GB75ER crew. We were all very proud indeed to have been there and made it happen.

"What did we get out of it? Hard work, great fun and we learned a lot about being a tourist guide! Many amateurs from around the world visited the station which ran for nine days. Many members of the Burnham Beeches RC gave up their holidays to be there and we must also thank members of the Maidenhead ARC for their help and, of course, the RSGB for their support."

## "Diamonds-plus" at Potters Bar

by Jack Hum, G5UM

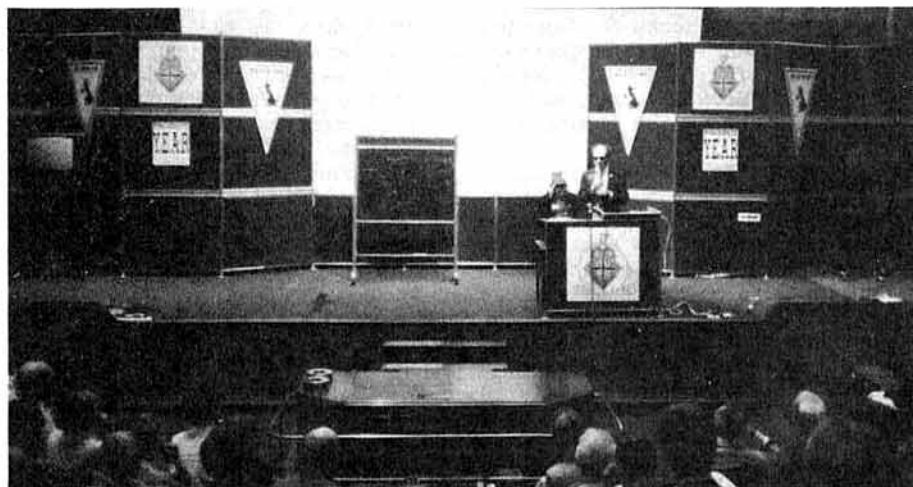
Jack was one of over a hundred members who visited RSGB Headquarters during the Open Days last July.

"A quarter of a century ago an article printed in RadCom (or the Bull) under the headline 'One Man's Golden Year', attempted to encapsulate some of the delights of the National Society's Golden Jubilee celebrations. Now, in 1988, more celebrations marking the Society's attainment of its 75th year of activity. Said someone, 'If fifty years was the golden and sixty years (most appropriately) the diamond, what is 75 years?'. Any suggestion to call it the double-diamond was promptly rejected.

"Special significance has been given to this year of '88, quite apart from its amatory amateur radio associations. After all, it was only in 1588 that Drake drummed off a hostile invader from these shores. Then in 1688 a very welcome invader set foot upon them. What of 1788? It was the year in which Mozart wrote his last three magnificent symphonies before his premature death; and 1888? Hmm, nothing much in that peak year of the Industrial Revolution except that an Act of Parliament authorised the building of a railway between Bourne and Castle Bytham in Lincolnshire.



Barry Carter (right), Video Systems Manager of Microwave Modules Ltd., explaining to HRH The Duke of Edinburgh (left) and David Evans (second left) the use of the company's new 22 GHz microwave television system for security purposes during the Prince's tour of the RSGB National Convention.



EI3EG addressing the first RSGB Data Symposium at Harrow School. Although a white-stick operator he is responsible for coordinating EI packet activity and is very active himself running a mailbox with the aid of a speech synthesiser.



One of the many visitors to GB3RS/GB75HQ during the RSGB Headquarters' Open Days. Contacts came thick and fast.

"And so to 1988 and its special significance to RSGB. Any 75th birthday calls for a slap-up treatment and that is what the National Society laid on. You could tramp the acres of the National Exhibition Centre at Birmingham to goggle at many more electronic senders that you could afford; or you could dine with the Queen's husband when he declared the RSGB exhibition open, an event which attracted big TV coverage and helped, no doubt, to lay at rest any lingering doubts that we are nothing more than a lot of CBers.

"Apart from all this panache and panoply there was a much more intimate side to the 1988 celebrations. It took the form of a conducted tour of the RSGB Headquarters at Potters Bar - an outlying suburb of the Great Wen and NORTH of Watford, in case you didn't know.

"Few of us had seen any more of Headquarters than the Reception area, perhaps when buying books or renewing a subscription. On Tuesday 19 July we were able to see the mechanism behind the clockface. As each party of ten or so climbed the steps to 'The House of Diamonds' (Lambda House doesn't sound quite so romantic) it was welcomed by reception committee headed by Basil, G2AMV and plied with coffee and biscuits by Eileen, G3WIO. Soon afterwards Hilary, G4JKS, took over to introduce the party to each department in turn. Although Hilary had a clipboard to tell her where to go and whom to introduce, she relied on what seemed to be an infallible memory on getting right the names of each person in each office and saying what he (or for the most part she) did during the daily duties. 'Any questions?' she asked as each station was visited. Most of the visitors were so blinded by the organisational science that they couldn't think of any. One member did pluck up enough courage to ask one of the office occupants how she managed the three computers which were under her control. The reply was that she learned by doing, and you could say the same of the Morse code!

"It wasn't only the VDU-computer system linking all offices that took the visitors by surprise. They were much impressed by the smart decor of the distaff side of HQ - white blouses, navy blue skirts and RSGB scarf (ladies only, of course.....) as they spun their



David Gough, G6EFQ and Ron Broadbent, G3AAJ ready to answer questions about some of the archive material on show during the RSGB Headquarters' Open Days.

way through the intricate work of attending to the requirements of 37,000 or more members, thankfully not all at once even though it might seem like it on occasions. 'How many radio amateurs are there on the staff?' was a question put by several of the visitors. 'Seven out of twenty-four people' was the answer.

"Way down in the bowels of Lambda House the visitors were introduced to Bert, another 'faithful subject' and the gent who sees that any requirements for RSGB printed matter are promptly met, whether they be for a pile of books for America or two-dozen stiff certificate envelopes for the VHF Awards Manager. There it was on the shelves carrying the identity of each item.

"And so to The Station and a look at what makes GB3RS tick. Visualise a long desk stretching from one end of the room to the other and loaded with transceivers for virtually every band; VHF/UHF by the window, HF and LF centrally and at the left a collection of Morse keys of a variety enough to promote a tactile urge at the finger-ends of any or all of the visitors who pound their own keys. The original McElroy bug-key was there as well as its much later British counterpart, the Eddystone one. You could almost go back as far as the American

telegraph such that some of the World War One keys on display had a positively contemporary feel about them. 'Where is the six metre beacon?' came the question. 'Oh it's just a box chugging away to itself under David Gough's desk'. At least the Six Meteorites in the party now knew where their guaranteed 24-hours-a-day signal comes from on 50.050 MHz.

"The beacon might not have seemed very historical but the next room we entered was; it contained a display of archive material from the Society's library dating back 75 years to 1913 when it all began. Written in impeccable copper-plate were the membership details of many of the pioneers now sadly Silent Keys but in their day active in getting the then infant Society airborne. These ledgers alone were worth the visit; they are the history of the RSGB.

"Finally, an admiring gaze at the marvellous collection of gold, silver and crystal memorabilia which had been showered on the RSGB from national societies in virtually every corner of the globe. These, if anything did, showed the esteem in which Britain's National Society is held continent-wide. Here's to the next 75 years....and what a different RSGB Callbook it will be then!"



# Families & Activities Day

**Sunday 24 July 1988**

Quite early on in the plans for the 75th Anniversary celebrations, it was clear that not all of the affiliated clubs would be able to come along and join in with the events which would be held during the last two weeks in July. With this in mind, it was decided to hold a 'Families & Activities Day' on Sunday 24 July, right in the middle weekend. The basic idea was to give affiliated clubs, groups and societies the opportunity of celebrating the 75th Anniversary in their own particular way, the only stipulation being that the event should involve the whole family and help to promote amateur radio to the general public and, particularly, to youngsters. It was envisaged that perhaps 100 of the 650 or so affiliated clubs would take part on that day and that they would all be on the air talking to each other and generally having a good time, after all that's what amateur radio is all about - isn't it? To give a bit of an incentive it was agreed that a case of champagne would be awarded to the club which held the most unusual or meritorious event on the day and to be considered for the prize, the club would have to submit a written report of the day's events and supply photographs for reproduction in RadCom if their entry was successful.

So what happened? In a nutshell, very little! Out of over 650 affiliated clubs we heard of about 10 who had anything planned at all - and out of those only four sent in a report. Of those four, one entry was quite outstanding - that of the White Rose Amateur Radio Society in Leeds and it must be said that even if there had been a hundred entries it would have been hard to beat this one.

The following, with photographs, is their account of what happened and shows what was achieved with a little thought and an awful lot of enthusiasm.

"The idea was to create an activities day for all ages and to invite families and friends of the White Rose ARS to share in the national celebrations of the RSGB's 75th Anniversary.

"To enlarge upon this theme, we attempted to contact fellow amateurs in Leeds' twin towns of Lille in France, and Dortmund in Germany using the special callsign GB75WRR. On Thursday 21 July, seven amateurs from Dortmund joined in the White Rose 80m net and managed to contact GB75WRR. However, despite several attempts, no contacts were made with amateurs in either of the twin towns on 'Families & Activities Day' itself.

"In planning the events for the day, the White Rose ARS was supported by the Moortown Rugby Club, whose premises we share, and they showed great forbearance in allowing us to use the rugby pitch for the games - more about that later. On the amateur radio side, G3TDZ ran a portable station in a tent using his home-designed and home-brew 80m transceiver. The station was very popular with all the visitors; G3TDZ kept things going all day and was still transmitting when the tent, with G4MLN inside it, blew away! We also had a packet radio station on show which was run by G1SEN and G1UDB.

"G4DXA ran the main station (indoors) and did a wonderful job in getting the children on the air, ably assisted by Jenny, G7BKC, who coached the youngsters and handed out certificates confirming that they 'had passed a greetings message from GB75WRR to mark the 75th Anniversary of the RSGB.' The next day, some very proud children took their certificates to school.

"One of the highlights of the day was G4DXA's attempt at lighting the barbecue. He had no problem in putting a smoke screen over the entire rugby pitch before managing to get the charcoal alight. He got it right in the end and, disappearing sausages apart (and I think the little dog knew something about that - don't you?), the barbecue was terrific.

"The games started in the afternoon and were a great source of enjoyment, all thanks to the organiser, Carole Taylor, who was 'volunteered' by her father GOBTG. Carole, her friends and their children from Horsforth really made it a family occasion. There were all kinds of races from sack races to three-legged races, and imagine, if you will, an egg and spoon race - using table tennis balls in place of the eggs - on a windy day! There were balloons galore and all participants received a sticker for achievement or effort. The communal rounders was the most popular of the games. Everybody had the chance to bat, at least two or three times, but where were the fielders?

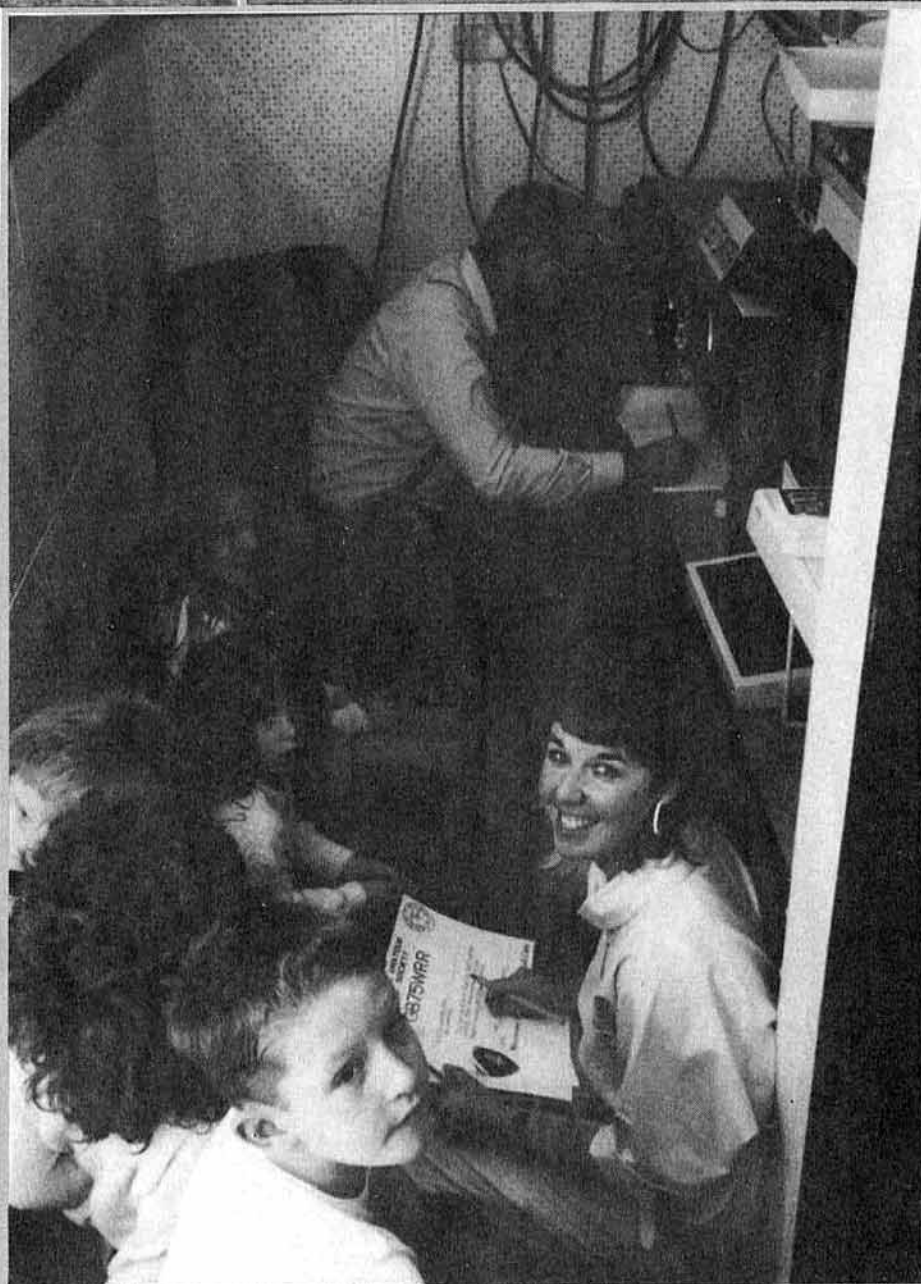
"Well it all had to end sometime and the children and families had to be revived with tea and biscuits in the clubhouse. Not the White Rose members, however, they ended up in the bar sitting round in a cosy group discussing the day's (cont on p.947 col.3)

*The winning entry  
by  
The White Rose ARS*



(Top right and left)  
Some of the children dissipating  
their energy on the sports' field.

(Below)  
"Le Chef Extraordinaire", G4DXA,  
enjoying a well-earned pint.



Jenny, G7BKC, handing out the certificates to some of the children  
after they had their first taste of amateur radio by passing simple  
greetings messages from GB75WRR to other UK stations.



(Left)

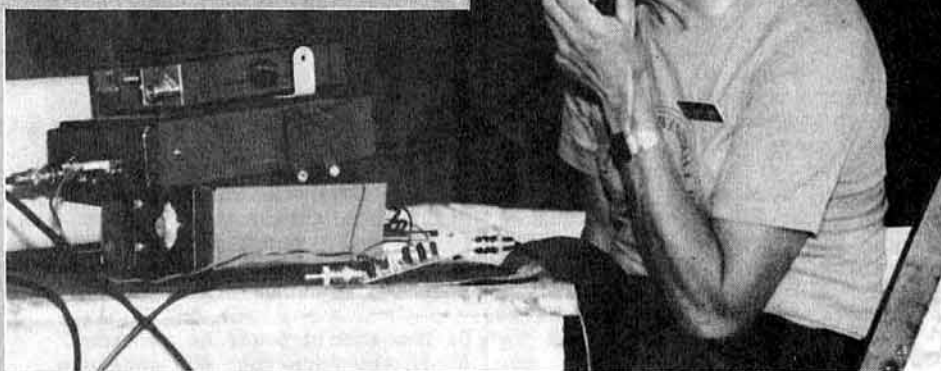
Too many chefs? - G4DXA did a wonderful job of putting a smoke-screen across the sports' field before managing to get the barbecue going.

(Right)

G3TDZ with his home-brew 3W transceiver and 100W linear just before the tent blew away!

(Below)

Happy families relaxing after an enjoyable day.



activities, the RSGB, and some of the well know amateurs of the past. G4FKS did a wonderful job photographing all the day's activities. He was tireless and his photographs stand as a reminder to all those involved in a successful 'Families & Activities Day'."

So there you have it - the winning entry in the RSGB's Families & Activities Day competition. It certainly looks as though they had a good time and it's a pity we haven't more space to print all the photographs. However, we do plan to show them off at this year's Annual General Meeting in Manchester before handing them back to the White Rose ARS, with our thanks and, of course, a case of champagne! Congratulations.

PS: If you didn't get the chance to work GB75WRR, the White Rose ARS will be re-activating the callsign this month to give people a last chance to make contact, gaining some more points towards the RSGB 75 Award and seeing out the year.

## International Satellite Seminar

Thursday 28 July 1988

After last year's AMSAT-UK Colloquium, Terry Carrell, ZL3QL, made a suggestion. This was that the Society should host a international satellite seminar. On 28 July 1988, the Society duly hosted the first International Satellite Seminar in the UK at Godalming, Surrey, immediately before this year's AMSAT-UK Colloquium. David Evans takes up the story...

"The date and venue were chosen so that as many people as possible - from national societies, satellite user and building groups and other interested parties could attend - bearing in mind that many were already in the UK for the RSGB's 75th Anniversary celebrations and would be staying on for the AMSAT-UK Colloquium.

"The object of this informal meeting was to provide a focus for the various projects, ideas and needs of the groups involved, with a view to making informal recommendations to the IARU with regard to the future of amateur satellites. The meeting was hosted on behalf of the RSGB by the Society's Secretary/Chief Executive David Evans, G3OUF and chaired by Terry Carrell, ZL3QL, the President of the New Zealand Amateur Radio Transmitters Society.

"Some 45 representatives from around the world attended the meeting. Discussions were wide-ranging and very positive with regard to the future of amateur satellites. A full report of the meeting was given at the start of this year's AMSAT-UK Colloquium, and a number of ideas and informal recommendations have already been passed to the IARU as a result of the meeting.

"It is hoped that other national societies will follow RSGB's lead and organise similar events in their own countries. In the meantime, if there is sufficient demand for another meeting of this kind before next year's Colloquium, AMSAT-UK would be happy to help arrange and jointly host it."

DON'T FORGET - copies of the RSGB's 75th Anniversary Souvenir programme can be obtained by sending a large 26p SAE and two loose 19p stamps to the Membership Services Dept at HQ.



Some of the delegates at the International Satellite Seminar hosted by RSGB (left to right facing) Ron Broadbent, G3AAJ; David Evans, G3OUF; Terry Carrell, ZL3QL, Chairman; Arthur Gee, G2UK; and Steve Dunkerley, VP9IM.

## THE NEW LICENCE — your questions answered

As the countdown to NLD (New Licence Day) continues apace we're still receiving queries about its terms and conditions. Here's a selection from this month's postbag, with answers.

Q. How should power be recorded?

A. In the form that the schedule requires for each mode.

Q. Are computer programs covered under 1(4) classed as data? Can any data codes be used?

A. Yes to both, provided they are coded in such a way as to facilitate communications and not to obscure the meaning.

Q. Must the station ident in morse or telephony every 30 mins.

A. Yes.

Q. Can class B licensees use repeaters whose output is below 30MHz?

A. Yes.

Some other general points have been made by members, and here are some of them.

In general, there's some concern about the implications of the "non-interference" clause - clause 1 - in the notes to the licence; worries have been expressed that there appears to be no support for the proposition that manufacturers need to improve the EMC standards of domestic appliances. We completely agree, and in fact we

believe that the owner of such equipment must bear a much greater responsibility for improving its immunity in the event of a problem.

\* Concern has also been expressed that visiting Class 2 amateurs from CEPT countries cannot operate on 50 or 70 MHz. The reason is that the CEPT recommendation only applies to frequencies of 144 MHz and above - we hope that this may change in the long term.

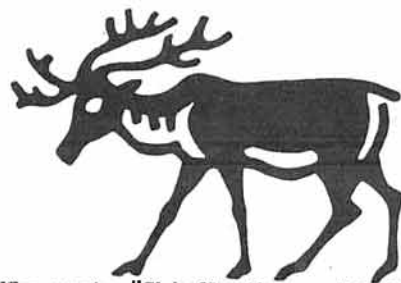
\* Everyone seems delighted with the new maritime mobile facilities but quite a few members have expressed regret that aeronautical mobile isn't included. We agree, and we'll be pursuing the matter of /AM in the future.

\* It's been said that 2.3GHz is too high for linking packet and other unattended operation. We agree that it's somewhat more difficult and we'll be trying to obtain some facilities on the lower bands. Don't forget that formal mailboxes can be linked on 1.3GHz under the agency agreement, though.

\* "Why no HF mailboxes?" Basically, in view of the extremely crowded nature of the HF bands, general unattended operation and mailboxes were not allowed.



# Christmas Quiz



Yes folks, it's that time of the year again when we sprain your brains with the Christmas Quiz - so stop moaning and groaning and stuffing that Christmas pud, drag out the pile of 1988 RadComs and get your brain hemispheres into gear! This year we've decided to base about half of the Quiz on things to do with the 75th anniversary of the Society, and if you're even slightly awake you should be able to find the answers to the first batch of questions somewhere in the January-November 1988 editions of RadCom.

As befits this special Quiz, there are some very special prizes. The first prize winner will receive a complete set of 75th Anniversary souvenirs including a pair of the very limited edition crystal whisky tumblers. The second prize winner will receive a set of souvenirs and one crystal whisky tumbler and the third prize winner will receive everything but the whisky tumbler. There will be runner up prizes for the next 25 entrants but we're keeping those a surprise! So, without further ado, let's go.

1. What special event station called the world from the City of London Festival?
  2. Who was the Society's PRO at the time?
  3. Who founded the Empire Broadcasting Service?
  4. Who took the Patron's photograph in June 1988?
  5. In which district of Birmingham does the RSGB 75 Award Manager live?
  6. Who sat and smoked a pipe in FD 1949 and April 1988?
  7. Who was Young Amateur of the Year?
  8. Which MP visited HQ with him?
  9. On what date?
  10. Which DTI official spoke after the Patron?
  11. What does Y.E.A.R stand for?
  12. What is the nearest large town to the establishment shown on the front cover of the May 1988 edition?
  13. What organisation connected with 12 also had an anniversary recently?
  14. Who liked the diamond in May 1988?
  15. Who was RXX?
  16. Between what dates was Radiolympia 1939 held?
  17. What does the Latin motto on the early badge mean?
  18. Who is the Society's archivist?
  19. What was our address in 1935?
  20. and finally in this section - where was GB75ER?
  21. What does MELF stand for?
  22. and what about HEMT?
  23. What's Vcc for a BC109?
  24. and what's Va for an EL84?
  25. What's the nominal vision carrier frequency of Channel 59?
  26. and what frequency is Radio 2 from Sutton Coldfield?
  27. What frequencies are implied by RMT2?
  28. and what about R7?
  29. Where would you look for DLOPR?
  30. Where is the GB3NHQ beacon sited?
  31. What 14 MHz frequency has time-sharing beacons on it?
  32. Who used PICCOLO?
  33. Who uses TACAN?
  34. Who uses TRIFFID?
  - 35a. In which part of the spectrum was CONSOL?
  - 35b. What was the callsign of the one with the same name as a whiskey distillery?
  - 36a. Where in the spectrum would you look for GBZ?
  - 36b. Where's the transmitter site?
  37. Who wrote "Chiefly the mould of a man's fortune is in his own hands" and gave the Ministry of Defence the idea for a codeword?
  38. In which stormy Shakespeare play would you find an antenna?
  39. Who used the slogan "What are the Wild Waves saying?"
  40. Where would you find a Euroconnector?
  41. What's the acronym usually found in association with it?
  42. At what output power should you run a 100W transistor amplifier on SSB?
  43. Does tuning and loading a valve amplifier for maximum RF output give you the narrowest signal?
  44. Give an approximate value for polarization coupling loss.
  45. Give an approximate value for the loss of 100 metres of LDF4-50 at 1296 MHz.
  46. Give an approximate value for the gain of a VHF antenna with a boom length of 4.2 wavelengths.
  47. In one word, describe the radiation pattern of a 3.5 MHz dipole about 30' off the ground.
  48. When did the original G6 licences begin to be issued?
  49. and the current ones?
- AND FINALLY - THE TIE BREAKER.
50. Where and on what date was the Patron of the RSGB born?

You'll be relieved to know that's it! Take the cold wet towel from round your head, write a fair copy of your answer sheet so that the tear stains don't show and send it to David Gough at RSGB Headquarters - to reach us by Friday 20 January 1989, latest. The results will be published in the March 1989 Bulletin, and - as in previous years - attempts to bribe the judges with used notes, bottles of Scotch, etc, will be treated with compassion and understanding.

# Helplines

'Helplines' is designed to help put people in touch with each other. If you have a problem, it's more than likely that someone out there who has the solution; if you are looking for an old colleague or amateur friend, there could be a reader who has some news of their whereabouts; if you have solved a particular problem, write and tell the rest of us. 'Helplines' is here to help you and to give you the opportunity of helping others. Write to us marking your envelope "Helplines - News Bulletin" and we'll do what we can to get the message out. But above all, please let us know what success you had!

## CHASSIS BASHING - WHERE TO GO:

In October's 'Helplines' we mentioned the demise of Messrs. H.L. Smith, the well-known chassis bashers and asked if anyone knew of another company who did this kind of work. We're indebted to George Dobbs, G3RJV, R. Taylor, GW2HJC, Colin Westwood, G3VFD, D.S. Morgan, GW4KYZ, Mark Rogers, G4RGB, and David Porter, G4OYX, for suggesting or recommending the following suppliers;

Minffordd Engineering  
Sun Street  
Ffestiniog  
Gwynedd LL41 4NE  
tel: 0766 76 2572

Radio Component Specialists  
337 Whitehorse Road  
West Croydon  
Surrey  
tel: 01-684 1665

H.L. Morgan Smith  
Sheet Metal Engineers  
Unit 3, Vernon Buildings  
Westbourne Street  
High Wycombe  
Bucks.  
tel: 0494 32421

C W Westwood  
1/7 Paxton Place  
West Norwood  
London SE27 9SS

Most, if not all, of the above can produce custom-made chassis to your designs in addition to supplying chassis from a standard range. Westwood's will also take on any other general metal work i.e. mast brackets or specially turned metal work for cavities and the like. The other three companies offer cases, rack cases

and boxes in addition to aluminium chassis and all can send you more details on receipt of a stamped addressed envelope. Now you've no excuse for not building.

## WANTED - NEW MLC MEMBER:

The RSGB's Membership Liaison Committee (formerly the Membership & Representation Committee) is in need of another member to help with its work during the coming years. MLC is a busy committee with a broad brief covering the wide range of information and membership services provided by the Society. The committee meets about four times a year in London and is looking for an additional member from either the London or home counties areas.

If you are interested in and feel able to contribute to the work of this committee for the benefit of fellow members, please contact the Chairman Dave Smith, G4DAX, on Whitby 86333 for more details.

## WANTED - EMC COMMITTEE MEMBERS:

It looks as though the current workload of the EMC (Electro-magnetic Compatibility) Committee will increase significantly over the next few years with the advent of radio spectrum deregulation and the implementation of the EEC's EMC Directive. In order to cope with this increase and to tackle it in the best possible way, the Chairman of the Committee is looking for a number of new members.

The EMC Committee's work covers a wide range of areas and rather than provide a full job description in this column, those interested are invited to write to:-

Dan Bernard, G4RLE  
RSGB EMC Committee  
c/o 11 Byrd Close  
Purbrook  
Portsmouth  
Hants. PO7 5UX

A full description of the general duties and responsibilities will be provided on request.

## COME ON UP:

Can you send or receive Morse at around 20 wpm or more? Would you like to win £3,000? We suspect the answer could well be yes. If so, there's a new skill-based game-show

called "Grand Slam" being planned for next year that's looking for potential contestants.

Scottish Television will be recording a pilot edition of the show in late January or early February 1989 and is looking for about seven people who are proficient at Morse to be contestants. The show will be recorded in Glasgow and all expenses, including overnight accommodation will be paid to those chosen. In addition, contestants could win up to £3,000 in prize money.

Interested? Then contact Nonny Williams on 01-254 9711 and she'll be pleased to tell you more.

## COLOUR CODING:

Mr Hogg, G3VPZ, has written to ask if anyone can give him the colour sequence for the 11-way connections to the socket of the link-cable between his PSU and FT200. Unfortunately the sequence was lost when he was trying to smarten up the socket connection. Anyone know? If so please ring him on 0903 45876 or contact him QTHR.

## LEAFLETS PLEASE:

Attention all you hoarders. It'll soon be time for spring-cleaning the shack - if you have any old radio and television leaflets or the like amongst all the other rubbish under the desk, don't throw them away. Douglas Byrne, G3KPO, the Hon. Curator of the Wireless Museum on the Isle of Wight, is looking for such items as well as war-time or pre-war copies of the "Radio Times" for an historical display. If you do find anything which you think might be of interest to Douglas please drop him a line to:-

52 West Hill Road  
Ryde  
Isle of Wight  
PO33 1LN

...or telephone 0983 67665.

## WANTED - MY FATHER'S QSL CARD:

Rodger Bryce, GM3JOB, has written to ask if anyone has a copy of his father's QSL card. Rodger's father became silent key on 1957 and Rodger took over his original callsign in 1981. He's been trying, without success, to obtain a copy (cont. p.953 col.3)

# Around the Groups

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The deadline for the FEBRUARY issue is Wednesday 21 DECEMBER latest, but if you can send items in earlier it would be much appreciated.

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## AMSAT-UK NEWS:

Just a couple of snippets from "Ronnie B" this month - we hear that he's just got back from a few days well-deserved break in preparation for another year's work in the world of satellites.

Firstly, the next issue of OSCAR News is due to be posted on 14 December and should - if all goes well - arrive with AMSAT-UK members in time for Christmas.

Secondly, Ron would like to say "thank you" to all the many members of AMSAT-UK who sent in extra cash donations - and some of them were quite a bit extra - to help swell the AMSAT funds again. You'll remember last month we reported that AMSAT-UK had made a very generous donation of £5,000 to help secure a launch opportunity for the Phase 3-D amateur radio satellite and since then another donation has been made to secure a place on board the UoSAT D satellite for a packet transponder.

PS: Last month we got our figures in a twist when we joined two satellites together and made Fuji-OSCAR 13. The two are, of course, entirely different birds and we apologise to both for the mix-up; Fuji is really OSCAR 12. Sorry - Ed.

## BARTG NEWS:

BARTG's annual general meeting, held on Saturday 5 November, heralded a new era for the group when its membership decided to change the name from the British Amateur Radio Teletypewriter Group to the British Amateur Radio TELEDATA Group.

BARTG has had the word 'Teletypewriter' in its name since its formation in 1959 and the decision to make the change was not taken lightly. The change was suggested at last year's AGM and BARTG members were given a year in which to make their opinions known. After a final discussion at this year's AGM the formal decision to change the name was made.



Mike Smith, G6UUD, of the Crowborough ARC tuning around the two metre band watched by scouts from the 1st Jarvis Brook Group at its Jamboree On The Air station GB75JBV. (Photo G4OSH)

This does not mean, of course, that BARTG will be dropping all interest in the humble mechanical teletypewriter but rather that the group wants to make it clear that it also caters for the likes of AMTOR, packet, FAX and, for that matter, any future developments in data communication. BARTG's aim is to encourage and promote amateur radio activity in all data-orientated modes and it is hoped that this simple change in name will help to get the message across and take the group into a new era.

## QTI-TNA NEWS:

The QTI Talking Newspaper Association is now established at its new base in Lancaster where it is being run by the new Chairman, Harry Longley, G0JKT, following his election at the last AGM in July.

QTI-TNA is a voluntary organisation which produces a tape magazine for visually handicapped radio amateurs. The magazine is a compilation of technical articles selected from current radio magazines which are read by a fine team of readers from all parts of the UK. Each fortnightly issue

comprises two C90 cassettes and is available to all radio amateurs who are visually handicapped for an annual subscription of just £3.50 post free. The service is available to other handicapped persons who find it difficult to read magazines other than through blindness, but in these cases the postage has to be paid. Currently, more than 120 blind amateurs worldwide receive the tape magazine.

QTI-TNA was started in a modest way by John Feely, G4MRB and his wife Diz, G6DIZ about eight years ago from their home in Sheffield. Through their enthusiasm and dedication more and more visually handicapped people have been able to hear what's going on technically in the world of amateur radio, year by year. Much material and financial support has been given by the electronics industry, amateur radio dealers and the radio press, not to mention the various fund-raising activities run by John and Diz and their team of helpers at amateur radio rallies around the country.

Nevertheless, an enterprise of this kind is always in need of funds to cover maintenance, (cont. over)

replacements and the purchase of up-to-date recorders and fast-copiers in order to provide a first class service to the visually handicapped in the amateur radio fraternity. All donations, large or small, are gratefully accepted and a covenanted donation is worth one third as much again since QTI-TNA, as a registered charity, can reclaim the income tax you have already paid on the amount. There is also a 'Sponsor a Member' scheme which is designed to help those members who are on small incomes.

For more information on covenanted donations or the 'Sponsor a Member' scheme please contact:-

Harry Longley, G0JKT  
Chairman/Organiser  
QTI Talking Newspaper Assoc.  
7 Anderson Close  
Lancaster LA1 3JE  
tel: 0524-33207

...and have a very Merry Christmas from all at QTI-TNA.

#### GB75DH:

The special event station GB75DH will be active from Dunnet Head, Caithness between 4 and 31 December (festive days excluded). Operation will take place from 12 noon until 7pm and will be in the 80m, 20m, 15m and 10m bands with the addition possibility of some 2m activity in the event of an aurora (or two). The station is being run to celebrate the anniversary of the Tearoom/Food-Inn at Dunnet Head which, incidentally, is further north than John O Groats. It will also give amateurs one of the last opportunities to collect points/contacts for the RSGB 75 Award. Special QSL, sponsored by the Caithness Tourist Office and the Caithness Development Offices, will be sent for all contacts. Members of the public will be visiting the station during the operating periods and will be invited to pass greetings messages to amateurs around the UK, USA, Canada and the Falkland Islands.

#### WAB NEWS:

The WAB Winter Activity Award will run again this winter between 1 December 1988 and 28 February 1989. The award is based on a points system with 250 points being required for the initial certificate. Endorsements are available for each additional 250 points collected. One point is collected for each area, district, county and bookholder worked (one point per bookholder regardless of the number of book held). No points can be claimed for duplicating an area, district or county.

The cost of the award is £2.00 plus 2 first class stamps. Endorsements can be claimed for 2 first class stamps.

GODVT has become the first to claim the endorsement for 90 islands worked on 7 MHz SSB - which reflects the growing activity in this band during daylight hours.

The first two Basic Awards for working 250 areas on 50 MHz have gone to G0JHC on SSB and G4ZUR using mixed modes. G0JHC has also been awarded the first Island Award for working 10 islands on 50 MHz SSB.

Finally, the first WAB 50 MHz Contest on 9 October seemed to attract a high level of activity in its three hours duration. Early indications are that most English counties had at least one station represented in the logs.

#### ERNIE POWER MEMORIAL CONTEST:

Members of the Oswestry & DARC will be able to compete for the Ernie Power (HF) Trophy and (VHF/UHF) Cup between 17 December and 15 January. The contest will take place at weekends only during the period and contestants will be looking for contacts with those who knew Ernie and remember his exploits. Ernie was highly respected and a founder member of the club.

Amateurs and SWLs may like to take this opportunity of collecting contacts for the club's Border Award since some activity from Powys, Shropshire and Clwyd is anticipated. Further details from Brian, GWODLW (QTHR).

#### WINNER OF RAFFLE AT WOBURN:

Tony Clements, G4KDZ, made a 40 Amp power supply which he raffled at the RSGB's Woburn Rally in aid of the British Kidney Patients Association. A total of £183 was raised and the lucky winner was Mr J.Allen, G4LTH of Stanford-le-Hope.

#### RSGB 75 AWARD:

Yes, we know we said that the certificates would be in the post by Christmas. What with one thing and another, we think we were being just a shade optimistic. The "special extra surprise item" will not be delivered to HQ for at least another seven or eight weeks and we felt it would be silly to send one without the other. So - please bear with us a little longer and we'll get them off to you as soon as we possibly can.

In the meantime, there are still a few more operating days left before the end of the year and the final day of the RSGB 75 Award. Several special GB75 stations will be on the air over the holiday period and we have it on good authority that one member of HQ staff will be coming in on Christmas morning to operate GB75RS. In addition to this valiant effort and selfless dedication, some of the other members of staff have been discussing the possibility of running a number of other GB75 stations over the period. If everything goes to plan we'll be able to give more details in the GB2RS news broadcasts.



Graham Baraclough, G8DLT/ZL1TDQ and Ted Fritsch, KA7QZN met on top of Ayers Rock - in Australia's Northern Territory - at 8.30 in the morning of 29 May 1988 after a three to four hour climb. Ted was attempting to access the Alice Springs repeater some 350km away and Graham just went for the walk! Neither of them knew that the other was also climbing the rock. These radio amateurs get everywhere.....

# Talking Point

## What is AROS?

We're sometimes asked exactly what the fearsome-sounding "Amateur Radio Observation Service" does. Well, here's what its co-ordinator, Bob Osborne, G4FJN, has to say about it:

"The Amateur Radio Observation Service is an advisory and reporting service of the RSGB which is intended to assist licensed amateurs and others - Society members or not - who may be affected by problems which occur within the amateur bands or which develop on other frequencies as a result of amateur transmissions.

"The organisation is entirely voluntary, with day-to-day affairs being managed by a Co-ordinator with support from a number of 'Observers' spread around the United Kingdom. The purpose of the service is to investigate reports of any licence infringement or instance of poor operating practice which could bring the amateur service into disrepute, whether deliberate or unintentional.

"On receipt of a report the Co-ordinator is responsible for any further enquiries to verify details, following which the offending operator is informed about what has been reported and how the problem can be cured. Reports are acceptable from any authentic source and are entirely confidential. There is no disclosure of sources of information without permission. Requests for further details may go direct to the original source or through independent verification by an Observer. A proforma will normally be issued so that all relevant facts are presented. Anonymous communications cannot be

considered and the originator of any report or complaint must be prepared to respond to further enquiries and be fully identified by name and address.

"A report to the Co-ordinator has to contain all possible details of the alleged problem to cover dates, times, modes and exact details of what has been heard, preferably supported by a tape recording. Identification of the offender or the address is important; unless this is known it may not be possible to take any action. Preferably, a report should be originated by more than one person so as to support its authenticity, and must refer to a breach of the terms of the licence or an act contrary to codes of operational practice which are agreed nationally or internationally.

"After proper investigation and proof of a serious deliberate offence by an identified operator, and the offender not responding to reasonable advice by the Co-ordinator, a formal report may be made to the licensing authorities for them to proceed with independent enquiries and to take disciplinary action should it be appropriate. As far as possible, problems are settled within the amateur service and are only referred to the authorities as a last resort".

The Co-ordinator of the Amateur Radio Observation Service is:-

Mr Bob Osborne, G4FJN  
Leys Hill  
Walford  
Ross-on-Wye  
Herefordshire HR9 5QU

('Helplines cont. from p.950)

of the QSL card which had a thistle on the front and the words "Ayr on the Air". Many hundreds were sent out in the 1950s but, so far, none have turned up.

If you worked GM3JOB senior in the 1950s and have a copy of the original QSL card, Rodger would be very grateful if you could send it to him at:-

3 West Bowhouse Way  
Girdle Toll  
Irvine  
Ayrshire KA11 1NJ

...and he'll reimburse any expenses incurred.

CAN WE HAVE OUR CALLSIGNS BACK?:

The Southampton University Radio Club has a problem - it wants to re-apply for four callsigns (two for the club and two for the contest group) but cannot do so without the permission of those who held them on behalf of the club.

The callsigns in question are G3KMI, G4KMI, G6KMI and G8KMI, and the club would like to hear from the holders or from anyone who has any information regarding the whereabouts of the holders in order that they can be contacted. If you can help please contact:-

Mr C E Thompson  
Hon. Secretary  
Southampton University Radio Club  
c/o JCR Post  
Southampton University  
University Road  
Southampton SO9 5NH

UHF PA POWERLESS:

Well-known VHF and UHF DX-chaser Bob Henshaw, G4GCM, has got a problem. He's built a 430 MHz PA for a 7213 but doesn't have a 7213; like many others he has a DOD006 but this doesn't want to know at 430 MHz. He's desperate to get hold of a 7213 and will arrange collection anywhere in England - any offers to Bob at 4 Holybourne Road, Romsey, Hants SO51 8QW or give him a bell on 0794 524025.

CALLING ALL CLUBS IN S.YORKS:

We don't want to be accused of regionalising this part of the News Bulletin but this particular item is aimed directly at clubs in South Yorkshire. So here goes.....

Your local RLO Ian Abel, G3ZHI, has recently sent a questionnaire to all clubs in your area and he'd like to remind you please to fill it in and return it to him as soon as possible.

## AMTOR and band plans — new year resolution

Tuning round the HF bands just recently we've been aware of a number of G stations using AMTOR in the dedicated CW bit of the bandplan. Being as it's the season of peace on earth, goodwill to all men, etc, how about making a resolution to stick firmly to the published bandplan for the bands you operate on and not deviate from them by so much as a single Hz?. Keep data and RTTY in their defined places, gents, and HF CW types will have an easier life. Oh, and what about the time-sharing beacons on

14100 kHz? On most occasions we listen, the beacons are beneath about five layers of CW, RTTY and AMTOR - come on, chaps, knock it off. Don't transmit on 14.1 MHz for love or money - leave it free for its intended and valuable purpose.

Whilst we're on the subject, the spirit of the concession allowing Class B licensees to use Morse for practice purposes doesn't REALLY extend to using high-speed CW for 144 MHz MS working or knocking off the DX in an aurora....!

## CLUB NEWS

**DEADLINE** - Items for inclusion in the FEBRUARY Issue must be sent to HQ marked "Club News - Bulletin" to be received by Tuesday 20 DECEMBER latest.

If news is received by the published deadline, it will appear in the listing. It is your responsibility to ensure that items are sent to HQ in good time, either direct or via your RL0. News items should be sent in writing, preferably typed or written legibly, and be signed by the club secretary or the person responsible for publicity.

## AVON:

- \* Bath & DARC - 21 Christmas party.
- \* Bristol RSCB Group - 12, Christmas party.
- \* North Bristol ARC - 9, QSL card display; 16, Christmas party.
- \* South Bristol ARC - 7, judging for Terry Dunsford trophy; 14, QSL card evening; 21, Christmas party; 28, 10m activity evening.
- \* Thornbury & DARC - 13, talk "Radio Astronomy".
- \* Weston-super-Mare ARS - 12, home brew night.

## BEDFORDSHIRE:

- \* Dunstable Downs RC - 9, talk "smart cards" by G8XTM; 16, Christmas TV show; 23, Christmas party.
- \* Sheffield & DARC - 1, constructors contest; 3, club dinner - Stratton House Hotel Biggleswade; 8, talks from winners of constructors contest; 15, talk "Model Engineering" by G4JLP; 22, Chairman's mince pie night.

## BERKSHIRE:

- \* Burnham Beeches RC - 5, Christmas dinner; 19, GB7SER review/video "what really happened!"
- \* Reading & DARC - 6, constructional contest; 13, Christmas dinner; 20, informal.

## BUCKINGHAMSHIRE:

- \* Chesham & DARS - 14, Christmas surprise by Dave, G3WLO; 21, Christmas drinks at the Queen's Head.
- \* High Wycombe ARC - \*NEW\* meets every second Thursday of the month at Unit 2, Fryers Works, Abbercombe Avenue, High Wycombe. Details G2DRT.

## CAMBRIDGESHIRE:

- \* Cambridge & DARC - 2, crystal set competition evening; 9, log book evening; 16, Christmas party.
- \* Hunts RS - 1, talk "Measuring the frequency and power of HF transceivers" by G3KBR; 15, Christmas social.

## CUMBRIA:

- \* South Lakeland ARS - 13, HF Operating at Dowlades; 16, Christmas dinner.

## DEVON:

- \* Exeter ARS - 12, talk "DC Receivers" by G3YBK.
- \* Taunton & DARC - \*NEW SECRETARY\* Peter Robinson, G0EYR tel: 0823-275973. 2, talk "How to make a valve" by Geoff, G0FMF; 16, Christmas party (provisional).
- \* Torbay ARS - 20, Christmas party including "Kwiz" Cup competition.

## DORSET:

- \* Poole RAS - 16, construction evening (bring your soldering iron).
- \* South Dorset RS - 6, talk "the virtues of your computer".

## ESSEX:

- \* Braintree & DARS - 5, cheese & wine Christmas party.
- \* Loughton & DARS - 2, night on the air with G4ONP; 16, Christmas dinner - Ciro's Restaurant, Loughton.
- \* Southend & DRS - 2, construction competition judging; 9, talk on hairdressing & hair care by Maurice Berger; 16, Christmas party.

## GREATER LONDON:

- \* Acton, Brentford & Chiswick ARC - 20, discussion "The new 1989 licence".
- \* Edgware & DARS - 8, junk sale.
- \* Sutton & Cheam RS - 16, Christmas get-together.
- \* Wimbledon & DARS - 9, social evening.

## GREATER MANCHESTER:

- \* Eccles & DARS - 6, demo "quality audio amplifiers" by G8DTF.
- \* South Manchester RC - 2, talk "the antenna dilemma" by G6M0Q; 9, lecture; 23, Christmas party.

\* Stockport RS - 14, AGM.

## GWYNEDD:

- \* Dragon ARC - \*NEW SECRETARY\* Tony Rees, GWOFO tel: 0248-600963. 5, construction evening; 19, Christmas party.

## HAMPSHIRE:

- \* Basingstoke ARC - \*NEW SECRETARY\* David Deane, G320I tel: 0734-332777. 1, junk sale.
- \* Farnborough & DARS - 14, Christmas social.
- \* Horndean & DARS - 17, Christmas social.
- \* Itchen Valley ARC - 9, Christmas social.
- \* Southampton ARS - \*NEW SECRETARY\* Malcolm Troy, G1UWL tel: 0703-701770.
- \* Three Counties ARC - 7, Quiz night; 16, Christmas party at the Half Moon, Street.

## HEREFORD &amp; WORCESTER:

- \* Bromsgrove ARS - 6, social evening.
- \* Kidderminster & DARC - 6, surplus sale; 20, Christmas social.
- \* Malvern Hills ARC - 13, AGM.
- \* Redditch ARS - 8, talk "Student Licences" by COEYO.
- \* Vale of Evesham ARC - 1, annual club dinner at Park View Hotel, Evesham; 15, pre-Christmas get-together at HQ.
- \* Wythall RC - 6, surplus/bring & buy sale; 13, construction evening; 20, social evening; 27, night on the air.

## HERTFORDSHIRE:

- \* Cheshunt & DARC - 14, Christmas cabaret by Roy & Karen.
- \* Stevenage & DARS - 6, junk sale; 20, quiz night.
- \* Verulam ARC - 20, AGM and "bun fight".
- \* Welwyn-Hatfield ARC - 5, AGM; 19, Christmas social.

## HIGHLAND:

- \* Inverness ARC - 1, video "Japanese Horse".

## ISLE OF WIGHT:

- \* Binstead ARS - \*NEW ADDRESS FOR SECRETARY\* Mr D.F. Barnes, Flat 17, Rose Court, Melville Street, Ryde PO33 3AT.

## JERSEY:

- \* Jersey ARS - \*NEW SECRETARY\* David Reid, GJ0BZF.

## KENT:

- \* Bredhurst R&TS - 8, talk "Advanced car control" by John, G0ARB.
- \* SE Kent (YMCA) ARC - 14, 2M fox hunt; 21, Christmas social.

## LANCASHIRE:

- \* Bury RS - 13, AGM.
- \* Central Lancs ARC - 2, Christmas party; 5, amateur radio quiz; 19, social evening.
- \* East Lancs ARC - 6, AGM.
- \* Fylde ARS - 8, construction competition; 15, supper and social evening.
- \* Myre ARS - 5, video "Club activities 1988"; 12, Lancaster University challenge; 19, Christmas get together.

## LEICESTERSHIRE:

- \* Leicester RS - 5, HF/VHF NFD slides & video; 12, HF/VHF activity night; 19, mince pie social evening.
- \* Melton Mowbray ARS - 16, pre-Christmas evening (lots of attractions).

## MERSEYSIDE:

- \* Liverpool & DARS - \*NEW SECRETARY\* Lynn Bromsgrove, G1EXJ tel: 051-486 5745. 6, surplus sale; 13, activities night; 20 Christmas social.
- \* Mirral ARS - \*NEW SECRETARY\* Alex Seed, G3F00. 7, talk "Scanners" by G3LCI.
- \* Mirral & DARC - 14, talk "Bee keeping".

## NORFOLK:

- \* Norfolk ARC - 7, talk "Common sense about food" by Arnold G3PTB; 21, Christmas party.
- \* Yarmouth RC - 8, talk "Fault finding on radio equipment"; 15, sherry, pies and games evening.

## NORTH YORKSHIRE:

- \* Hornsea RC - 7, talk "HF antennas (wire & beam)" by G3PNK; 14, Yuletide Quiz by G4YTV; 21, Christmas party.
- \* York RC - 7, G1YRC on the air; 14, Christmas dinner; 28, G1-YRC on the air.

## NOTTINGHAMSHIRE:

- \* Mansfield ARS - \*NEW VENUE\* Westfield Folk House, Westfield Lane, Mansfield, second and forth Fridays at 7.30pm. 9, quiz.
- \* Worksop ARS - 6, video night; 17, annual dinner and dance; 20, on the air.

## ORKNEY:

- \* Orkney Group - 7, "nosh-up".

## OXFORDSHIRE:

- \* Harwell ARS - 20, AGM.
- \* Vale of White Horse ARS - 6, Christmas social.

## POWYS:

- \* South Powys ARC - 6, talk "plugs & sockets".

## SHROPSHIRE:

- \* Salop ARS - 1, used equipment sale; 15, video "electronic tuition"; 22, Christmas social.
- \* Telford & DARS - 2, quiz final, Madeley; 7, construction evening; 14, Christmas social, Station Inn; 21, on the air; 26, Special Christmas Net 10am 2/160 metres.

## SOMERSET:

- \* Mid-Somerset ARC - 2, open evening; 16, party evening.
- \* Yeovil ARC - 1, talk "open wire feeders" by G3MYM; 8, talk "the new licence conditions" by G3MYM; 15, talk "circular polarisation" by G3MYM; 22, mince pies on the air!; 29, operating night.

## SOUTH GLAMORGAN:

- \* Cardiff RSCB Group - 12, discussion "Project YEAR" chaired by G4HWR.

## SOUTH YORKSHIRE:

- \* Rotherham & DARS - \*NEW VENUE\* The Comedian public house, St. Ann's Road, Rotherham. Meets on the first Wednesday of each month.

## SUFFOLK:

- \* Felixstowe & DARS - 12, Christmas social.
- \* Ipswich RC - 14, quiz v. Stowmarket; 28, seasonal get-together.

## SURREY:

- \* Kingston & DARS - 21, film show.

## WARWICKSHIRE:

- \* Mid-Warwickshire ARS - 13, Christmas supper night with RSCB guest.
- \* Rugby ARS - 20, sherry & mince pie evening; 23, Christmas dinner at The Huntsman, Dunchurch; 27, get-together at "The Bull", Clifton.
- \* Stratford-upon-Avon & DARC - 12, talk "Tuning up Aerials" by G300Q; 19, Christmas party.

## WEST GLAMORGAN:

- \* Swansea ARS - 1, AGM; 15, Christmas Quiz.

## WEST MIDLANDS:

- \* Coventry ARS - 2, night on the air
- \* GB7SCOV/morse tuition; 9, night on the air
- \* GB7SCOV/morse tuition; 16, judging construction competition; 23, night on the air/morse tuition/pre-Christmas toast.
- \* Midlands ARS - 6, Christmas party.
- \* South Birmingham RS - 7, Christmas party & construction competition.
- \* Wordsley RC - 8, video review "Years Past" by G4TGH; 22, Christmas open night.

## WEST SUSSEX:

- \* Horsham ARC - 1, AGM.
- \* Mid-Sussex ARS - 8, talk; 16, Christmas dinner.

## WEST YORKSHIRE:

- \* Halifax & DARS - 20, Christmas social.
- \* Keighley ARS - Christmas dinner (date unknown).
- \* North Wakefield RC - 1, AGM; 15, Christmas dinner; 22, on the air.
- \* Pontefract & DARS - 1, talk "Logic gates" by Bill G4ZVB; 15, Christmas party; 22, on the air.
- \* Spen Valley ARS - 1, talk/demo "Test equipment"; 15, quiz night, pie & peas supper.
- \* Todmorden & DARS - 5, lecture by George Dobbs.
- \* Wakefield & DRS - 13, members on the air VHF contest; 20, Christmas social evening at Ossett.
- \* White Rose ARS - 7, talk "Computer databases et al" by G4DXA; 15, Christmas Dinner.

## 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.

## 11 DECEMBER

- \* Leeds & DARS Christmas Rally - Pudsey Civic Centre, Dawson's Corner, Pudsey, nr Leeds. Details Harry G4HYD, tel: 0274-685039.

# Events Diary

## 1989 RALLIES

### 22 JANUARY

- \* Oldham Mobile Rally - Queen Elizabeth Hall, Civic Centre, Oldham. Usual trade stands, large bring & buy, refreshments and bars. Easy access for disabled visitors. Free parking. Details Kathy C4ZEP tel: 061-624 7354.

### 29 JANUARY

- \* NARSA Rally - Norbreck Castle Exhibition Centre, Blackpool. Details Peter G6CGF, tel: 051-630 5790.

### 25 FEBRUARY

- \* Rainham Radio Rally - Parkwood Community Centre, Deanwood Drive, Rainham, Gillingham, Kent. Opens 10am, usual attractions, bring & buy stall, refreshments and bar. Talk-in on 2m and 70cm by G4RRR. Details Bob, G1LKE tel: 0634-362154.

### 26 FEBRUARY

- \* 2nd Taw & Torridge Rally - BAAC Halls, The Pill, Bideford, Devon. Opens at 10.30am, trade stands, bring & buy, refreshments, bar, ample car-parking, talk-in on S22. Details GOAYM tel: 0805-2376.

IN BRIEF - More details later.

### 4 MARCH

- \* The Blue Star Radio Rally - High Gosforth Park (Newcastle Racecourse). Details Terry, G6VEG tel: 091-264 8196.

### 5 MARCH

- \* Barry Rally - Barry Leisure Centre, off Holton Road, Barry. Details Mike GW8CMU tel: 0446-711426.
- \* Bury Hamfest - The Castle Leisure Centre, Bolton Street, Bury. Details G4KLT tel: 061-762 9308.

### 12 MARCH

- \* Trafford Rally - \*NEW VENUE\* The G-MEX Centre, Manchester. Details Graham G1JIK tel: 061-748 9804.
- \* Pontefract & DARS 9th Annual Components Fair - Details Colin GOAAO tel: 0977-43101.

### 19 MARCH

- \* South Essex ARS Mobile Rally - The Paddocks Community Centre, Long Road, Canvey Is. Details Ken G0BBN tel: 0268-755350.
- \* Mid-Devon Rally - Pannier Market, Tiverton. Details G4TSW, Mid-Devon Rally, PO Box 3, Tiverton, Devon.
- \* Cambridgeshire Repeater Group Junk Sale & Rally Extravaganza - Phillips Catering Centre, St. Andrews Road, Cambridge. Details G0HEY tel: 0799-23689.

### 26 MARCH

- \* Cunningham District RC Rally - Magnus Leisure Centre, Irvine. Details Peter G4OFCI tel: 0294-72253.

### 2 APRIL

- \* White Rose Rally - Leeds University. Details A.S. Kessler, G4DXA, PO Box 73, Leeds, LS1 5AR.
- \* North Cornwall Radio Rally - Sports Hall, Launceston College. Details Mary tel: 0566-5632.

### 16 APRIL

- \* RSCB VHF CONVENTION - Sandown Park Racecourse, Esher, Surrey. Details RSCB HQ.

### 23 APRIL

- \* Swansea ARS Rally - Leisure Centre, A4067 Swansea to Mumbles road. Details Roger GW4HSH tel: 0792-404422.

### 30 APRIL

- \* BADC Rally - The Crest Hotel, junction 2 of the M6 motorway. Details Trevor, G8CJS tel: 0532-670115.
- \* 6th Anglo-Scottish Rally - \*CHANGE OF DATE\* Tait Hall, Kelso. Details Bruce G4U1B.

### 7 MAY

- \* Southend & District Mobile Rally - Roachway Youth Centre, Rochford, Essex. Details Ted G4TUO tel: 0702-202129.

### 14 MAY

- \* Drayton Manor Mobile Radio Rally - Drayton Manor Park, Tamworth, Staffs. Details Norman G8BHE, tel: 021-422 9787.

### 21 MAY

- \* 32nd Northern Mobile Rally - Great Yorkshire Showground, Harrogate, North Yorkshire. Details Harry G3C00.

### 28 MAY

- \* 13th East Suffolk Wireless Revival - Civil Service Sportsground, Bucklesham, nr. Ipswich. Details Jack, G4IFF tel: 0473-464047.
- \* Maidstone (YMCA) Radio Rally - Sports Centre, Melrose Close, Maidstone. Details G6FZD tel: 0622-50709.
- \* Plymouth RC Mobile Rally - Plymstock School, Church Road, Plymstock, Plymouth. Details Joe, G1RXR tel: 0752-509855.

### 29 MAY

- \* Doncaster Radio Rally - Bircotes Sports Centre, near Bawtry, Doncaster. Details Audrey Wilson tel: 0302-721259 or 0302-857526.

### 11 JUNE

- \* Elvaston Castle Mobile Rally - Elvaston Country Park near Derby. Details John G4PZY tel: 0332-767994. Trade Peter G3WU tel: 0332-700265 evenings.

### 18 JUNE

- \* Denby Dale ARS Rally - venue to be advised.

- \* Details Gerald Edinburgh tel: 0484-602905.

### 25 JUNE

- \* 32nd Longleat Mobile Rally - Longleat Park, nr. Wiltshire. Details Shaun, G8VPG tel: 0225-873098.

### 2 JULY

- \* Pontefract Racecourse Rally & Fair - Details Colin GOAAO tel: 0977-43101.

### 8/9 JULY

- \* 2nd RSCB DATA SYMPOSIUM - Harrow School, north west London. Further details later from RSCB.

### 29/30 JULY

- \* 4th AMSAT-UK Colloquium - University of Surrey, Guildford. Details G3AAJ tel: 01-989 6741.

### 6 AUGUST

- \* RSCB NATIONAL MOBILE RALLY - Woburn Abbey, Bedfordshire. Details Norman Miller, G3HVV tel: 0277-225563 daytime.

### 20 AUGUST

- \* Red Rose Summer Rally - Bolton Sports & Exhibition Centre. Details Dave, G1100 tel: 0204-24104 evenings.

### 27 AUGUST

- \* Torbay Mobile Rally - STC Social Club, Brixham Road, Paignton, Devon. Details G3KZJ (QTHR).
- \* Galashiels & DARS Open Day - Fucus Centre, Galashiels. Details John, G4OAMB.

### 3 SEPTEMBER

- \* 22nd Preston ARS Rally - University of Lancaster. Details Godfrey, G3DWQ tel: 0772-53810.

- \* Telford Amateur Radio Rally - Telford Exhibition Centre. Details Martyn, G3UKV tel: 0952-255416.

### 10 SEPTEMBER

- \* Vange ARS Rally - Nicholas School, Basildon. Details G4NVT tel: 0268-43025 or Mrs Thompson tel: 0268-552606.

### 24 SEPTEMBER

- \* Harlow Mobile Rally - Harlow Sports Centre. Details G4MIS tel: 0279-722622 evenings or G4KVR tel: 0279-22365 daytime.

### 8 OCTOBER

- \* Armagh Rally - Drumsill House Hotel. Details G1BRNX.

### 19 NOVEMBER

- \* West Manchester RC Winter Rally - Bolton Sports & Exhibition Centre. Details Dave, G1100 tel: 0204-24104 evenings.

## OTHER EVENTS

### 10 DECEMBER

- \* RSCB ANNUAL GENERAL MEETING - Main Theatre C16, C Floor, Renold Building, University of Manchester Institute of Science & Technology, Sackville Street, Manchester M60. Meeting commences 2pm sharp. Doors open from 11.30am for registration. Bookstall open from 11.30am to 1.45pm only. Cafeteria open for lunchtime snacks/refreshments before the meeting between 11.30am and 1.30pm and for teas/coffees during the break.

- \* RSCB PRESIDENTIAL INSTALLATION - 8pm for 8.15pm. Barnes-Wallis Building, UMIST.

### 8/9 JULY 1989

- \* 2nd RSCB DATA SYMPOSIUM - Harrow School, north west London. Further details later from RSCB.

### 29/30 JULY

- \* 4th AMSAT-UK Colloquium - University of Surrey, Guildford. Details G3AAJ tel: 01-989 6741.

## GB CALLS

The list below shows ALL the special event stations licensed for operation during this month and early next month, (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.

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*****
*
* ALL "GB75" PREFIX CALLSIGNS
* VALID FOR RSCB 75 AWARD
* CLOSING 31 DECEMBER 1988
*
*****
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UNTIL THE END OF 1988:

GB75RS - 75 (ANNIVERSARY) RADIO SOCIETY (GB):  
RSCB HQ, Lamb House, Potters Bar.

### 1 DECEMBER:

- GB0CDN - Grid: SZ 295 849
- GB0CDP - Portchester Castle, Hants.
- GB0NIN - The 'Ninian' Lat:60 54'N Long:01 25'E.
- GB1MRS - Macclesfield RS, Cheshire.
- GB1RFC - Royal Flying Corps, Leicester.
- GB1RSC - Royal Star & Carter Home, Surrey.
- GB6AQ - Tops CW Club, Tyne & Wear.
- GB7SDC - Drummonds Centre, Colchester, Essex.
- GB75LOA - RAF Mount Batten.
- GB75NR - Nunsfield House Community Centre, Derby.
- GB75RLD - City Hospital, Derby.

### 2 DECEMBER:

- GB2MSR - Manx Scout Radio, Isle of Man.
- GB2SNP - St. Nicholas Church, Warwick.
- GB75AUG - St. Augustine's Church Centre, W.Yorks.
- GB75NFX - Kingsthorpe Comm'ty Centre, Northampton.

### 3 DECEMBER:

- GB0CDS - Grid: SU 628 069
- GB1CDS - Grid: SU 628 069
- GB75JST - Jubilee Sailing Trust, Portsdown Hill.

### 4 DECEMBER:

- GB0CDX - Grid: SZ 339 879
- GB2CDV - Grid: SZ 569 786
- GB75DH - Dunnet Head, Scotland.
- GB75MN - Merchant Navy, Northampton.
- GB75RN - Royal Navy, HMS Mercury, Hants.

### 6 DECEMBER:

- GB75TSR - Training Ship Resolute, Gwent.
- GB75USA - Darley ARC, Harrogate, N.Yorks.

### 7 DECEMBER:

- GB1CDA - Fort Blockhouse.

### 8 DECEMBER:

- GB2CDU - Grid: SZ 627 588

### 9 DECEMBER:

- GB2RCC - Grid: SK 839 112
- GB500 - Paisley 500, Paisley, Scotland.

### 10 DECEMBER:

- GB4GBA - 91st Leicester Scout HQ.
- GB75DX - Sandholm, Bury St. Edmunds, Suffolk.
- GB8GBA - 91st Leicester Scout HQ.

### 1 JANUARY 1989:

- GB2CDV - Grid: SZ 569 786
- GB5RFC - Royal Flying Corps., Leicester.

### 4 JANUARY:

- GB0CDX - Grid: SZ 339 879

### 5 JANUARY:

- GB2CDU - Grid: SZ 627 588

### 7 JANUARY:

- GB2NRS - Norbeck Castle Hotel, Blackpool.

PS

*On Christmas Day,  
Arthur Milne, G2MI,  
senior GBERS news reader,  
will be reading  
the news for the  
1500th time.  
This is equivalent to  
approximately 750 hours  
or one month's continuous  
transmission.  
Well done, Arthur  
and many thanks from  
all of us.*

**P. J. ECKERSLEY G4FTJ**

# **AMATEUR RADIO OPERATING MANUAL**

## **THIRD EDITION**

THE AMATEUR RADIO OPERATING MANUAL contains information on setting up a station, operating procedures, DX working, Contests, Mobile and repeater operation, satellites, RTTY, slow scan tv, and special event stations. There are also eight useful appendices showing continental and regional maps, callsign and countries lists, time zones, frequency allocations, standard frequency stations, and foreign language contacts. This book should be in the shack of every active amateur.

Amateur Radio Operating Manual costs £5.81 to RSGB members by post.

**RSGB SOCIETY OF GREAT BRITAIN**

# TECHNICAL TOPICS

PAT HAWKER · G3VA

## DIRECT DIGITAL SYNTHESIS OSCILLATORS

*TT* has frequently referred to the problems created by oscillator phase noise on both receive and transmit modes, particularly in the case of the low-cost pll frequency synthesisers used in many transceivers. Admittedly, some manufacturers have succeeded during the past decade in significantly improving the performance of their

synthesisers. But it remains true that a good free-running vfo can provide superior noise performance than a synthesiser. One recalls for example that Peter Hart, G3SIX in his equipment review of the Ten-Tec Corsair hf transceiver (*Rad Com* November 1984) – a model using a low-noise, permeability-tuned vfo covering 5.0 to 5.5MHz – admitted that after thoroughly testing this transceiver in the laboratory

and on-the-air he decided to purchase one to replace an ageing FT101. Most of us are, however, not in a position to carry out exhaustive laboratory measurements before deciding which model to buy.

For those who value the convenience of digital control from microprocessors and memories etc, the synthesiser retains its attractions; otherwise, presumably, the transceiver manufacturers would have dropped them. However there is now new hope that digital synthesisers can be radically improved. In *TT* (March 1988) I mentioned an article in *Ham Radio* (November 1987) 'Tomorrow's receivers: what will the next 20 years bring?' by Robert J Zarvel, W7SX noting that: "W7SX considers that synthesisers offer distinct advantages in that they can be directly controlled by microprocessors and do not require special mechanical rigidity or moving parts, but admits that at present it is difficult, if not impossible, to duplicate the permeability-tuned oscillators of the 'sixties with pll synthesis, given the constraints of typical amateur budgets. He quotes, however, that another type of synthesiser – 'the direct digital synthesiser (dds)' – holds great promise for the future."

*Ham Radio* returns to this subject in its October 1988 issue with the article "A direct digital synthesis vfo" again by Robert Zarvel, W7SX (Digital RF Solutions of Santa Clara, California). This introduces DDS as follows: "The direct digital synthesizer has arrived in Amateur Radio (the new high cost Icom 781 uses DDS). In the past several months DDS state-of-the-art has progressed to the point where good radio performance is obtainable using DDS. The DDS offers some attractive features over the analogue or phase-locked loop (PLL) synthesizer. DDS is digitally controlled. Tuning is regulated by either memories or counters which, in turn, are controlled by rotary optical couplers. Unlike the PLL, DDS doesn't use a vco, loop filter, phase detector, or digital divider and prescaler. Waveform information is generated using digital information only. The last step uses a digital-to-analogue converter (DAC) to generate the rf signal."

W7SX shows that an important feature of the DDS system (Fig 2) is the NCMO vfo (NCMO stands for 'numerically controlled modulated oscillator'), which creates digitally defined rf waveforms and is now a trademark of Digital RF Solutions. It was conceived and designed by Earl McCune Jr, WA6SUH and it is described as follows:

"The NCMO is a highly integrated cmos phase accumulator with numerous interface and modulation features. It uses a 24-bit phase accumulator counter controlled by a 24-bit tuning word. The 24-bit tuning resolution implies over 16-million equally spaced discrete frequencies in an NCMO system; 16-million "channels" suggests about 1.2Hz steps with a 20MHz clock. Half of the frequencies appear between the Nyquist and clock frequencies. These are simply

## NICAD PULSE CHARGER

An extensive list of 'facts and fallacies' about rechargeable nicad (NiCd) cells and batteries, based on an article by ZS5JF, appeared in *TT* May 1988, p349. But there is little doubt that many amateurs still do not appreciate that the useful life of these batteries can be significantly reduced by failure to recognize the way in which nicads can be damaged during charging.

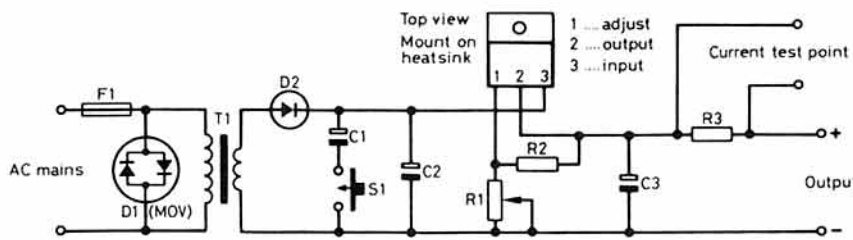
In his 'The Weekender' column in *Ham Radio* (September 1988, pp18, 20 and 21), R L Measures, AG6K provides a useful description of why it is necessary to charge nicad cells at not less than 0.1C (Where C is the Ah capacity of the cell) but at the same time to avoid overheating the cell once it is fully charged. He writes: 'If the charging current of 0.1C (or more) is maintained after a wet cell NiCd battery is fully charged, the surplus charging energy that the battery can't store converts the water in the liquid electrolyte to hydrogen and oxygen gas. This causes no damage to the cell as long as distilled water is added periodically. . . . It's not convenient to add water in a sealed NiCd cell; an internal process of turning the hydrogen and oxygen gas back into water is designed into the cell. When hydrogen and oxygen unite as water they release energy in the form of heat. . . . If the cell is continuously cooled enough to maintain cell temperature below about 35°C during charging, the sealed cell won't be damaged by overcharging. If the temperature is allowed to rise above about 35° during charging the cell won't last long. . . . You can eliminate overcharging by using a constant-voltage charger (about 1.43V per cell) but then unfortunately, as the cells become charged, their voltage rises and the charge current decreases below the critical 0.1C level. This is both good and bad . . . the cells won't overheat when overcharged but bad because not enough current will be supplied

near the end of the charging process to charge fully the deep parts of the plate.'

AG6K's answer to this dual problem is a pulsed constant-voltage charger: Fig 1. With the half-wave rectification, in the absence of a large-value 'reservoir capacitor' (C1), the output is in the form of 'rectified (raw) ac' or "dirty dc", a succession of current/voltage pulses with the voltage limited by the three-terminal ic regulator (eg LM321T for currents up to 1A). Remember that the secondary winding of the mains transformer needs the current rated at about 1A where the 0.1C value is about 100mA. The charger is adjusted as follows:

With no battery connected, depress the push-button switch S1 thus bringing a reservoir capacitor into circuit and adjust R1 for a charger output of about 1.43V per cell to be charged. Release S1, connect the nicad battery with a multimeter across R3 to determine the average charging current. The initial average charging current for a fully discharged battery should be about 0.3C. When the battery is fully charged reset R1 to show an average charging current of 0.02C. If you have a suitable oscilloscope, the measured peak current should be about 0.1C. With the charger set up in this way it should then be safe to leave a battery on charge for up to several days without the cell temperature rising to 35°C.

FIG 1 AG6K's NICAD PULSE CHARGER PROVIDING VOLTAGE-LIMITED "DIRTY DC" PULSES WITH PUSH-SWITCH S1 OPEN. D1 IS A SMALL (9mm SIZE) METAL-OXIDE VARISTOR RATED AT LINE VOLTAGE (UK 240V). D2 3A 100PIV OR GREATER SILICON RECTIFIER. C1 220µF (35V). C2, C3 1µF (35V) TANTALUM CAPACITOR MOUNTED NEAR REGULATOR IC. F1 0.2A FUSE FOR 240V SUPPLIES. R1 1K MULTITURN TRIMPOT. R2 100Ω 1/4W. R3 CURRENT SAMPLING RESISTOR (10Ω 2W FOR AA BATTERIES, 0.1Ω 2W FOR C OR D BATTERIES). WITH 0.1Ω RESISTOR 1mV EQUALS 120mA. TRANSFORMER SECONDARY 1:1 TIMES NUMBER OF CELLS PLUS 3V RMS. NO-LOAD SECONDARY VOLTAGE MUST BE LESS THAN 24V RMS.



'folded back' below the Nyquist frequency, so there are actually only about 8-million possible discrete frequencies. Only the most significant 12 bits are used in this project. . . . The NCMO can be tuned in three ways: (1) a parallel mode connecting to 24 pins on the ic device; (2) a strobed mode for three eight-bit words, mainly for microprocessor interface; and (3) a serial mode which allows direct connection to a rotary optical coupler so that it can 'feel' like an analogue tuner."

Later in his long article, W7SX writes: "For on-the-air tests I have a Corsair II which uses a super low-noise permeability tuned oscillator (PTO). The output level of the TRW1012 dac is similar to the requirements of the Corsair (about +5dBm). Switching back and forth between the PTO and the NCMO vfo proved to be a good 'qualitative' test. Results were excellent; only a few weak spurs were noted." The specifications of the 18X 2070 NCMO VFO as described in the article gives: Phase noise at 1Hz offset -95dBc/Hz; 10Hz offset -115dBc/Hz; 100Hz offset

-128dBc/Hz; and 1kHz -135dBc/Hz. Spurious signal generation -75dB (worst case), -90dB (typical). Frequency stability is equally as good as for a PLL, synthesizers in both cases being determined by the stability of the crystal reference oscillator.

Clearly this is a highly promising development, though more complex and costly than the PLL approach, for those who want digital control from microprocessors, memories or 'analogue-feel' rotary optical couplers. W7SX concludes, however with a word of warning: "You can purchase assembled DDS boards from Digital RF Solutions Inc. These boards are recommended for advanced experimenters. As a minimum, a low-frequency spectrum analyser is required before attempting experimentation. For more information contact Doug Hammed at 3080 Olcott St. Suite 200d, Santa Clara, CA95054, California." For those who are not deep into digital electronics, there remains much to be said for a good free-running vfo, such as the PTO used in the Corsair models.

## BROADBAND CAN BE VULNERABLE

On many occasions *TT* items have doubted the wisdom of adopting uncritically the trend towards 'broadband' configurations in both receiver front-ends and transmitter amplifiers. Unquestionably, though, such approaches can offer useful operational advantages and cost savings in eliminating multi-ganged variable-capacitor tuned circuits. It has been frequently stressed that good pre-mixer selectivity is a great help in overcoming the problems presented by limited dynamic range, particularly where very strong signals from local transmitters or broadcast stations are involved.

In the case of stand-alone receivers, it is often possible to add an external selectivity unit in the form of a low-gain pre-amplifier with two or more tuned circuits (see, for example, *TT* August 1981). Carried to the extreme such a selectivity unit may take the form of signal-frequency crystal filters as developed and proposed by Peter Haylett, G3IPV (*TT*, July 1985, pp 541-2 and *TT*, February 1986, p109).

Really sharp small-signal filters cannot readily be fitted to typical 100Watt transceivers, unless relay bypass switching is provided. The best that can be done without such switching is a sub-octave bandpass filter constructed to handle the transmitter output power as described in the accompanying item "Bandpass filters for co-sited transmitters". Such filters will provide limited attenuation of broadcast signals on adjacent bands (eg the 7.1MHz and 21.5MHz broadcast bands, or, on 14MHz, the not quite adjacent 15MHz band).

Gerald Stacey, G3MCK carries the debate forward to the broadband antennas which deliver to the receiver, at full strength, the many strong signals from those modern 250kW, 500kW and more broadcast transmitters working into their high-gain antennas to give effective radiated powers of many megawatts along the beam. Receiver emf input across 50ohms of these signals can be of the order of 0.1V, 100dB (µV), about a million times greater

FIG 2 NCMO-BASED DIRECT DIGITAL SYNTHESIZER (W7SX).

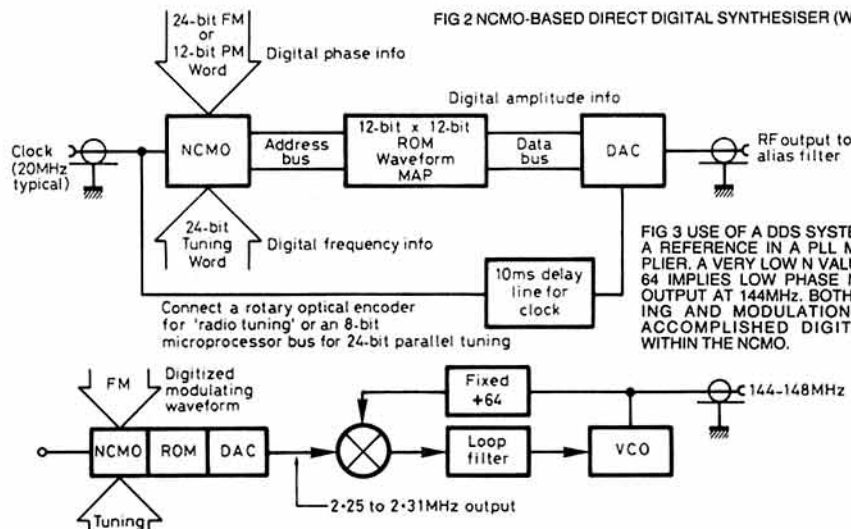


FIG 3 USE OF A DDS SYSTEM AS A REFERENCE IN A PLL MULTIPLIER. A VERY LOW N VALUE OF 64 IMPLIES LOW PHASE NOISE OUTPUT AT 144MHz. BOTH TUNING AND MODULATION ARE ACCOMPLISHED DIGITALLY WITHIN THE NCMO.

## 'SQUEEZE' (IAMBIC-MODE) KEYING

As a result of my review of the Samson ETM8c keyer (*Rad Com*, October 1988, pp777-8) it has become clear that a number of readers are hazy as to the difference between 'iambic-mode' dual-paddle keyers and the traditional form of single-paddle elbugs. Although, as mentioned in the review, the dual-paddles of iambic-mode keyers can in practice be operated with the same hand-movements as the single-paddle elbug, this throws away the advantage of being able, with iambic-mode logic, to form many letters with just one single controlled squeeze of the paddles.

I noted in my 1972 review of the original ETM-3 keyer: "On a manual 'straight' key, all symbols are made manually and the 'shape' of every dit and dah depends entirely upon the operator; some 82 contact closures are needed to send the alphabet. The semi-auto ('bug') key replaces multiple dits with a single timed-closure, and the shape and spacing of the dits is taken care of automatically; an alphabet needs 66 contact closures. The (single-paddle) elbug replaces multiple dits and multiple dahs with single closures and can include self-completing

and character-spacing 'memory'; the alphabet now represents 53 closures.

"With 'iambic-mode' operation we enter a rather different world; those who remember the rules of metrical scansion of poetry will grasp that iambic means that when the paddles are squeezed together, the keyer produces a series of interspersed dits and dahs - short-long, short-long, short-long continuously, all accurately spaced, formed and completed. Because there are two paddles, it is possible to do more than this; if the paddles are closed in the reverse sequence (ie the other paddle makes its closure first) out comes dah-dits; one paddle closure gives a series of dits; the other alone a series of dahs. So we have four automatically formed combinations: dits, dahs, dit-dahs and dah-dits all with correctly timed spaces and cross-overs maintained as long as one or both paddles is activated. We are now down to 45 contact closures per alphabet, compared with the 82 for the straight key. Furthermore, such useful procedure signals as AR, VA, CT can all be made with what amounts to a single squeeze; CQ with two squeezes.

"So it is easy to come to the conclusion that, theoretically, iambic-mode squeeze keying does

represent a very real and useful advance on earlier types of keyers and keys. Having decided this, one must add a rider: it makes possible higher speeds and is less tiring at the cost of introducing the timing errors that result in jibberish, with the machine trying to take over from an increasingly flustered operator."

John Piggott, G2PT, in an excellent survey article (*RSGB Bulletin*, May 1956) pointed out that an operator's mind must be ahead of his hand movements since 'it is fairly certain that there is no individual nerve signal for each transmit movement of the key' - in other words, the times involved in morse are less than human reaction times. In acquiring a new form of keying it is clearly necessary to be prepared to put in many hours of practice, to program the brain so to speak.

It should also be pointed out that the logic design of a squeeze keyer differs from that of the single-paddle electronic keyer. A number of designs for both types of keyers, using mainly integrated circuit devices, have been published. It will be appreciated from the review of the ETM-8c that it is a fairly complex and sophisticated device, though amateurs have, of course, successfully built iambic-mode keyers.

than the weak amateur signal with which the receiver may be trying to cope. Remember that the effects of strong signals are cumulative.

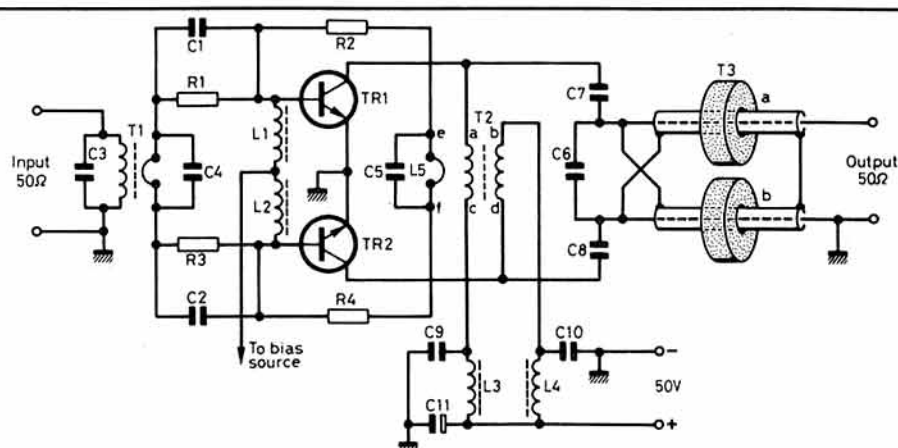
G3MCK writes: "With regard to some recent *TT* items on broadband antennas, I wonder how much they degrade the performance of many modern receivers. With such a set-up you have a broadband antenna picking up some very strong signals, feeding through a wideband (sometimes 0 - 30MHz) front-end into a receiver with a fairly wide roofing filter. This does not seem to me to be good design practice even though the actual effects may not appear to be too bad.

"My own view is that for an optimum receiver system you should have a narrow-band antenna, as much front-end selectivity as possible and the narrowest first i.f. filter you can use. This would seem to put out of court many current hf rigs which not only have no significant front-end selectivity but also have an fm (25kHz) filter as their first selectivity element. It would seem that the provision of 1001 memories etc is considered to more than compensate for such 'trivial' shortcomings as not being able to receive weak signals among the mass of spurious intermodulation products etc!"

G3MCK's remarks can also be considered in relation to the question of matching an antenna to a receiver. In the September, 1988 issue of *QST* (Technical Correspondence p46), Zachary Lau, KH6CP of ARRL staff, points out that properly matching receivers to a transmission line is much more complicated than matching transmitters to the line: "The latter is relatively simple - just obtain the largest power transfer. With receivers, the goal is a low system noise figure... Good receivers are optimized for 50-ohm source impedances... Note source impedance and not input impedance. Just because a receiver is designed to work well with 50-ohm sources doesn't mean it has a 50-ohm input impedance... the receiver input impedance may be far from 50 ohms, particularly if the noise figure is pretty good and obtained with a fet amplifier. As a result, feeding a receiver with an antenna matched to 50-ohm coaxial cable usually works pretty well, at least on hf. The mismatch is important if you have a big station with phased and matched beams."

KH6CP reminds us that laboratory-quality instruments for measuring power transfer cost hundreds of dollars, while noise figure measurement equipment costs run into thousands.

The difference between noise-figure matching and power-transfer matching, KH6CP suggests, explains why using a receiver to tune a Transmatch doesn't always work. When you tune a Transmatch for maximum (received) signal, you are tuning for maximum power transfer into a load which often isn't 50ohms. There is in fact a good reason why it is not desirable to have receiver matching adjusted for maximum power transfer: many modern receivers, with noise figures of the order of 6dB or so, have some 20-30dB more sensitivity than is required on the lower hf bands, leading to the type of overloading on strong signals that G3MCK has in mind. Even today, manufacturers design for good weak signal reception rather than for handling very strong signals, if necessary including rf attenuators between the antenna and the first stage. What you want out of a receiving antenna is a good signal-to-noise ratio, not necessarily maximum microvolts.



## SOLIDSTATE RF POWER AMPLIFIERS

In the April and July *TT*s, I drew attention to the growing belief, at least as far as broadcast engineering is concerned, that the future of high-power solid-state power amplifiers will increasingly depend on mosfet rather than bipolar devices. The July *TT* provided details of a state-of-the-art Motorola design for a 300watts-carrier-output, broadband (10 to 175MHz) amplifier based on the "Gemini MRF151G" push-pull mosfet package. In general terms, rf power mosfets tend to work with higher voltage (50 to 70V) supplies than bipolars, reducing the heavy-current problems. They also provide rather higher power gain per stage and are free from secondary breakdown problems.

At present, however, the upper frequency limit of state-of-the-art rf power mosfets is about 150MHz although there are signs that some semiconductor firms are frantically working towards devices suitable for use up to about 1000MHz in order to meet the requirements of television broadcasting.

The broadband fet amplifier described in the July *TT* was designed by Helge O Granberg (*Microwaves & RF*, November 1987). An earlier design, based on push-pull bipolar devices, is described by him in Motorola Applications Note AN-758 "A two-stage 1kW solidstate linear amplifier" and remains a good guide to the design, construction and setting up of high-power bipolar transistor amplifiers. AN-758 describes two basic push-pull amplifiers, 1-6 to 30MHz, operating from 50V supplies. The design (Figs 4, 5) is based on combining the output from four 300Watt amplifiers each using two MRF428 (150Watt) bipolar transistors, with a 50Watt driver amplifier using a similar push-pull design with two MRF427A (25W) devices. The complete 1kW linear amplifier thus uses eight MRF428 and two MRF427A devices, and has a minimum total power gain of 30dB. For ssb has a third-order intermodulation distortion (IMD) of -30dB maximum (1kW p.e.p. 50V supply, or at 800W p.e.p with 40V supply) and can provide continuous cw output of 1kW with

FIG 4 BASIC 300W AND 50W SOLIDSTATE BIPOLAR PUSH-PULL AMPLIFIERS AS DESCRIBED IN MOTOROLA APPLICATIONS NOTE AN-758. COMPONENT VALUES DIFFER BETWEEN THE 300W POWER MODULE AND THE 50W DRIVER AMPLIFIER. COMPONENT LAYOUT AND FULL DETAILS OF COMPONENT VALUES AND CONSTRUCTION OF L1-4 AND T1-3 ARE GIVEN IN AN-758, TOGETHER WITH THE FOUR-PORT POWER DIVIDER AND OUTPUT COMBINER, MEASUREMENT TECHNIQUES ETC.

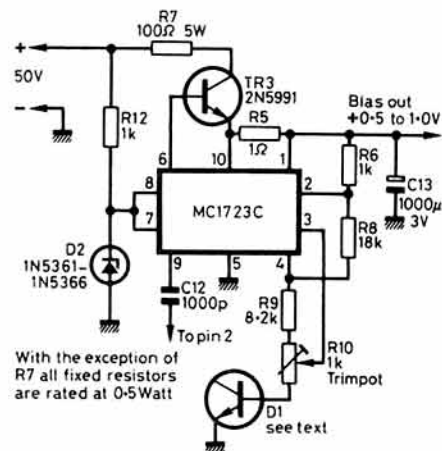


FIG 5 BIAS VOLTAGE SOURCE FOR THE MOTOROLA AMPLIFIERS. D1 IS BASE-EMITTER OF 2N5991 TEMPERATURE-TRACKED.

50% duty cycle over 30-minute periods with heatsink temperature less than 75°C. While the construction of this 1kW amplifier would represent for a radio amateur an ambitious and costly project in totality, it may be worth noting that the information in AN-758 covers, in effect, 50Watt and 300Watt linear amplifiers and associated regulated bias voltage source that would be suitable as stand-alone amplifiers. The 150Watt Motorola MRF428 device is currently listed in a *Ham Radio* advertisement at \$50 (RF Parts, 1320 Grand Avenue, San Marcos, CA92069, USA) and in *Rad Com*, with VAT-added etc, at about £69. I would again stress that it would be unwise to attempt to build either amplifier without careful study of the 16-page AN-758 Application Note available from Motorola (see July *TT*).

## RADIATION WORRIES

The continued public concern and controversy surrounding the safe level for extended periods of exposure to non-ionizing radiation has taken a new turn which could affect a few amateurs using high-power on hf with monopole vertical antennas. A few years ago both the British

National Radiological Protection Board (NRPB) and the American National Standards Institute (ANSI) proposed new guidelines that recognised for the first time that at frequencies between 30 to 300MHz, our bodies tend to act as dipole antennas and absorb more rf energy than, for example, from equivalent mf or lower-hf

radiation. ANSI recommended that the safe level for public exposure at vhf should be reduced from 10W/m<sup>2</sup> (10mW/cm<sup>2</sup>) to 4W/m<sup>2</sup>. *TT* (November 1986, pp780-781) showed how the ANSI guidelines translated into safe distances from medium-wave monopole and vhf dipole broadcast antennas at various power levels up to 1kW. More recently the IRPA (International Radiation Protection Association) has proposed that the ANSI lower level should be extended to cover frequencies between 10 to 30MHz. This will increase slightly the safe distances around the base of hf vertical (monopole) antennas and is perhaps another reason for discarding buried radials in favour of elevated ground planes. It is unlikely to affect horizontally polarized antenna distances since these are usually high-enough for the energy at ground level to be well within the guidelines.

Broadcasters, with co-sited transmitters increasingly run for 24 hours per day, have special problems in carrying out maintenance work on antennas without having to shut down all or some channels at the site for extended periods. They are increasingly recognising the

need to ensure that the public, riggers and field engineers are not subjected to excessive radiation and realise that there is increasing public concern, whether or not justified, at the possibility of potentially harmful athermal effects due to radiation at levels well below the ANSI/NRPB/IRPA guidelines.

This year the International Broadcasting Convention (IBC88) at Brighton included for the first time two detailed papers on this subject: 'Health and safety with rf broadcast radiation' by P Shelswell, R D C Thoday and S Wakeling (BBC), presented by Sue Wakeling and Dennis Turner, and 'Radiation levels and protection near broadcast antennas' by G E Hatfield (Telecom Australia). The written papers can be found in *IEE Conference Publication No 283* although the oral presentations, particularly of the BBC paper, included information not in the published paper.

The BBC paper has resulted from surveying over 70 papers and 140 abstracts on this subject and is claimed to represent the current understanding of the problem of interaction of electromagnetic radiation with the body. The

thermal effects include those caused by directly heating of tissue; those caused by a thermal loading of the body's thermo-regulatory system; and those that appear to be caused by an interaction with the field components themselves. The IRPA and ANSI guidelines are deemed to include a safety factor of about ten times in protection against thermal effects. (Though amateurs need to note that radiation from vhf/uhf 'rubber-duck' antennas held very near the eyes can represent a potential hazard at power levels of more than about 7Watts - G3VA).

Much of the current debate centres on whether there are harmful athermal effects caused by em fields interacting directly with the body. The BBC paper points out that: "These are very controversial because they do not have an obvious method of interaction of em fields on tissue and the theories put forward have not been confirmed by other experimenters... Two plausible methods of interaction have been proposed; the interaction of the field with calcium or other divalent ions, and the reception of magnetic fields by the pineal gland... Any link between em radiation and cancer has yet to be established and propositions are tenuous because of the way in which cancer occurs."

The conclusions to this paper include the following: "The levels of rf field which are safe are under close scrutiny. It is clear that the old limits which are based on the cooking effects of fields are well known and there is little difficulty in agreeing the physical basis of the safety standards, although the safety margins are often the causes of differences of opinion."

"More recently there has been concern that athermal effects are important. There is no firm evidence that athermal effects can cause any irreversible change in the body. Such changes that do occur are not seen to be dangerous. However there is pressure to recognise these effects and reflect them in the safety standards especially for public (as opposed to occupational) exposure. This may present some difficulty in the measurement techniques necessary, especially if there is a dose limit applied."

## ELEVATED VERTICAL ANTENNAS

An item in the August *TT* "Elevated radials vindicated" (p599) made reference to a paper in *IEE Transactions on Broadcasting* (March 1988, pp75-77), "AM broadcast antennas with elevated radial ground systems" by Al Christman and Roger Radcliff of Ohio University. This reported computer modelling studies that have indicated that a lower-cost elevated vertical monopole antenna with four elevated horizontal radials can be expected to produce more ground-wave (low-angle) field strength than a conventional (broadcast) grounded monopole with 120 buried radials. I pointed out that this goes a long way to confirm, at least theoretically, the important practical work of Arch Doty, K8CFU and his colleagues, based on thousands of field measurements, first reported in *TT* (February, 1983, p131) and in more detail in *QST* (February 1983, pp20-25) and *CQ* (April 1984, pp24-42).

It transpires that Al Christman is KB8I and an expanded version of the *IEE Trans* paper, with emphasis on amateur-radio applications, appears under his name in *QST* (August 1988,

## W1JR ON IMD

Joe Reisert, W1JR in his regular 'VHF/UHF World' column in *Ham Radio* (October 1988, pp71-74, 79-80) provides an informative survey of the problem of intermodulation distortion (IMD) in high-power transmitters: a more common term for IMD is, of course, 'splatter'. He points out that amateur-radio exciters and linear power amplifiers are often specified as having third-order IMD products at between about -26 to -30dB at a specific peak-envelope-power output. The third-order products are those generated closest to the desired signal and are the strongest unwanted products, but there will also be many higher-order products. Third-order products will be outside the 2.5kHz to 3kHz passband of an ssb signal. A figure of -26dB to -30dB is roughly some 6 to 10dB worse than the usual -36dB specification for professional, commercial or military transmitters. It should also be appreciated that the "specified" performance is likely to be that measured under optimum laboratory conditions. Much stronger IMD products will be produced if any attempt is made to squeeze more output from a rig by speaking loudly into the microphone and/or by turning up the audio gain.

W1JR agrees with the view often expressed in *TT* that a valve linear amplifier will usually have superior IMD performance than can be expected

from solid-state amplifiers, particularly those with 12V supplies. He also agrees that the trend towards the use of rf power mosfets, with 'ht' rails up to about 60V represents a promising development. However he also stresses that "the fact that an amplifier uses a vacuum tube is no guarantee that it will be linear. Certain operating parameters must be met." As GW3DIX pointed out in the September *TT* (p679) one of the rocks on which designs may survive or founder is the power supply which must have sufficient rating to prevent it from saturating on peak demand.

With respect to vhf/uhf linear amplifiers, W1JR notes that tetrodes usually provide the highest power gain and are often operated in the grounded-cathode configuration: "However, the newer high-mu triodes driven in the grounded-grid configuration, while having less gain, will generally deliver the best IMD performance". Table 1 is derived from W1JR's article though omitting some of the highest-power valves rated well above UK legal power limits. W1JR stresses that the figures given in Table 1 have been extracted from manufacturers' data sheets and the IMD performance at the specified output is likely to prove an optimized target figure that will vary somewhat with different valves and will have been achieved under tight laboratory conditions with good instrumentation.

TABLE 1

IMD specifications for a selection of transmitting valves used by amateurs on hf/vhf/uhf extracted by W1JR from valve manufacturers' data sheets

| Type                  | Dissipation (Watts) | Peak Envelope Power output (Watts) | Specified IMD (dB down on p.e.p.o/p) |
|-----------------------|---------------------|------------------------------------|--------------------------------------|
| <b>Triodes</b>        |                     |                                    |                                      |
| 3CX400A7/8874         | 400                 | 590                                | 35                                   |
| 3-400Z/8163           | 400                 | 590                                | 28                                   |
| 3CX800A7              | 800                 | 750                                | 36                                   |
| 3-1000Z/8164          | 1000                | 1080                               | 29                                   |
| <b>Tetrodes</b>       |                     |                                    |                                      |
| 4CX250R/7580W         | 250                 | 470                                | 23                                   |
| 8930 (formerly DX393) | 350                 | 350                                | 27                                   |
| 7650                  | 600                 | 680                                | 27                                   |

Note that the specified IMD performance applies to the valve operated with correct parameters at the specified output. IMD will increase significantly at higher output powers.

## BANDPASS FILTERS FOR CO-SITED TRANSMITTERS

The first time that I encountered the difficulty of operating simultaneously several transmitters and receivers from a single site was in a house in the XVI-th arrondissement of newly-liberated Paris in September 1944 when we were running several different links for Special Communications using HRO receivers and 40-watt (Mark III) and 150-watt (Mark X) transmitters. Every time one of us pressed a key it would disrupt every receiver in the room: a problem normally minimised in professional communications, other than Naval, by locating receivers well away from transmitters (with several HROs close together one could also experience the less serious problem of interference from local oscillators).

Today, 44 years later, the problem of co-sited and local transmitters still exists for amateurs, particularly during multi-operator, multiple-transmitter Field Days and contests. Indeed in some respects it has become worse due to design trends in modern transceivers (see "Broadband can be vulnerable").

In "Bandpass filters for hf transceivers" (*QST*, September 1988, pp17-19, 23), Lew Gordon, K4VX points out that when Field Day events are ruined by there being a number of transmitters on the same or nearby sites: "All that planning and anticipation down the drain! Frustrations and tempers immediately mount: someone yells 'Eighty metres is wiping me out!' or 'Every time you transmit, all I hear is noise!'... Although interference caused by receiver front-end overload from adjacent transmitters has existed since the earliest days of multiple-transmitter operations, the mutual interference problem has been exacerbated in the past few years by the widespread use of solidstate synthesized exciters. These rigs have not only greatly expanded operating ease and capabilities but

| Band | C1/C3<br>(pF) | C2<br>(pF) | L1/L3<br>( $\mu$ H) | L2<br>( $\mu$ H) | T-86-core |     | T-80-6-core |     | F <sub>r</sub><br>(MHz) |
|------|---------------|------------|---------------------|------------------|-----------|-----|-------------|-----|-------------------------|
| 1-8  | 4000          | 400        | 2-2                 | 22               | 22t       | 69t | 23t         | 70t | 1-75                    |
| 3-5  | 2000          | 200        | 1-1                 | 11               | 16t       | 48t | 16t         | 50t | 3-38                    |
| 7    | 1000          | 100        | 0-55                | 5-5              | 11t       | 35t | 11t         | 35t | 6-78                    |
| 14   | 500           | 50         | 0-28                | 2-8              | 8t        | 25t | 8t          | 25  | 13-56                   |
| 21   | 330           | 33         | 0-18                | 1-8              | 7t        | 20t | 7t          | 20t | 20-65                   |
| 28   | 250           | 25         | 0-14                | 1-4              | 6t        | 17t | 6t          | 18t | 27-39                   |

| Band<br>(MHz) | Loss in decibels on different bands |      |      |      |    |
|---------------|-------------------------------------|------|------|------|----|
|               | 3-5                                 | 7    | 14   | 21   | 28 |
| 3-5           | <0.5                                | 29   | 50   | 65   | 65 |
| 7             | 30                                  | <0.5 | 32   | 41   | 49 |
| 14            | 56                                  | 32   | <0.5 | 16   | 40 |
| 21            | 63                                  | 44   | 8    | <0.5 | 15 |

also, as new devices and techniques are introduced, greater dynamic ranges than have previously been possible.

"There is a shortcoming in the new generation of transceivers, however. Phase noise... Not only is phase noise transmitted (and propagated) along with your signal on the band on which you are operating, but some noise energy is also transmitted on adjacent bands... fortunately not usually a major problem unless stations are

operating in close physical proximity.

"Filters constructed with components that can handle 100Watts of exciter output fitted between the exciter and the linear amplifier (if any) or the antenna would 'do the job nicely' providing filtering also in the receive mode, helping to reduce front-end overload problems. Even with new components the cost of filters should not exceed \$10 each."

K4VX provides layout and constructional details of these three-pole Butterworth bandpass filters in his *QST* but Fig 6 and Tables 2 and 3 will, it is hoped, provide a digest of this information in the space available in *TT*. It should also be noted that this form of band-pass filter will help to clean-up the harmonic output of any low- or medium-power transmitter and limit the number of strong broadcast signals entering the receiver in circumstances where the phase noise radiation on adjacent bands does not present a practical problem. Each filter was constructed on a 2- by 4-in single sided pcb.

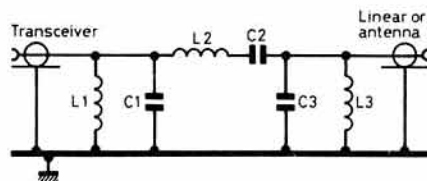


FIG 6 K4VX'S THREE-POLE BUTTERWORTH BANDPASS FILTERS FOR REDUCING TRANSMITTER NOISE RADIATION ON ADJACENT BANDS AND FOR PROVIDING ADDITIONAL RF SELECTIVITY FILTERING IN RECEIVE MODE.

pp35-42) as 'Elevated vertical antenna systems'. In this he writes:

"In agreement with the findings of Arch Doty,

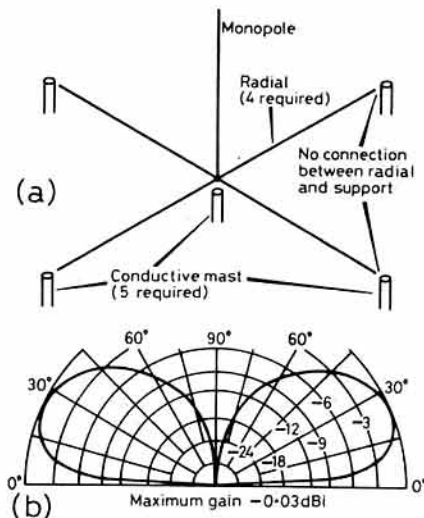


FIG 7(a) THE BASIC FOUR-RADIAL, ELEVATED VERTICAL MONOPOLE (GROUND-PLANE) ANTENNA DESIGN AS SUBMITTED TO COMPUTER INVESTIGATION BY KB8I (*QST*). (b) ELEVATION-PLAN RADIATION PATTERN WITH ANTENNA ISOLATED FROM SUPPORT MAST WITH FEED-POINT HEIGHT OF 15 FEET (COMPUTER SIMULATION, GROUND CONDUCTIVITY NOT STATED).

K8CFU, I believe that the use of elevated, rather than buried, radials provides superior performance, because it allows the collection of electromagnetic energy in the form of displacement currents, rather than forcing conduction currents to flow through lossy earth.

"I will be doing field studies to verify the computer predictions... If the information gathered from (the) NEC-GSD software is correct, the construction, cost and complexity of effective vertical-monopole antenna systems can be greatly reduced over that of comparable buried-radial systems now widely in use. At the same time, ease of installation and low-angle gain will be increased. The elevated-radial technique appears to be equally valid in the medium-frequency broadcast band and at the lower end of the hf range, so perhaps the ground-plane vertical is 'the antenna for all bands'!

"My studies on vertical monopole antennas (eg Fig 7) using the NEC-GSD computer code indicate that a radiator elevated 10 to 20 feet above ground and having only four elevated horizontal radials can outperform a ground-mounted monopole with 120 buried radials. At 3-8MHz an elevation of about 15 feet is adequate for average soil, while a lower height is satisfactory for shorter wavelengths. Higher elevation above ground is necessary over soil with poorer electrical characteristics and at lower operating frequencies."

## REMOTE-TUNED 5-5M VERTICAL

A review of the type TCS80 antenna developed by DJ2UT in *Radio-REF* (09/1988, pp20-21) illustrates a novel use of a variometer-type arrangement to provide electrical loading of a 5-5m vertical antenna (quarter-wave resonance of the rod 13-6MHz) to enable it to work over the full range 3 to 30MHz, remotely tuned by means of the motorized variometer: Fig 8. In his review, Francois Rouais, F6CTK suggests that a six-month trial has shown that the TCS80 functions reasonably effectively throughout the hf spectrum when used with fewer radials than for more conventional verticals. The search for resonance is stated to be relatively quick and its efficiency is the same or better than a vertical antenna of the same height.

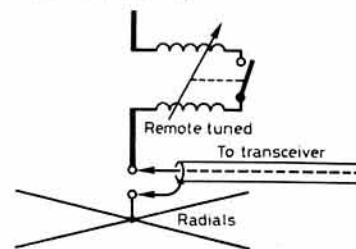


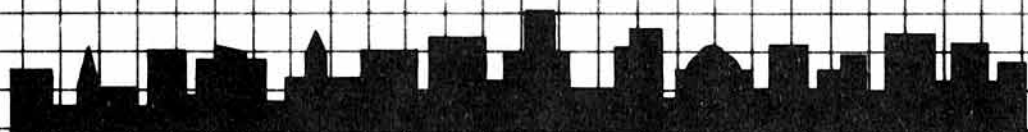
FIG 8 DJ2UT'S MULTIBAND (3-30MHz) VERTICAL ANTENNA WITH VARIOMETER LOADING, MARKED AS TYPE TCS80.

**L.A. Moxon, G6XN**



# **hf antennas**

*for all locations*



HF ANTENNAS FOR ALL LOCATIONS by Les Moxon, G6XN, is renowned worldwide as probably the most in depth look at practical amateur radio hf antennas available. Sometimes controversial, but always helpful and encouraging to the experimenter, the author guides the reader through the theory of hf antennas with the minimum of headaches. The book is not just theory however. Many practical designs are given, a large proportion of which are completely unique to this book. Whether you throw a piece of wire out of an upstairs window, or have four elements on 7MHz you cannot fail to be fascinated by this book.

HF Antennas for All Locations costs £6.15 to RSGB members by post.



# 3

## 45 WATT 2 METRE FM MOBILES

ICOM  
IC-228H

KENWOOD  
TM-221ES

YAESU  
FT-212RH

PETER HART G3SJX

FM 2m mobile transceivers must be the best-selling types of equipment on the amateur market. Each new generation outclasses previous models in facilities, and size seems to be continually decreasing. The latest ranges to be offered by Icom, Kenwood and Yaesu produce a 'beefy' 45 watts output power in a box no larger than a small broadcast car radio, and there's a host of features to support every conceivable operating convenience. The Kenwood TM-221ES is intended for UK and European markets; it is one of the range of eight models which cover 144, 220 and 430MHz bands with low and high power versions. Similarly, the Yaesu FT-212RH has a matching 430MHz version, the FT-712RH. The Icom IC-228 is available in 25watt versions for USA and European markets as well as the 45watt model featured here.

### PRINCIPAL FEATURES

All three transceivers offer a comprehensive core of features. They all deliver 45watts nominal output switched to high power and 5watts output switched to low power. The low power setting for the TM-221ES is internally adjustable up to 30watts. Tuning step sizes are selectable between 5/10/12.5/15/20/25kHz and 1MHz. Comprehensive battery-backed memory facilities store frequencies for both receive and transmit, duplex status etc. The IC-228H has 20 general purpose memories, the FT-212RH has 18 plus 3 memory locations allocated to call channel and scan frequency limits, and the TM-221ES has 14, five of which double to store

priority channel, scan frequency limits and odd-split repeater data. Each rig comes complete with a microphone which in the Kenwood is a dynamic; the other two have electret condenser types. In all cases, frequency and memory stepping may be performed from the microphone, and for the Icom and Yaesu rigs, holding in the up/down keys initiates frequency or memory scanning. All rigs will scan a set frequency band or sequentially through the memories with pause on channel occupied. All rigs will allow selected memory locations to be skipped during scanning if required. The FT-212RH also allows memory locations to be 'hidden' until activated for future recall.

Priority channel activity monitoring every five seconds is incorporated in all rigs. All memory locations can be checked for priority monitoring in the Icom and Yaesu rigs but only memory channel 1 in the Kenwood.

The repeater shift is selectable for both frequency shift and whether + or - in frequency on all the rigs. The FT-212RH selects repeater shift automatically when the relevant sub-band is selected. Reverse shift for checking repeater inputs is implemented at the touch of a button.

All rigs incorporate a 1750Hz toneburst generator but only the Kenwood includes a timer. For the other two rigs the toneburst generator seems somewhat of an afterthought and is activated by pressing a button on the microphone for about half a second. Confirmation beeps are used to acknowledge key presses and announce conditions such as priority

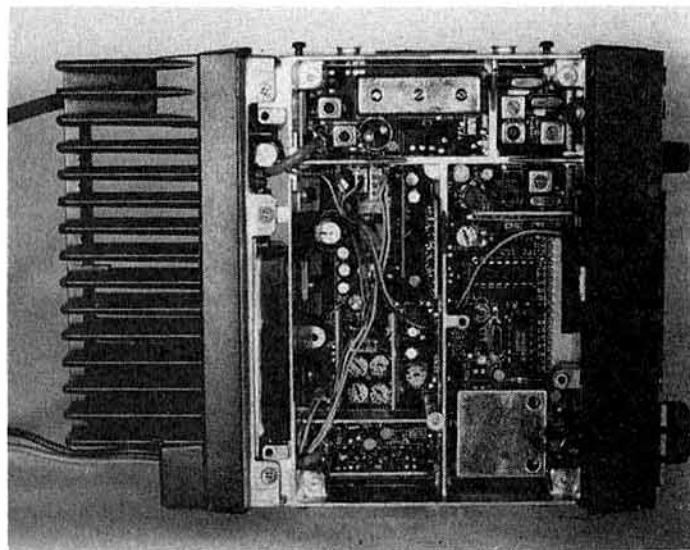
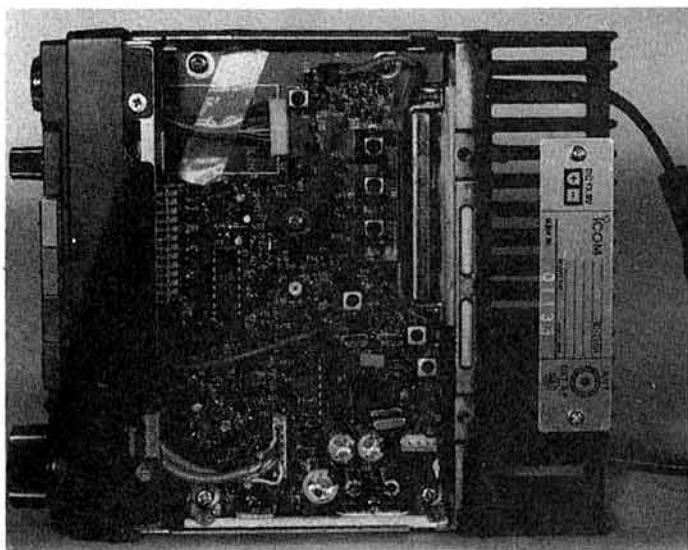
channel busy. The confirmation beeps can be disabled. The Icom uses a single beep tone whereas the other two rigs use several tones which make them very musical in operation.

The display illumination is fixed on the Kenwood but there are four selectable levels with the Icom and the Yaesu dims automatically under low light conditions. Power and antenna connections are brought out on flying leads through the rear panel and an external speaker socket is provided.

The Yaesu FT-212RH may be controlled from an external computer through two pins on the microphone socket. The format adopted is similar to other Yaesu rigs with data sent at 4.8kbts/sec. The rig is suitable for connection to packet radio tncs via the microphone connector with a simple modification. This involves routing the squelch status line to the microphone connector, but unfortunately disables the toneburst generator. Two internal options are available for the FT-212RH, the FTS-12 tone squelch unit

### PRICES

Typical prices current in September 1988 were £317 for the Kenwood TM-221ES, £349 for the Yaesu FT-212RH and £385 for the Icom IC-228H. The DVS-1 digital voice store for the FT-212RH costs £79 and the RC-10 remote controller for the TM-221ES costs £169. All prices include VAT.



(mainly of interest in the US) and the most intriguing, DVS-1 digital voice storage system. One megabit of battery-backed RAM and a speech code chip are used with the coding bit rate selectable to allow a tradeoff between recording time and fidelity. The memory will store up to 30 seconds of high quality speech or up to 128 seconds at reduced quality. The memory may be segmented into 1,4 or 8 blocks to allow the recording of one long message or several shorter messages. Recording can be from the microphone or off received signals, and playback through the loudspeaker or on the air. A 4 digit ID number may be set to allow selective recording and playback. Without the operator being present, incoming messages can be recorded by stations with a DTMF equipped transceiver having access to the private station ID number, and these messages can then be read back to the station operator, either locally or by remote access through DTMF control codes. A hand microphone with DTMF keypad is available for this transceiver.

A remote control accessory for car use is available for the TM-221ES. This is the RC-10

and looks similar to a mobile telephone handset. The unit plugs into the microphone socket and up to two transceivers can be controlled for simplex or crossband duplex operation. The handset clips into a cradle and contains a five-digit display and keypad as well as the microphone and earpiece.

#### DESCRIPTION

The three rigs are all similar when comparing size, styling, construction and even rf architecture and circuitry. The smallest is the FT-212RH, measuring 140(W) x 40(H) x 160mm(D). The IC-228H is 10mm higher and the TM-221E is 20mm deeper than these dimensions. The construction in all cases employs a solid diecast frame and a substantial rear finned heatsink, necessary at these relatively high power levels. The Yaesu and Kenwood rigs use modern surface mount techniques as far as possible whereas the Icom uses conventional leaded pcb components.

The front panels are dominated by multifunction lcd displays indicating frequency, memory number, bargraph S meter/power output and a

variety of status indicators associated with scanning, repeater shift etc. All the displays are easy to read with a good viewing angle. The Icom display is further enhanced by coloured background panels. A click-stop rotary control is used for tuning and memory selection with miniature rotary controls for volume and squelch. Other functions are selected by push buttons which operate in a scrolling or toggle mode. 55mm diameter speakers are used in all the rigs and give a remarkably high level of audio output although an external speaker is preferable for noisy car environments such as motorways. The speaker faces upwards in the Kenwood rig and downwards in the Yaesu and Icom rigs. Preference for upward or downward facing is an important consideration and depends on the intended mounting position.

All three rigs use a similar rf architecture. The receiver is a double conversion superhet. The first i.f is 10.7MHz for the Yaesu and Kenwood rigs and 17.2MHz for the Icom. The second i.f in all cases is 455kHz. A single loop frequency synthesiser is used to generate the receiver first local oscillator and to directly generate the carrier frequency on transmit. Modulation is applied directly to the synthesiser vco. Transmitter amplification uses a hybrid power module firmly bolted to the rear heatsink.

#### MEASUREMENTS

All measurements were made using a 13.8V power supply, unless stated otherwise, using the full length of the power cable supplied with the equipment. Note that as the current on transmit is quite high, it is advisable to keep this lead as short as possible and in a mobile installation route the cable directly to the battery terminals. The performance was assessed mainly using a Rohde and Schwarz SMFP2 mobile radio test set and the measurement results are given in the accompanying table. Additional comments are as follows.

#### RECEIVER MEASUREMENTS

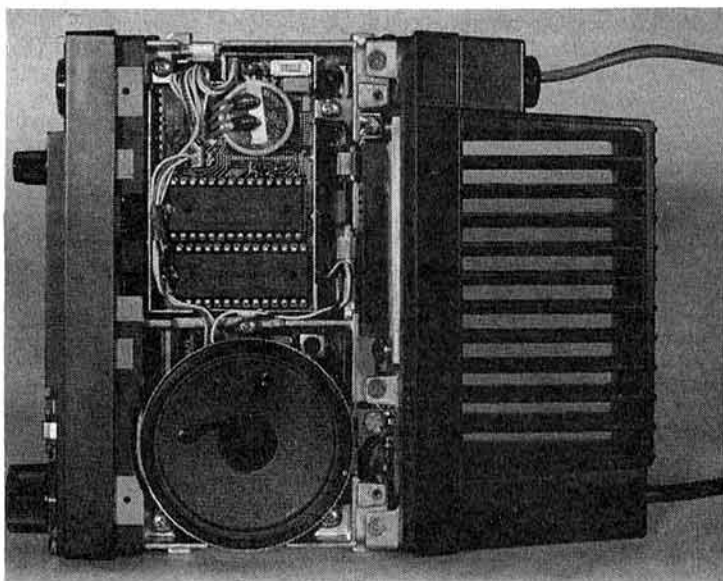
##### SENSITIVITY

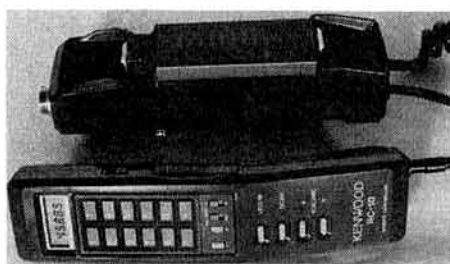
The sensitivity figures are reasonably good, although the TM221ES is about 1.5dB below specification. The squelch sensitivity limit was around 0.1 microvolts for all rigs, which is

TOP LEFT: THE ICOM IC-228H WITH ITS BOTTOM COVER REMOVED

TOP RIGHT: KENWOOD'S TM-221ES WITHOUT ITS TOP COVER

YAESU FT-212RH, MINUS ITS BOTTOM COVER, SHOWING THE DVS-1 VOICE STORAGE UNIT





KENWOOD'S RC-10 REMOTE CONTROLLER

sufficient to allow any readable signal to operate the squelch.

#### S-METER CALIBRATION

The linearity and range of S-meters on all fm rigs is notoriously poor and these rigs are no exception. S1 to full deflection represents only 9dB for the IC-228H, 20dB for the TM-221ES and 26dB for the FT-212RH.

#### ADJACENT CHANNEL REJECTION

The current 144MHz band plan allows for 25MHz channelling in the fm section of the band. However, with the current level of activity, there is increasing use of half channels at 12.5kHz spacing, as has been standard for private mobile radio (pmr) applications on vhf for many years now. The RSGB VHF Committee is currently considering the implications of adopting 12.5kHz channelling on this band – as has been reported recently in this magazine. The i.f. bandwidth of the Yaesu and Icom rigs is too wide for effective rejection of the 12.5kHz adjacent channel. The Kenwood is just about acceptable. As well as reducing the i.f. bandwidth, the deviation must also be reduced for full utilisation of 12.5kHz channels. PMR specifications give 5kHz as peak deviation for 25kHz channelling and 2.5kHz peak deviation for 12.5kHz channelling. Performance measurements are made at 60 per cent of the peak deviation to be more representative of speech signals. Hence the test results taken in this review at 3kHz and 1.5kHz deviations respectively. Note from the table that the rejection of a 1.5kHz deviated signal in the adjacent 12.5kHz channel is much better than for a 3kHz deviated signal. This implies that the rejection of a transmitter correctly setup for 12.5kHz channelling will be much better than for a transmitter setup for 25kHz channelling. The transmitter deviation of all three of the rigs under review has, however, been set appropriate for 25kHz channelling. The rejection of 25kHz adjacent channels is good for all the rigs and is limited by reciprocal mixing noise in all cases and not by filter selectivity.

#### STRONG SIGNAL PERFORMANCE

The Kenwood TM-221ES has a particularly good performance.

#### RECEIVER AUDIO

The IC-228H receiver audio distortion is excessively high and does not reduce at lower levels. It is noticeable during listening tests. The FT-212RH gives limited audio output power but at increased volume, 1.5W can be achieved at 10 per cent distortion. The rigs all show about 6dB per octave de-emphasis across the audio band.

#### TRANSMITTER MEASUREMENTS

##### POWER OUTPUT

The figures given in the table were measured at 13.8V supply. At 12V supply, all three rigs

#### MEASURED PERFORMANCE OF FT-212RH, IC-228H AND TM-221ES

##### RECEIVER MEASUREMENTS

Supply current (min audio)  
Sensitivity for 12dB SINAD, 3kHz pk dev.  
S meter sensitivity – S1  
S5  
S9  
FSD

##### Adjacent channel rejection

- 1) 25kHz with 3kHz dev.
- 2) 12.5kHz with 3kHz dev.
- 3) 12.5kHz with 1.5kHz dev.

##### Co-channel rejection

##### Image rejection

##### Rejection of any other channel

##### Blocking/recip. mixing – 100kHz offset

– 200kHz offset

##### 3rd order intercept

##### Max audio into 8 ohms before clipping

##### Audio distortion up to clipping level

##### TRANSMITTER MEASUREMENTS

##### Power output – high power

##### low power

##### Current consumption – high power

##### low power

##### Harmonic output (2nd, 3rd)

##### Spurious outputs

##### Max deviation

##### FT-212RH

0.28A  
0.18µV  
0.35µV  
0.8µV  
2.0µV  
7.0µV

##### IC-228H

0.41A  
0.17µV  
1.0µV  
1.2µV  
1.6µV  
2.8µV

##### TM-221ES

0.27A  
0.19µV  
0.3µV  
1.0µV  
2.0µV  
3.3µV

##### 68dB

##### 9dB

##### 27dB

##### 6dB

##### 85dB

##### 75dB

##### –40dBm

##### –37dBm

##### –13dBm

##### 0.8W

##### 2.8%

##### 52W

##### 5.6W

##### 8.0A

##### 2.6A

##### –47, –50dB

##### see text

##### 5.3kHz

##### IC-228H

0.41A  
0.17µV  
1.0µV  
1.2µV  
1.6µV  
2.8µV

##### 72dB

##### 9dB

##### 32dB

##### 6dB

##### 83dB

##### >80dB

##### –36dBm

##### –33dBm

##### –12.5dBm

##### 2.4W

##### 6.6%

##### 49W

##### 4.8W

##### 7.9A

##### 2.65

##### –48, –52dB

##### <–80dB

##### 4.9kHz

##### TM-221ES

0.27A  
0.19µV  
0.3µV  
1.0µV  
2.0µV  
3.3µV

##### 75dB

##### 28dB

##### 52dB

##### 6dB

##### 89dB

##### >90dB

##### –29dBm

##### unmeasurable

##### –0.5dBm

##### 1.9W

##### 1%

##### 46W

##### 5.2W

##### 8.4A

##### 2.9A

##### –49, –51dB

##### <–80dB

##### 4.8kHz

All signal input voltages are given as pd across the antenna terminal.  
All measurements made with 13.8V supply.

delivered about 40W in the high power position. The transmitters continued to function at reducing power levels down to a minimum supply voltage of 10V. Power output was flat across the band.

#### SPURIOUS OUTPUTS

Apart from harmonics, no other spurs were visible on the output spectrum of the IC-228H or the TM-221ES. The FT-212RH exhibited a spurious 10.7MHz lower in frequency at –70dB; also synthesiser reference sidebands at  $\pm 6.25$ kHz at a level of –65dB. No other spurs were visible.

#### ON-THE-AIR PERFORMANCE

All three rigs performed well during on-air tests. The receiver audio quality was perfectly acceptable although distinctly different between the various equipments. It is difficult to say which was best. The IC-228H has a more 'toppy' response which generally yielded better readability, although the other two were possibly of lower distortion. All three rigs were very similar in terms of weak signal performance and no strong signal problems were experienced.

On transmit, reports generally favoured the Kenwood TM-221ES as having the most natural audio quality. Some reports of slight distortion were received with the other two rigs. These comments, however, may reflect more on the microphones than on the rigs themselves.

All the rigs were easy to use but ergonomically I found the IC-228H the best, helped by the larger panel size. The display is particularly clear and all the displayed legends large and easy to read. All the various functions and facilities may be selected via four modes of operation – vfo mode, memory mode, call channel mode and set mode. In operation, control usage is logical without requiring frequent reference to the instruction manual and the keys are single operation without second level shifted functions.

The other two rigs, in particular the FT-212RH, use multi-function push-buttons and in some cases these are not particularly logical. To be fair, however, these are all generally associated with less frequently used functions.

The FT-212RH has the greater number of

built-in features, particularly when fitted with the voice storage unit. This inevitably results in multi-function push-buttons and, certainly at first, a constant delving into the instruction manual to become fully acquainted with all the facilities. The software in the Yaesu is very sophisticated and user friendly, trapping illegal or unlikely control combinations and providing such facilities as automatic repeater shift selection when within standard repeater subbands.

Although no specific measurements were made of transmit/receive switching and recovery time, it was observed in use that the Icom exhibited a noticeable delay between pressing the ptt and the rf appearing. A similar delay was experienced in the receiver recovery on returning to receive. This delay would need reducing for packet radio use. The delay with the Kenwood was just detectable but the Yaesu showed a very 'snappy' changeover.

#### ACKNOWLEDGEMENTS

I would like to thank Icom (UK) Ltd of Herne Bay, South Midlands Communications Ltd of Eastleigh and Lowe Electronics of Matlock for the loan of the equipment. Also I would like to thank the various stations worked for their valuable comments on the transmission quality.

#### VERDICT

All three of these fm transceivers can be thoroughly recommended and it is more a matter of personal preference which one to buy. The Kenwood TM-221ES has the best electrical performance and is also the cheapest, the Icom IC-228H in my opinion is the easiest to operate and the Yaesu FT-212RH has the greatest number of built-in features. For packet radio use, the Yaesu would appear to be the most suitable and this has obviously been considered in the design of the equipment. The transmit/receive switching speed of the Icom is too long for packet radio use.

# FESTIVE FUN with RE BYRNES' *Trace of the Smart Alec*

All you need is a pair of dice, a load of luck, a jug of wine, and then beside me singing in the wilderness.....



**Start here**

Special Rule: If you land on a sq. which is already occupied, you are entitled to shoulder-charge your opponent's counter back one square

**12**

You take part in the pre-news net. Back one square

**45**

you go out on a binge the night before your CW test. Have another throw

**VII**

**8**

**9** +20dB

ELECTED AS AN RSGB REGIONAL THINGY. Miss a go

**11**

You take your Hols during the Sporadic E Season. Go on to No 15

**13** U

You are on CLIPPERTON IS. and you have remembered to bring the RIG. START AGAIN.

**15**

**16** SWEET

Drop King Hussein of Jordan's name at a club meeting. Advance one sq

**18**

n...n...n  
...n...n  
...nineteen

You win an RSGB award! Back to Square No 8

**21**



"Dear Lord and Father of Mankind, forgive our foolish ways...." John Greenleaf Whittier.

flash git!



PILE UP!

FO1NIT



Where we go 'ere we go!

Welcome to SMART ALEC CITY, winner. Peace and Goodwill to you all.



**33**

You have NEVER used mode JL on Oscar 13. Get back to Square 28.

Pick up the wrong mic. and say "ONE FOUR FOR A COPY!" All your opponents move back one!

Sodom for GOMORRAH We die!!



zzzzzz



No, the 3m Cumulative was LAST week! THROW AGAIN

**28**

**21**

You attend a CLUB MEETING in a SMOG MASK! Go to Square 27

**25**

You wear an ANORAK to a RALLY. U.R. TOTALLY DISQUALIFIED!!



**23**



# FESTIVE FUN with **RE BYRNES** *Trace of the Smart Alec*

All you need is a pair of dice, a load of luck, a jug of wine, and how beside me singing in the wilderness.....



**Start here**

Special Rule: If you land on a sq. which is already occupied you are entitled to shoulder-charge your opponent's counter back one square

**12**

You take part in the pre-news net. Back one square

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Sodom for GOMORRAH We die!!

Who, me??

Where we go 'ere we go!



FO1NIT

PILE UP!

Welcome to SMART ALEC CITY, winner. Peace and Goodwill to you all.



"Dear Lord and Father of Mankind, forgive our foolish ways..." John Greenleaf Whittier.

flash git!

WKD 100 COUNTRIES ON TVI



RADIO SOCIETY OF GREAT BRITAIN

# RADIO DATA

REFERENCE BOOK

G. R. JESSOP G6JP

THE RADIO DATA REFERENCE BOOK is an invaluable source book of all manner of information concerned with radio and electronics. Here is just a fraction of the wide range of data available: Design information for yagi antennas; Properties of ferrites; Wire gauges and sizes; Boundaries of sea areas as used in shipping forecasts; TV and radio standards and systems; Coastal radio stations and frequencies; Waveguide sizes; Transmission Lines; Filter design data; and a table for converting voltage and power ratios to that bugbear of electronics, the decibel. This book is a must for every shack. Put it on your bookshelf and you will wonder how you ever managed without it.

Radio Data Reference Book costs £8.15 to RSGB members by post.

FIFTH EDITION

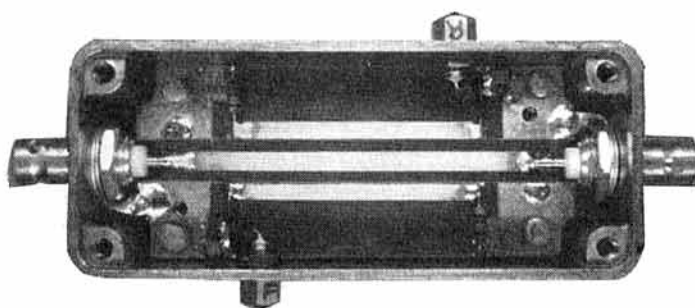
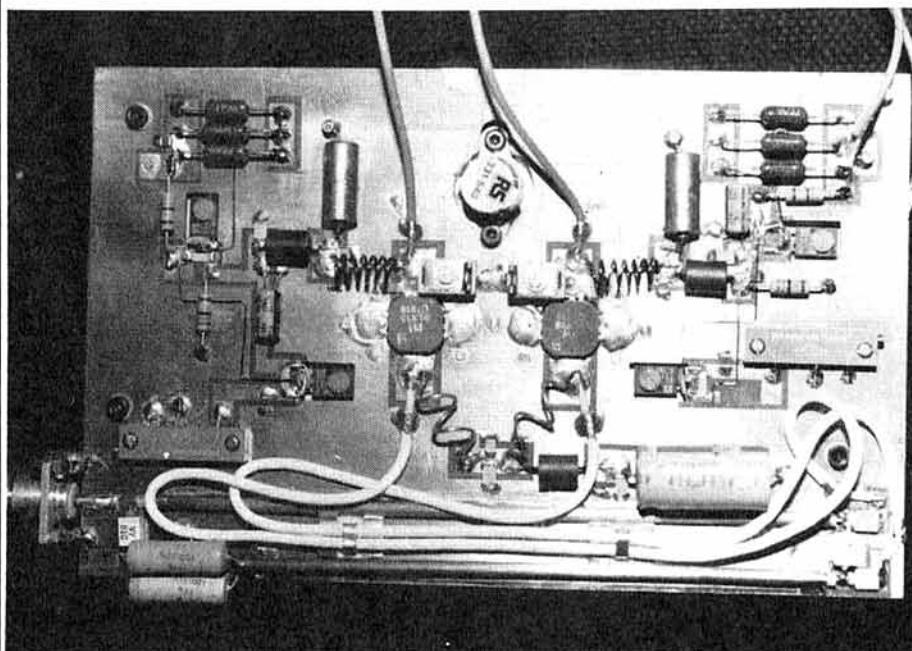
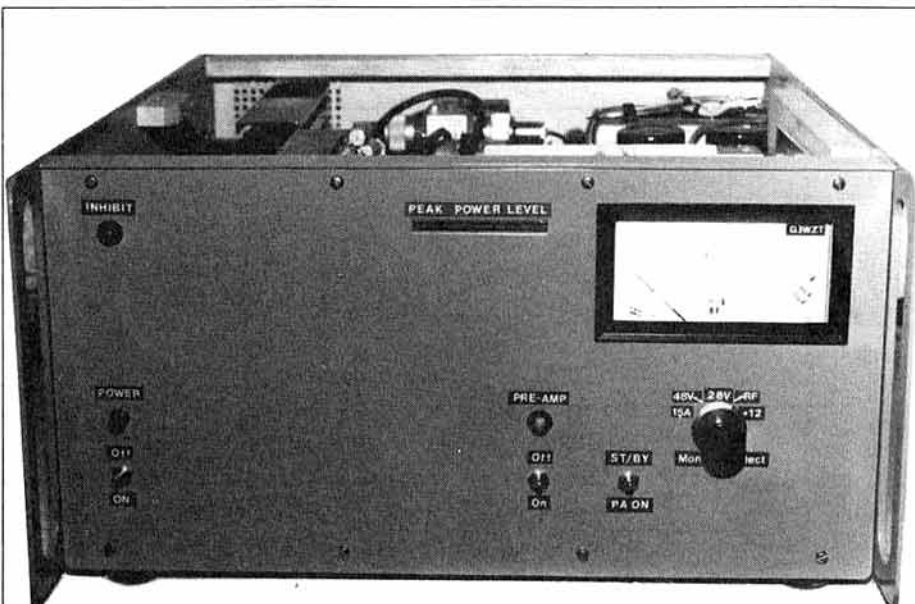
# GUIDE- LINES

## FOR THE DESIGN OF SEMICONDUCTOR VHF POWER AMPLIFIERS

### PART TWO

CONTINUED FROM SEPTEMBER

BY  
**JOHN MATTHEWS**  
**G3WZT**



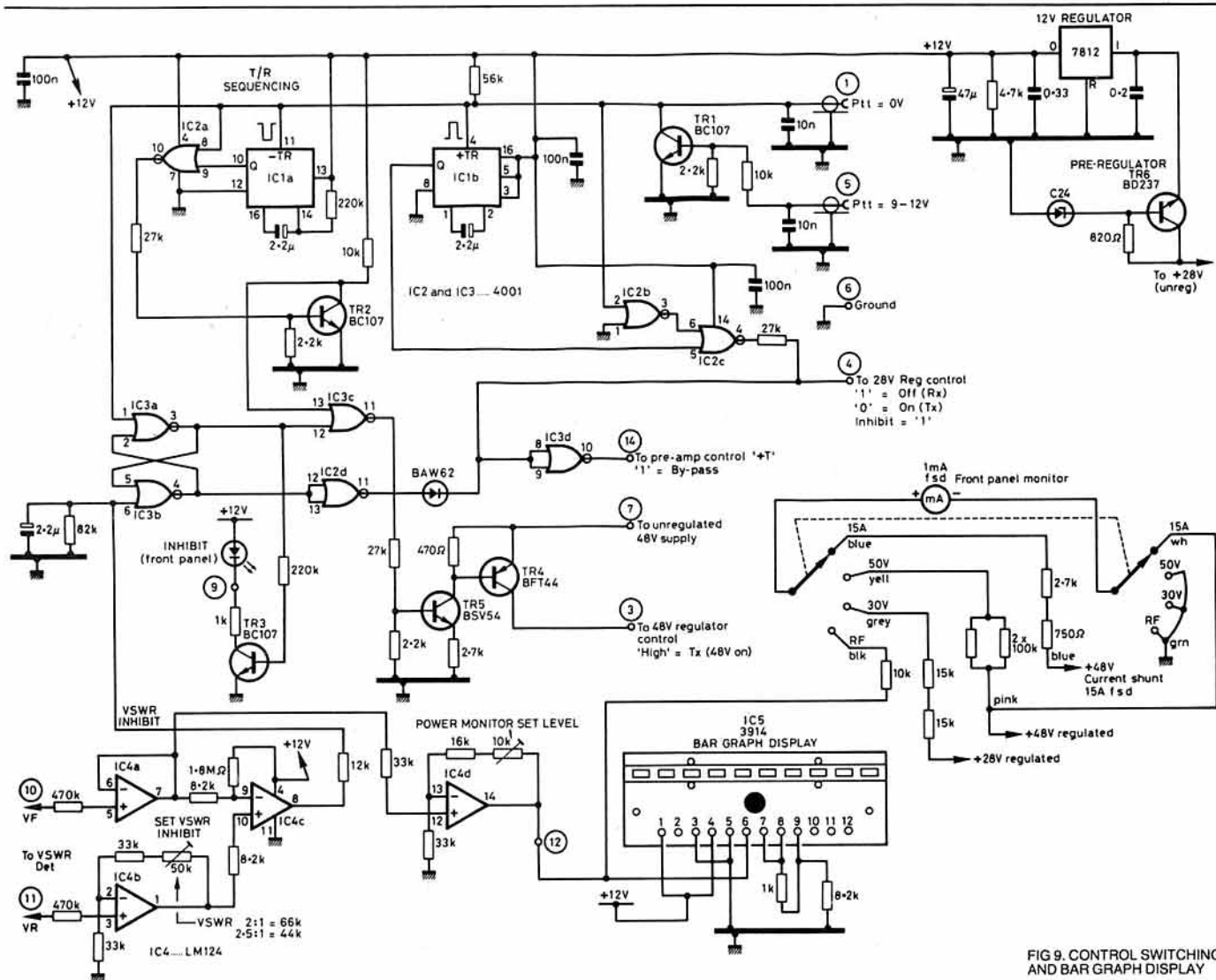


FIG 9. CONTROL SWITCHING AND BAR GRAPH DISPLAY

## CONTROL AND SWITCHING

Fig 9 shows the circuit diagram for various functions required by the complete amplifier.

The functions included and the reasons for inclusion are:

### 1) SEQUENTIAL Tx/Rx SWITCHING

This function is controlled by mono-stables 9-IC1a, b. It ensures that when changing from Tx to Rx and vice versa, power supplies are switched in the correct sequence. All voltages are removed from the amplifier on receive by turning off the voltage regulators. The only exception is a low current 12V supply used for logic and the built-in Rx pre-amplifier.

When changing from Rx to Tx it ensures that antenna change-over relays (28V supplied) are energised before the main PA 48V supply. By so doing, rf is not present until the amplifier is correctly terminated by the antenna. The reverse is true when going from Tx to Rx and in both cases ensures that no rf is present when antenna change-over functions are taking place.

Two alternative inputs are available for

ptt. One operates Tx functions when grounded, the other when a 6-12 volt positive supply is applied.

A correctly sequenced output to mute the receive pre-amplifier is available at 9-IC3 pin 10.

### 2) Tx INHIBIT

The purpose of Tx inhibit is to force the power supplies into Rx mode when high vswr is presented to the pa.

If for any reason a fault should develop in the antenna or feed system or, the amplifier is operated inadvertently without a load, full protection is provided for the output devices.

Forward and reverse voltages from the vswr detector (Fig 10) are buffered and amplified by 9-IC4a, b. For a preset value of vswr, differential amplifier 9-IC4c changes state and activates the inhibit latch 9-IC3a, b and 9-TR4 and 5 are switched off to remove the 48V supply. At the same time 9-IC2d output goes high, inhibiting the 28V regulator. A front panel LED driven by 9-TR3 is used to indicate vswr shutdown.

Pre-regulator transistor 9-TR6 is included to prevent input voltage to the 7812 12V regulator exceeding the recommended maximum when the 28V (pre-regulated supply) is lightly loaded.

### 3) BAR GRAPH DISPLAY

Although at first sight this might be thought of as a gimmick by some, it does represent the most accurate and effective method of displaying peak power. Moving coil meters will only indicate 30-50% of the true peak value at syllabic rates. This leads to the tendency of turning up rf drive to get readings which are comparable to steady carrier values.

Power level set potentiometer (10K) is set to illuminate nine sections on the bar graph display at 240W rf output. When the amplifier is driven with ssb, drive level is adjusted so that the final led (10th) is never illuminated. When correctly driven, this ensures that maximum peak power is never exceeded. Drive for the bar graph display is obtained from the forward voltage detector buffer 9-IC4a and amplifier 9-IC4d. The display is provided to indicate relative peak

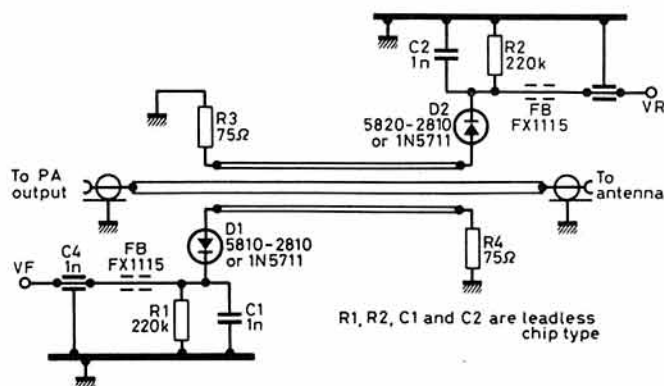


FIG 10. THE VSWR DETECTOR

power with a rapid response time. Any over driving on speech peaks can easily be seen and corrective action taken. Assuming the amplifier is operated into a well matched load the bar graph display may be calibrated in watts using a watt-meter as a calibration reference.

#### 4) METERING

In addition to the bar graph display, a front panel meter was used to monitor the following parameters: 48V supply, 28V supply, 12V supply, relative power and pa supply current.

A current sense resistor in the 48V series regulator is used as a shunt for final collector current measurement.

#### VSWR BRIDGE

Details of the vswr bridge are shown in Fig 10 and the accompanying photograph. It is a simple directional coupler (voltage sample type) and provides two outputs, V forward and V reverse, which are fed to the operational amplifiers 9-IC4 and b.

If the decision has been made to inhibit the power amplifier when vswr exceeds 2:1, all that is required is a voltage ratio at the detector outputs for this particular value of vswr. The actual voltage values are not significant – it is the ratio between V forward and V reverse which must be known.

The ratio of VR/VF is a measurement of load reflection coefficient  $\rho$  and is used to calculate vswr values.

The relationship between  $\rho$  and vswr is:

$$VR/VF = VSWR - 1/VSWR + 1$$

For a 2:1 vswr,  $VR/VF = 2 - 1/2 + 1$ . Therefore  $\rho = 0.333$

Taking a nominal voltage for VF of 5V, VR will be  $5 \times 0.333$  (1.66V) when VSWR is 2:1.

Now that relationships between VF, VR, and vswr are known, operation of the vswr inhibit circuitry may be more clearly understood. Referring to Fig 9, 9-IC4 is a voltage follower (buffer) stage and voltage at pin 7 is equal to VF.

If VF is 5V for a given power level, VR will be 1.66V at 2:1 VSWR. Amplifier 9-IC4b has a voltage gain of three making the dc level at pin 1 equal to that of pin 7 at 2:1 VSWR. 9-IC4c is a comparator. When the non-inverting input (pin 10) exceeds the level at pin 9, the output goes high, operating the inhibit latch which forces the amplifier into the receive mode. The inhibit function is reset by operating the ptt line.

Voltage for the bar display is obtained by amplifying the buffered voltage VF. Gain of 9-IC4d is variable and set to give 10V at full output power. Under these conditions, all 10 leds in the bar graph display are illuminated.

#### VSWR BRIDGE CONSTRUCTION

The vswr bridge is straightforward and easy to construct. A 50ohm transmission line and coupling loops are manufactured on 1.6mm double sided copper clad fibre glass board. Unwanted copper may be removed with a sharp knife and soldering iron or etched if preferred.

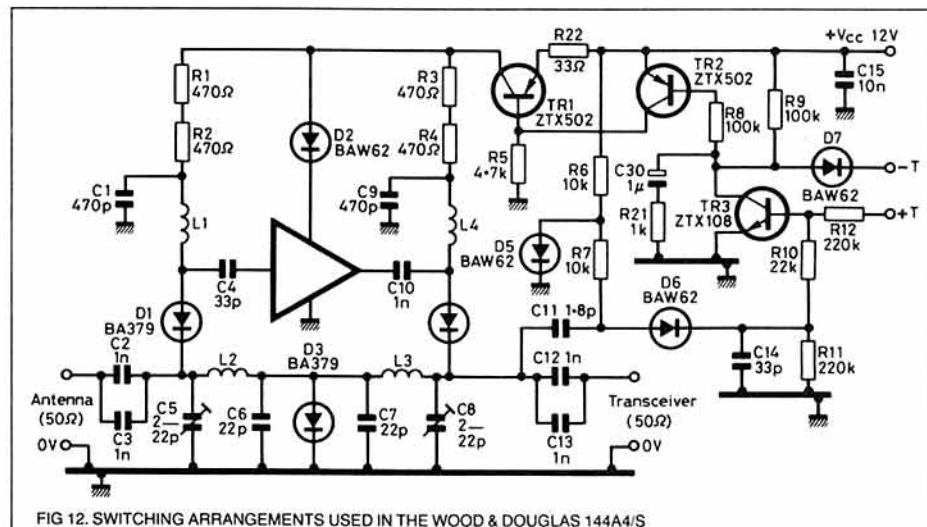


FIG 12. SWITCHING ARRANGEMENTS USED IN THE WOOD &amp; DOUGLAS 144A4/S



FIG 11. DESIGN FOR THE VSWR DETECTOR BOARD (TO SCALE)

Board dimensions and etching details are shown in Fig 11.

The board is enclosed in a 90 × 38 × 32mm diecast box with connectors mounted at each end, which are soldered directly to the printed circuit transmission line.

DC outputs, VF and VR, are fed out via feedthrough capacitors to op-amp 9-IC4.

Width of the 50ohm transmission line is 3mm.

Coupling is approximately 30dB and the peak voltage at VF, into a well matched load, is approximately 5volts at 250W output.

#### POWER SUPPLIES

The 48V regulated supply is very similar to that described in reference 1. Current requirement is 12amps.

Foldback current limiting and simple over-voltage protection are provided. The mains transformer used was a 50V, 625VA toroidal type manufactured by ILP.

The 28V regulated supply is a conventional 723 arrangement driving a Darlington series pass transistor.

In order to protect expensive rf power transistors it is essential to include over-voltage protection and current limiting in both power supplies. If required, additional information on the power supplies used may be obtained from the author on receipt of an SAE.

#### RECEIVE PRE-AMPLIFIER

A receive pre-amplifier was included and may be switched out if not required. For this purpose a Wood and Douglas 144PA4/S was used. This particular pre-amp does possess a very original and effective diode switching system for power levels up to 30W. It is ideally suited as an add-on switchable pre-amplifier and may be easily incorporated into an existing pa.

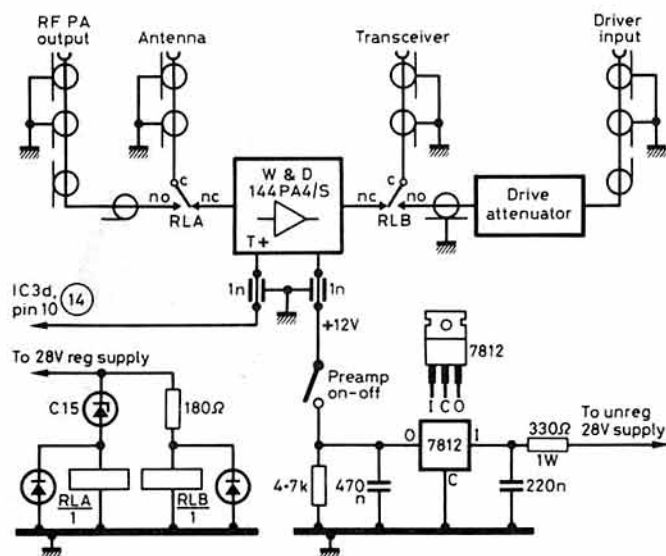
A circuit diagram of the switching arrangement used in the Wood & Douglas 144PA4/S is shown in Fig 12. Reproduction is by permission of W&D.

The schematic diagram for Tx/Rx switching and Rx pre-amp is shown in Fig 13.

A three terminal 12volt regulator fed from the 28V pre-regulated line is used to supply the pre-amp. Although the 144PA4/S is rf switched, input T+ is also used to by-pass whilst in transmit.

#### CONCLUSION

As stated in the introduction the intention of this article was to present various guidelines and techniques used in vhf power amplifier design. It is not written as a constructional project.



although sufficient information is included should experienced constructors wish to repeat any of the modules described. Like any design problems, whether it be analogue, rf, or digital, there is always more than one approach which may be taken to solve it. The various matching methods described here are no exception to this rule. They are, however, relatively simple to understand and implement.

In retrospect, there are some things which could be done to simplify this design. For example, two separate power supplies are used, one each for driver and power output stage. This could be simplified by using 48V devices all round.

Taking this argument one stage further, two modern generation high gain fets would provide 250-300W output and have sufficient gain to allow elimination of the driver stage. It quite simply depends on the depth of your pocket and the financial risks that you are prepared to take.

One 10μs flash with these devices works out at £15 per μs!

Solid state rf power amplifiers have unfortunately earned a poor reputation, particularly amongst devotees of valve amplifiers. In many cases this injustice is due to overdriving and attempting to get the advertised output power.

Get to know your pa by plotting a graph of input power against output power. Find out where the output starts to deviate from a straight line (compression) and don't apply more drive power than required to keep the amplifier operating in the linear region.

Once the amplifier performance is known, use a bar graph display to ensure that maximum linear power levels are never exceeded.

The graph shown in Fig 14 is hypothetical only and serves to demonstrate a simple method of characterising an amplifier using two power meters and a dummy load.

Power is shown plotted in dBm and serves as a convenient means of demonstrating the 1dB compression point.

The amplifier described is capable of delivering 250W, but at this level linearity is at the limit of acceptable performance with 3rd order imd products of -20dBc wrt either tone. A plot of 2 tone performance at 200W pep output is shown

▲ FIG 13. INPUT & OUTPUT SWITCHING PLUS PRE-AMP CONNECTIONS

FIG 14. EXAMPLE TO SHOW 1dB COMPRESSION POINT OF A LINEAR AMPLIFIER WITH 10dB GAIN ▲

FIG 15. IMD PRODUCTS OF COMPLETED AMPLIFIER ▶

in Fig 15. At this level 3rd order imd products are -25dBc wrt either tone and represents a very acceptable level of linearity.

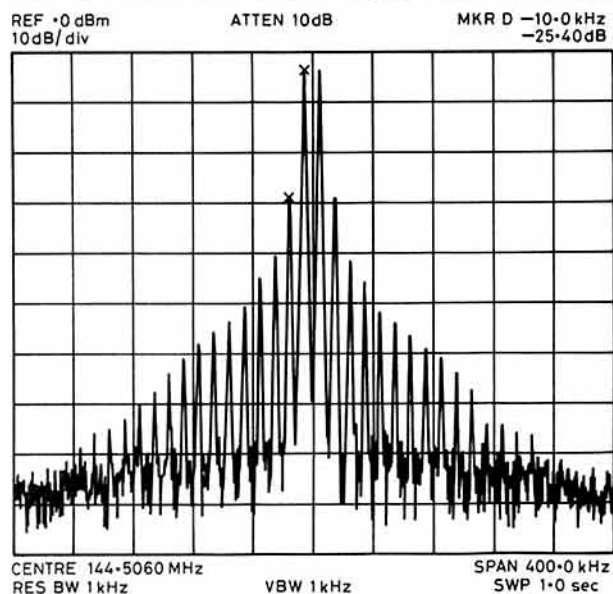
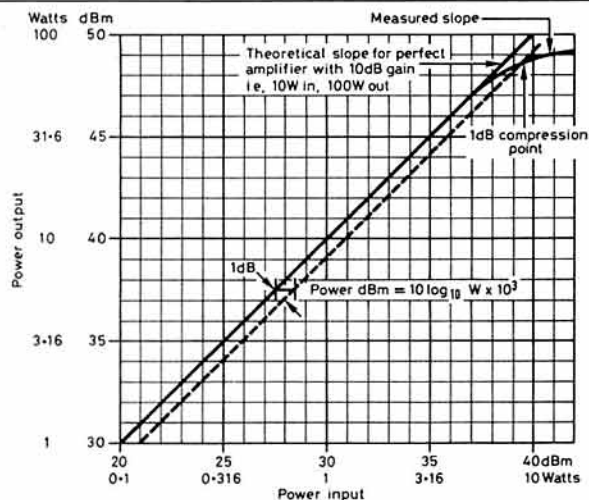
As a comparison, a commercially manufactured 10W in, 180W out, 144MHz pa was tested. At 125W pep the 3rd order imd products were -24dBc and at 150W, -15dBc. This is not a very impressive result, and all the more reason to "get to know your pa" and keep it clean by driving at the correct power level. From a constructional point of view, the described pa does represent a fairly advanced project.

It was never intended to compete with the straightforward and well proven approach of a 4CX250 amplifier. Hopefully what it does is provide an alternative approach and describes some methods which may be employed in the design of solid state vhf linear amplifiers.

#### ACKNOWLEDGEMENTS

I would like to thank MEL for giving permission to use their test equipment.

Also my thanks go to Tony Ault G3KTU and Tony Wadsworth G3NPF for reviewing the text and providing constructive criticism during preparation.



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Apologies first of all for two errors which filtered into the column during the editing process. The first was in the list of DXCC Honour Roll members given in the August issue - 'G4CPC' should, of course, have appeared as G4CP, and in the September column the name of the source of my information on the USSR/Canada Polar Bridge Expedition should have appeared as Al d'Eon.

Still problems with slow mail and my early deadline for this issue. I sincerely hope that the situation will stabilise early in the new year.

## DX NEWS

Bad news I'm afraid for some who thought that they had made good QSOs with NO1Z/KH1 on 14MHz cw around 0700 on 29 March. G3AAE

was one of this group and he received a letter from Jim Smith, VK9NS, which said, "I received many QSL cards for this time slot from European stations but it was a 'Slim'. Jim added that he had already written some 12,000 cards for the KH1 operation...

According to DX-NL KH6JEB was likely to be on from Kure Is in late November or early December. Irma, VR6ID, on Pitcairn Is meets her QSL manager several days each week on 21,305kHz or between 21,280 and 21,290kHz at 1700 and is also on 28,490kHz at 1700 on Sundays. SM7PKK should at the present time be in Fiji as 3D2KK and is scheduled to leave on 13 December. He has an IC-735 with wire antennas and a ground-plane. Likely frequencies are

65kHz up from lower band edges (on cw) and 3,795, 7,095, 14,195, 21,295, and 28,595kHz.

VK0IC is located at Mawson Base and will probably leave in January. VP8BRT is on S.Orkney Is and he often talks to G4WNP on 21,355/21,360kHz around 1700. LU1ZA is also on from the same area and has been reported on 21,343kHz after 1900. Steve Rodwell, who was second operator of VP8BRR on S.Georgia is now VP8BUB but is not keen on dx working. VP8BRR himself hopes to be very active and will be there until March. Neither operator is able to use cw. If you worked '3Y2AV' who appeared on the bands in July and August don't bother to QSL - LA7JO has received many cards but unfortunately he was a pirate.

DX'press reports via DK1RV that FH5EG has said that all planned expeditions to Tromelin Is for the remainder of 1988 have been cancelled. However a four man expedition is being organised for 1989. PA0CRA is planning a visit this month to the island and Reunion. FH5ET himself was putting a good signal into the USA at the time of writing on 14,205kHz at 1300 and on 21,005kHz from 2000. C9MKT in Mozambique is due to appear on the bands again between 9 and 11 December. Jean-Jacques, J28CW, in Djibouti, favours 7,020, 7,090, 14,040, 14,130-14,140, 21,225, 28,030, and 28,550kHz. 3B9FR on Rodrigues Is is on most days from 1100 to 1230 near 14,020, 14,165, or 14,170kHz. 3B8DB plans a visit early next year.

JX1UG will be on the air from Jan Mayen until next April and will be active on all bands 3.5 to 28MHz. UA1OEL is now on Franz Josef Land and is expected to be very active and to be on 1-8MHz.

## BRAZILIAN QSL CARDS

Ted Allen has written to say that he has recently received two 10kg sacks (about 7000 QSL cards) from the Brazilian bureau. Unfortunately the parcels inside had become unstrung with the result that the contents were mostly folded, crumpled, dog-eared, soiled, or a combination of all these. He will straighten them out as best he can but he apologises in advance to members for their poor condition - which is not due to any action of his.

## BAND REPORTS

The outlook remains promising - G8KG writes, "September was the third month in a row to have a monthly mean solar flux above 150sfu and probably the fourth with a monthly sunspot number above 100. It began and ended with the daily flux values above 170sfu and, except during a short spell around the middle of the month, hf band conditions were outstandingly good. The improvement was most marked on 28MHz where openings to ZL1 began in the first week and there was a good path to JA lasting four hours or more on many days. By the last week it was possible to copy beacon signals from all six continents simultaneously around mid-day and by the late afternoon the band was alive with N.Americans including many from the West Coast.

By the time this appears in print it should be evident whether or not the July-September solar upsurge has been followed by a pause but even if it has, conditions should have remained at least

## CONTESTS

The results of the 1988 ARRL DX Contests appeared in October QST and UK scores are as follows:

| phone Section |           |              |          |
|---------------|-----------|--------------|----------|
| GW4BLE        | 1,447,068 | G4AMT (3.5)  | 42,228   |
| G2QT          | 321,465   | G4VMM (7)    | 2,768    |
| G3SIX         | 305,724   | GM4WEW (14)  | 17,589   |
| G4IUF         | 156,060   | GU0NNSO (21) | 242,400  |
| GM3BCL        | 154,761   | GW0ARK       | 62,832   |
| G4BBV         | 87,210    | G4OSH        | 61,758   |
| G4MET         | 77,220    | GW4RHW       | 33,396   |
| GM4HQF        | 31,668    | G8GD         | 924      |
| GM3AYR        | 28,830    | G3CWL        | (QRP)180 |
| G4GFH         | 14,391    |              |          |

In the Multi-operator section GW8GT scored 1,291,797 points, GB75USA 102,960, and GB6SC 17,415.

| CW Section |           |            |         |
|------------|-----------|------------|---------|
| G4BUO      | 1,209,528 | G4BBV      | 34,776  |
| G3SIX      | 489,642   | G3WRR      | 17,982  |
| GM3RAO     | 314,835   | G6NK       | 11,880  |
| G2QT       | 297,171   | G3LIK      | 8,280   |
| GW3JI      | 178,659   | G4ZME      | 5,325   |
| G3ESF      | 174,585   | G3FXB (14) | 233,682 |
| G3APN      | 162,000   | G3SXW      | 175,896 |
| G2HPF      | 120,528   | GM4CXM     | 142,968 |
| GM3CFS     | 110,160   | G3TXF      | 80,478  |
| GM3NHQ     | 66,759    | G3MXJ (21) | 135,945 |
| G3HJF      | 53,295    |            |         |

In the QRP Section G4FOC scored 72,828 points, G4BUE 14,850, and G3CWL/A 3,600. The only UK entrant in the Multi-operator category was G0FAS who scored 17,100 points.

Results of the 1988 CQ WW DX Contest (phone) appeared in September CQ Magazine and the UK scores listed were as follows:

| Single-Operator |           |              |         |
|-----------------|-----------|--------------|---------|
| GW4BLE          | 2,928,000 |              |         |
| G3SNN           | 1,068,795 | GM4FDM (14)  | 167,343 |
| G3SIX           | 656,700   | G3TXF        | 130,305 |
| GM3BCL          | 376,124   | GM4HQF       | 31,104  |
| G4BBV           | 174,240   | GM4JFS       | 19,140  |
| GM4WEW          | 131,440   | GM4ENP       | 6,734   |
| G6QQ            | 64,736    | GB5NN (21)   | 438,900 |
| G0CCH           | 56,457    | G3XZE        | 27,072  |
| G6NK            | 4,488     | GM3MOR       | 6,280   |
| GW4RHW (3.5)    | 16,506    | G3VYI (28)   | 7,626   |
| GW4BKG (7)      | 62,790    | G10AEV/P     | 3,234   |
| G4VMM           | 41,032    | GM3VLB (1.8) | 3,096   |

In the Multi-Operator section GW6GT scored 3,710,162 points, G3NAS 2,536,434, G3UOA 900,990, G4XOM 91,770, G14MWA 52,635, and G4FKG 34,643. Finally - in the QRP Section G3CWL/A is the only UK entrant listed - he scored 1,360 points on 14MHz.

In the 1987 All Asian Contest (cw section) G8KP scored 350 points on 3.5MHz, GB5CE 126 on 7MHz, G4CP 19,912, G3TXF 8,415, G3DQL 2,320, and G6NK 686 on 14MHz, G4ODV 15,399, G3ESF 14,760, GM3CFS 10,098, G3OLU 1,998, and G4/VE7FJE 216 in the multi-band section. G13XRQ scored 7,400 with a multi-operator entry.

## ARRL 10 Meter Contest

10-11 December

Just a reminder - this could be very interesting this time - rules appeared in last month's column.

## Happy New Year Contest

0900-1200 1 January

Cw only in the band sections 3,510-3,560, 7,010-7,040, and 14,010-14,060kHz. Four classes: 1-500W input, 2-100W input, 3-10W input and 4 - listeners. Exchange RST and QSO number (AGCW members will also give their membership number). Each QSO counts one point and a station may be contacted once on each band. Only Europeans may be worked and the multiplier is one for each AGCW member worked. Listener logs must contain both calls of each QSO and at least one complete report. Usual declaration should be sent with log which must be postmarked no later than 31 January 1989 and sent to Fritz Bach jun, DK1OU, Eichendorffstrasse 15, D-4787 Geseke, FR Germany.

## Mid-Winter Contest -1989

0700-1900 14 January (cw)

0700-1900 15 January (ssb)

All bands 3-5 to 28MHz (not WARC) following IARU 'contest-preferred' segment recommendations. OMs work YLs only. Exchange call signs, report, and serial QSO number (YLs start with 2001 and OMs with 001). QSOs with YLs count five points, with OMs three. Each may be worked once per band and the multiplier is the number of different dxcc countries worked (each counted once only). Listeners may enter and score five points per YL station heard. They must log the call signs of stations being worked. Send logs to DYLC, PO Box 262, 3770 AG Barneveld, Netherlands, postmarked no later than 20 February 1989.

reasonably good. Despite what may have been read in *The Times* the best available predictions continue to be for a high peak late in 1989 or early in 1990". I would like to thank G2HKU, G3s GVV, PXT/M and VOF, G4EHQ, GW4KGR, G4NXG/M, GW4TEJ, G4XAH and G4XRV for acting to beat the very early deadline this time. This was caused by my being away at the IARU Region III Conference.

#### 1.8MHz 2200 C30LFL.

10MHz 0500 W7EXR. 0600 DK6AS/SV5, C30LFD. 0900 OG0HFC.

14MHz 0100 CEONKY. 0600 VK9NS. 0700 AX0NE, ZL5BA. 2100 HZ1HZ, ST2KR. 2200 GM4NSZVO2, 457WP.

21MHz 0700 BY1BH, JA, 6K24SO. 0800 BY8AC, HL, JA, VK, ZL. 1000 KH0/JA1QGG, KL7Y, VK, ZL. 1100 HL88K, UA0FF. 1200 KP2BH, T50DX, VU2NTR. 1300 DX1BBT. 1400 3B8FR, 5H1HK. 1600 KL7/KF6ME, XU1SS. 1700 C53SV. 1800 FR5DX, TA2/N4EXR, VP8BRT, 3X1SG. 1900 C9MKT, KL7KJ, TE88M, ZD8CB. 2000 VK, ZL2APW, 2100 HC8/HC2CG, N7HFW (Nev), T50DX. 2200 VK, ZL.

24MHz 1500 HB0/DL1GK, W2GDV, K2MGR.

28MHz 0800 BV2FA, BY9GA, C9MKT, HL5FTB, JH1MAO/JD, UA0LP, ZL1BWM. 0900 BY1QH, BY8AC, FK8FI, JA, JT1BG,

KH6FOO, T53RC, VK, 1000 FR5DX, FT5ZB, HL88ASS, JY4ZM, KX6HE, P29VU, T50DX, VP8ML, Y1IBGD, YJ8NJS, 3X1SG, 8Q7MT. 1100 D68JL, FT5ZB, H44MB, HS0B, KC6JC, KH6/JA1QGG, 3B8DB. 1200 HC2AGT/HD2, KD7P/NH2, P29ZL, VU2EA. 1300 A92BF, FR5DL, KH0/JA1QGG, T50DX, VS6BT, XX9MD, 3DA0AN. 1400 A22RA, FH4EE, HH7PV, J87CD, VK6HE, 3X1SG. 1500 9V1WW. 1600 FH8CB, OX3SG, TA1A, W6-W7, 7P88DX, 7X5AV. 1700 VU2SMN. 1800 VP8BRT (S.Ork), VP8BRY, W6-W7 (to 2100). 1900 K7MM (Wyo), N7HFW (Idaho). 2000 N7DOJ (Utah), P43HM, V21AR. 2100 XE2KB. 2200 HK0HEU, G4PEU/HH2.

I would also like to thank the authors of the following for items extracted: *DX'press* (PA3CXC), *CQ Magazine* (W1WY), *DXNL* (DL3RK), *Long Island DX Bulletin* (W2IYX), *DX News Sheet* (G4DYO), the *Ex-G Radio Club Bulletin* (GI3OEN/W6), *DX Report* (VK9NS), and the *Lynx DX Group Bulletin* (EA2JGO).

This is the last column of 1988 and I would like to thank all the many people who have supported it during the year. See you in 1989 – but in the meanwhile I wish everyone a very happy

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7X5AV

Christmas and New Year.

Please let me have all material for the February issue by 5 December. Scores for the 28MHz table will continue to appear in the first few months of 1989 – and please note that I do intend to carry this on in 1989 – who will be the first to 250?

## HF F-LAYER PROPAGATION PREDICTIONS FOR DECEMBER 1988

The time is presented vertically at two-hour intervals 00(00)gmt for each band, ie 00=0000, 02=0200, 04=0400 etc.

The probability of signals being heard is given on a 0 (indicated by a dot) to a 9 scale; the higher the number the greater the probability with 1 meaning 10 to 19 per cent of days, and so on. Additionally 50MHz F-layer and 1.8MHz openings are indicated by a plus (+) sign in the 28 and 3.5MHz columns respectively.

| Time / GMT    | 28MHz<br>000001111122<br>024680246802 | 24MHz<br>000001111122<br>024680246802 | 21MHz<br>000001111122<br>024680246802 | 18MHz<br>000001111122<br>024680246802 | 14MHz<br>000001111122<br>024680246802 | 10MHz<br>000001111122<br>024680246802 | 7MHz<br>000001111122<br>024680246802 | 3.5MHz<br>000001111122<br>024680246802 |
|---------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|--------------------------------------|--|
| ** EUROPE     |                                       |                                       |                                       |                                       |                                       |                                       |                                      |  |
| MOBSCOW       | ...69982...                           | ...89995...                           | ...99998...                           | ...99999...                           | 1..48878971.                          | 653765568975                          | 887533246888                         | ++42...35++                            |
| MILTA         | ...68774...                           | ...899861...                          | ...99993...                           | ...9889961...                         | 11.387789961                          | 773765568997                          | 998632236899                         | ++3...3++                              |
| GIBRALTAR     | ...17664...                           | ...388861...                          | ...69993...                           | ...899971...                          | ...98788961                           | 453276557996                          | 988753235899                         | ++2...25++                             |
| ICELAND       | ...3774...                            | ...5896...                            | ...89991...                           | ...199994...                          | ...6889891.                           | 342.86678973                          | 888364446788                         | ++3...35++                             |
| ** ASIA       |                                       |                                       |                                       |                                       |                                       |                                       |                                      |  |
| OSAKA         | ...4...                               | ...62...                              | ...85...                              | ...86...                              | 1..2763.11.1                          | 2..253334635                          | ...21.14673                          | ...45.                                 |
| HONGKONG      | ...885...                             | ...9971...                            | ...18884...                           | ...278861...                          | 1..5656431.                           | 2..23346771                           | ...12.21.                            | ...453                                 |
| BANGKOK       | ...8+982...                           | ...189994...                          | ...268897...                          | ...1487881...                         | 1..15568511                           | 3..3246877                            | 2..14787                             | ...454                                 |
| SINGAPORE     | ...189882...                          | ...289994...                          | ...268897...                          | ...2487881...                         | 1..16568611                           | 3..3246876                            | 1..14785                             | ...452                                 |
| NEW DELHI     | ...1+984...                           | ...28996...                           | ...468881...                          | ...347784...                          | 1..114567111                          | 631..1246777                          | 72..14788                            | ...455                                 |
| TEHERAN       | ...1+982...                           | ...388994...                          | ...677897...                          | ...7557882...                         | 211522568732                          | 8642..246887                          | 873..13778                           | 54..455                                |
| COLOMBO       | ...1+9+93...                          | ...378995...                          | ...3478981...                         | ...1257893...                         | 2..2568832                            | 62..246887                            | 51..13778                            | 2..455                                 |
| BAHRAIN       | ...2+8872...                          | ...488984...                          | ...6668972...                         | ...63478841...                        | 311311468853                          | 8731..136888                          | 872..14778                           | 54..444                                |
| CYPRUS        | ...+996...                            | ...299981...                          | ...5989994...                         | ...7878972...                         | 431765678974                          | 986532357998                          | 88621.125888                         | +3...25++                              |
| ADEN          | ...2+8885...                          | ...3778971...                         | ...55579951.                          | 1..523589731                          | 6412..268986                          | 983..336898                           | 872..13677                           | 54..444                                |
| ** OCEANIA    |                                       |                                       |                                       |                                       |                                       |                                       |                                      |  |
| SUVA/S        | ...244...                             | ...5662...                            | ...7885...                            | ...288871...                          | ...566784...                          | ...533464...                          | ...1311131...                        | ...                                    |
| SUVA/L        | ...332.121                            | 1..55421342                           | 11..87643652                          | 11..87666741                          | ...137546761.                         | ...3521354...                         | ...12..21.                           | ...                                    |
| WELLINGTON/S  | ...564...                             | ...27861...                           | ...58883...                           | ...78886...                           | ...766782...                          | ...1533463...                         | ...21.141...                         | ...                                    |
| WELLINGTON/L  | ...                                   | ...                                   | 11..21..111                           | 11..53211322                          | ...117533552.                         | ...2521353...                         | ...2..2...                           | ...                                    |
| SYDNEY/S      | ...76771...                           | ...87883...                           | ...298896...                          | ...388888...                          | ...16657841.                          | ...3334672...                         | ...1.1451.                           | ...2...                                |
| SYDNEY/L      | ...                                   | ...11...                              | ...3421.132                           | ...66421352                           | ...65554751                           | ...3323562...                         | ...1..23...                          | ...                                    |
| PERTH         | ...177653...                          | ...378875...                          | ...3688881...                         | ...2477893...                         | 1..15568731                           | ...2246873                            | ...13761                             | ...43.                                 |
| HONOLULU      | ...                                   | ...                                   | ...2...                               | ...5...                               | 22.3.1.461.                           | 261522263.                            | ...4531.131.                         | ...3...                                |
| ** AFRICA     |                                       |                                       |                                       |                                       |                                       |                                       |                                      |  |
| SEYCHELLES    | ...145763...                          | ...3568852...                         | ...43478851.                          | 1..212589841                          | 63...268986                           | 961...36899                           | 73...13678                           | 5...445                                |
| MAURITIUS     | ...1578751...                         | ...2568873...                         | ...33469962.                          | 21.212489852                          | 73...168997                           | 84...36899                            | 62...13688                           | 3...454                                |
| NAIROBI       | ...1878862...                         | ...27778841.                          | 11.444589741                          | 31.522379974                          | 8612...58998                          | 983...26899                           | 872...3687                           | 54                                     |
| HARARE        | ...3456731...                         | ...145678631                          | 21.344479863                          | 53.322258996                          | 9712...27999                          | 983...4899                            | 861...2688                           | 53                                     |
| CAPETOWN      | ...3467752...                         | 1..55678752                           | 32.144458985                          | 75.221137998                          | 9812...4899                           | 984...1689                            | 862...378                            | 53                                     |
| LAGOS         | ...8+888631                           | 1..98779852                           | 42..85458986                          | 75.273237998                          | 99354...5899                          | 89851...2799                          | 7783...488                           | 455                                    |
| ASCENSION Is  | ...48667631                           | ...77767752                           | 32..86446886                          | 651.83224898                          | 995251..1699                          | 99962...379                           | 8784...158                           | 555                                    |
| DAKAR         | ...4+88862...                         | ...69778852                           | 21..87547985                          | 541.86225898                          | 986173..2799                          | 98964...489                           | 77862...168                          | 4453                                   |
| LAS PALMAS    | ...4999851...                         | ...6999972...                         | ...89889951                           | 11..9888984                           | 664186557898                          | 999664324799                          | 888741..1489                         | ++4...25+                              |
| ** S. AMERICA |                                       |                                       |                                       |                                       |                                       |                                       |                                      |  |
| STH SHELTLAND | ...2344432...                         | ...45666542                           | 21..77765664                          | 441.87544456                          | 675165311135                          | 455332...2                            | 12321...                             | ...                                    |
| FALKLAND Is   | ...1446762...                         | ...35667641                           | 11..67643574                          | 432.87422356                          | 776.751...26                          | 688452...3                            | 36652...1                            | 342                                    |
| R DE JANEIRO  | ...143482...                          | ...27545641                           | 1..57443574                           | 332.76221377                          | 876.73...58                           | 999551...26                           | 87862...4                            | 5453                                   |
| BUENOS AIRES  | ...1333562...                         | ...35545641                           | ...67543453                           | 322.87321256                          | 777.751...26                          | 799482...4                            | 57862...1                            | 2453                                   |
| LIMA          | ...+861...                            | ...98763...                           | ...2854442                            | 1.1.14732234                          | 536.555...15                          | 7894532...3                           | 57863...2                            | 2454                                   |
| BOGOTA        | ...9+761...                           | ...98773...                           | ...1854451                            | 1..2732254                            | 435.155...26                          | 8884432...4                           | 67763...1                            | 3444                                   |
| ** N. AMERICA |                                       |                                       |                                       |                                       |                                       |                                       |                                      |  |
| BARBADOS      | ...3+872...                           | ...597773...                          | ...7854662                            | 1.1..7722475                          | 536.164...158                         | 8884431...27                          | 877631...2                           | 5444                                   |
| JAMAICA       | ...7+61...                            | ...88772...                           | ...865451                             | 1..2752253                            | 435.2452...26                         | 8885332...5                           | 777631...2                           | 4444                                   |
| BERMUDA       | ...8+71...                            | ...298882...                          | ...5876751                            | 1..6754673                            | 435.26521367                          | 8885332...37                          | 777631...5                           | 5443                                   |
| NEW YORK      | ...6+6+6...                           | ...79972...                           | ...188884...                          | 337.76762                             | 334.2553466                           | 888533211316                          | 776631...14                          | 5443                                   |
| MEXICO        | ...8+5...                             | ...9861...                            | ...19643...                           | 1..284221                             | 334.41461.3                           | 58853323..2                           | 377631...                            | 454                                    |
| MONTREAL      | ...5+5...                             | ...79971...                           | ...189884...                          | 338.7761                              | 334.25565566                          | 888533232247                          | 776631...14                          | 5433                                   |
| DENVER        | ...184...                             | ...286...                             | ...572...                             | 333..7763                             | 234.3..65333                          | 688532232.13                          | 477631.1.1                           | 453                                    |
| LOS ANGELES   | ...53...                              | ...75...                              | ...861...                             | ...1862...                            | 234.32.46322                          | 478253143.1                           | 267631.1.1                           | 353                                    |
| VANCOUVER     | ...1...                               | ...13...                              | ...46...                              | ...772...                             | 235.22.27642                          | 478253135323                          | 257631.121.1                         | 243                                    |
| FAIRBANKS     | ...                                   | ...                                   | ...1124...                            | ...11124...                           | 242.34366721                          | 577153346654                          | 356531.13432                         | 233                                    |

The provisional mean sunspot number for September 1988, issued by the Sunspot Index Data Centre, Brussels, was 120.8. The maximum daily sunspot number was 190 on 23 September and the minimum was 79 on 17 September. The predicted smoothed sunspot number for December, January February and March are respectively: (classical method) 130, 137, 143 and 149; (SIDC adjusted values) 130, 139, 146 and 153.

KEN WILLIS G8VR

## SOLAR UPDATE

Cycle 22 continues on a healthy-looking upward climb with the solar flux reaching 202 on 3 October, the first time this cycle that the figure has topped the double-century mark. This is slightly illusory since this is a daily figure provided by Radio Australia, and when smoothed values are calculated they will tend to be somewhat lower. However, all the signs are good for a much higher peak to this cycle than might have been expected a couple of years ago.

For those who want to expand their vhf interests, especially when conditions are flat, monitoring solar conditions might prove to be an interesting adjunct to the hobby. The technique for projecting sunspot images using a simple telescope is of course an approach which has been mentioned several times in earlier issues. Not everyone is equipped to do this, and in any case the results are qualitative, and yield no actual figures. On the other hand, much can be learned by plotting the daily solar flux, sunspot number and geomagnetic index figures available from various sources. Daily propagation reports by Mike Bird over Radio Australia at 0825-0830 gmt on 9.655MHz have been mentioned previously. This station is often very difficult to copy due to QRM from HCJB, Quito, Ecuador which recently appeared on the same frequency, sometimes masking the Australian signals completely. Mike's figures for Flux, S/N and A-index are repeated at 1525 gmt on 7205kHz, but here again, reception is often poor.

Smithy, G8KG reminds us that WWV transmits this information at 18 minutes past each hour in voice, but agrees that reception in recent months has not been very good. He has found, however, that recently WWV has been a much better signal in the UK at certain times, and suggests trying at 0718 and 0818 gmt on 10MHz, and at 1818 on 20MHz. The last one is a particularly good time since the observatory in Ottawa updates its solar flux reading daily at 1700 gmt and this is the figure reported by WWV just over an hour later.

Returning to Radio Australia, both G3ENY and myself wrote suggesting certain modifications to the reporting system, pointing out the large European audience which awaits these figures, some even taking radios to work for the purpose. On Saturday 17 September the announcer in Melbourne failed to run the tape of Mike Bird's figures, and within ten minutes was telephoned from the UK by an aggrieved listener! The tape was run 15 minutes late and resulted in some good-humoured banter over the air with a special mention of the UK amateurs who listen to these reports. It was Geoff, G3ENY, who got them to give both the Saturday and Sunday figures during the Monday slot, since no report is transmitted on Sunday. Mike normally gives figures for the previous day with a forecast for conditions during the current 24 hours. His report of solar flares in early October preceded a significant radio aurora on the afternoon of 6 October.

The geomagnetic A index jumped from a value of 3 to 25 between 4 and 5 October, preceding the aurora, so quite a lot can be gained from keeping notes on solar data. On 9

October Mike reported a minor solar storm between 1200 and 2100 gmt, and this too produced a small aurora next day. See VHF/UHF for June 1988 page 457 to see how the A index must be taken in conjunction with the Solar Flux or sunspot numbers to determine whether the ionosphere is disturbed (ie chance of auroral activity). A very good little book which deals in depth with the whole subject of VHF and HF propagation with special reference to the effects of solar radiation is *The Shortwave Propagation Handbook* by George Jacobs W3ASK and Theodore Cohen N4XX, published by CQ Publishing Inc., 76, North Broadway, Hicksville, N.Y. 11801. They will accept your credit card and mail a copy to you. Both hf and vhf operators will find it quite fascinating.

If you overlooked the G3UKV version of the jamjar magnetometer featured by G3VA in Technical Topics for July 1988, take a look at it. It is probably the best home-brew version yet, with no tricky optics and capable of being built by anyone who copes with the usual diy jobs

## AMAZING HAPPENINGS WORLD-WIDE IN THE 50MHZ BAND!

This band has its detractors among UK VHF operators, some saying that it is not vhf but just an extension of our hf allocations. At certain periods the 50MHz band may appear to exhibit some of the characteristics of both hf and vhf, but you would need to be very unimaginative to discount the phenomenal dx possibilities now opening up for QRP stations in this part of the spectrum. Have there been any new developments on 144 or 432MHz bands during the past ten years? Or do operators go on working the same prefixes, year after year? Now, for the first time ever, there is in the UK an army of operators with modern equipment poised to find out what this, for us, new band has to offer and there have been plenty of surprises already. Meanwhile the best way to report what has occurred as autumn approaches and the sunspot count waxes and wanes (but generally climbs upwards) is simply to list events by time and date. In the last issue we reached the point where there had been initial openings to ZS6 and ZS3 which were somewhat restricted in their coverage. This was soon to change.

Between 1950 and 2030 gmt on 17 September, CT4KQ worked six stations in Argentina (LU). N4JW reported via 28MHz that an expedition station on Galapagos Island, (HC8, Ecuador) had made numerous stateside contacts, with the W's also hearing signals from Chile, Uruguay and Argentina.

On 20 September after copying beacon GB3RMK for some 30 minutes ZS3AT worked GM3WOJ (IO77), a path of 9133km. Presumably this is a first GM-ZS3 contact for the band or did someone get in ahead of Chris?

By dint of listening to much white noise in the period 15 to 30 September, GJ4ICD caught several openings during which he had 48 two-way contacts with ZS3 and ZS6 on 50MHz. The best was on 27 September, with an F2 opening during the day and two tep events in the evening, providing Geoff with 14 ZS contacts and seven new squares. The F2 opening covered large areas of the UK with some excellent

around the house. Parts are readily available from Radiospares (Electromail) and other suppliers. No chart recorder is required. My model is being set high up in the roof-space, connected to a meter in the shack which can be read as required.

## NORTH WEST TERRITORY CANADA ON VHF

Laurence Howell, GM4DMA (Aberdeenshire) has contributed to this column several times in the past, but his reports have been punctuated by his absence from the UK while engaged in providing technical and communications support for some very demanding expeditions to remote areas. His wife, Morag, GM1ILL seems to share his enthusiasm and is never far from the action on these occasions, and a recent letter described yet another exciting time ahead for them which may yield some exotic contacts for 144 and 50MHz operators, as well as some opportunities for operators on the hf bands.

This is not an expedition to activate a new square, far from it. Laurence and Morag are part of the small team accompanying Sir Ranulph Fiennes in support of his attempt to

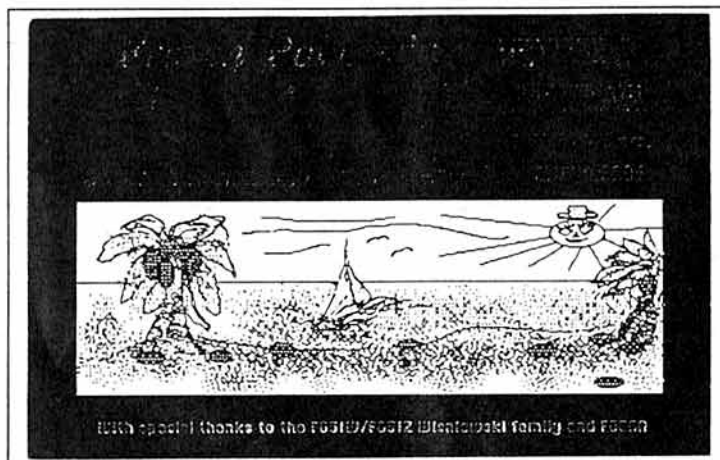
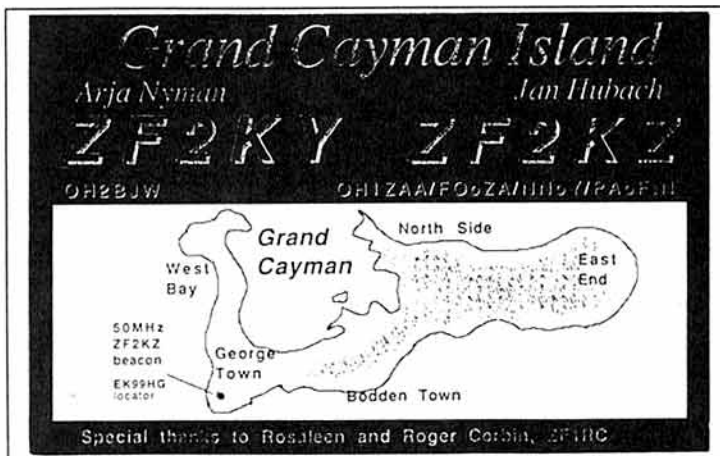
contacts being made, but reports suggest that the Channel Islands experienced openings which failed to reach the UK mainland some 150km distant. In the event of 27 September many UK mainland stations worked the five "big guns", ZS6WB, 6LN, 6XJ, 6LW and ZS4TX/6 (using ZS6WB's rig). Several 59 reports were exchanged during this event.

Saturday 8 October must surely go into the record books. During the evening, between 2145 and 2345, 9H1BT worked 50-plus Japanese stations two-way on 50MHz via the long path! He could have continued further, but he was so tired he went to bed. Next night, 9 October, it all started up again with 9H1CG and 9H1EL joining in. 9H1BT worked 111 J's all told. Look at a globe to see just how long the "long-path" is! When 9H1CG came home in the middle of it, the band was so full of J's that he thought he was tuned to 28MHz in error, and only by checking his local 50MHz beacon could he be sure he was on six! CT4KQ also worked into Japan though no details are available.

On Sunday 9 October with many G's at home, to join the fun, the ZS's appeared quite early, around noon local time, continuing to work UK stations throughout the day. The by-now well-known ZS6 and ZS3 calls were much in evidence, though Mike, G3JVL managed new ones in the shape of ZS4TX and ZS4AAB. It is an indication of the duration and intensity of this (F2) opening, that ZS6XJ reported having worked over 100 G's during the day.

GW3LDH reported hearing French stations working into Japan on 50MHz during the evening of 10 October, bringing the propagation to within 200km of his location. On the same day, ZS3AT copied Northern Ireland beacon GB3NGI for about three minutes at 519. During this entire reporting period there were several solar flares and minor storms which are assumed to have some bearing, at least, on events, but this cycle is certainly proving exciting so far. Thanks to the two Mike's G3JVL and G4UXC for much of these details.

QSL CARDS FOR THE GRAND CANYON (ZF2KZ) AND TAHITI (F00ZA) FROM JAN OH1ZAA. SEE 'SOME P2 DX POSSIBILITIES' BELOW.



With special thanks to the F001W/F001Z Wierzbicki family and F000A

## METEOR SCATTER

The Quadrantids shower is due next month, and the Joe Reisert (W1JR) computer program predicts that it will peak at 13:53 gmt on 3 January, lasting for 10 hours. The accuracy claimed for the peak time is plus/minus 15 minutes, the duration of the shower being 10 hours. This daylight shower has provided many operators with excellent dx contacts in the past, and for those who like to get to bed at a reasonable hour but would like to get a first taste of meteor reflections, this is a good one to monitor, though it will probably be at its best while most of us are at work. This was the first shower I experienced some years ago and it left me 'hooked' on the mode with a subsequent 'meteoric' rise (ouch!) in my squares score. Another program, by DL5MCG, shows the probability of reflections occurring during the shower (see table).

At first sight the two programs seem to conflict since the print-out shows a high probability of reflections between 0000 and 0700 gmt along certain paths. This is because the DL5MCG program is based on the position of the shower relative to Europe during the 24-hour period. Should there be any shower meteors between 0000 and 0700 gmt, they will at least be favourably placed to provide reflections. On the other hand Joe's program is based on astronomical data which suggests that most Quadrantid meteors will be present between 10:00 and 16:00 gmt with a peak close to 13:00. The best bet would seem to be to start monitoring or make skeds any time after midnight on 2 January to be

sure of catching the shower. Reports on your results in this shower would be appreciated by 10 January if possible to catch my deadline.

Dubus issue 3/1988 carried an article by I2KFX on the possible use of packet radio via meteor scatter. A QSO protocol is proposed which would be suitable for communicating via the short duration bursts which typify meteor scatter operation. The article includes interface circuit and computer information.

| HRS | AZ  | EL | N/S        | NE/SW      | E/W    | SE/NW      |
|-----|-----|----|------------|------------|--------|------------|
| 00  | 35  | 19 | xxxx       | x          | xxxxx  | xxxxxx     |
| 01  | 44  | 25 | xxxxx      | xxxxx      | xxxxxx | xxxxxxxx   |
| 02  | 52  | 32 | xxxxxxxx   | x          | xxxxxx | xxxxxxxxxx |
| 03  | 60  | 40 | xxxxxxxxxx | xxx        | xxxxx  | xxxxxxxxxx |
| 04  | 68  | 49 | xxxxxxxxxx | xxxx       | xxxxx  | xxxxxxxxxx |
| 05  | 75  | 57 | xxxxxxxxxx | xxxxx      | xx     | xxxxxxxx   |
| 06  | 84  | 67 | xxxxxxxx   | xxxxx      | x      | xxxxxx     |
| 07  | 95  | 76 | xxxxx      | xxxx       |        | xxx        |
| 08  | 128 | 85 | x          | xx         | x      |            |
| 09  | 245 | 83 | xx         | x          | x      | xx         |
| 10  | 268 | 74 | xxxxx      | xxxx       |        | xxxx       |
| 11  | 278 | 65 | xxxxxxxx   | xxxxx      | x      | xxxxx      |
| 12  | 287 | 55 | xxxxxxxxxx | xxxxxx     | xxx    | xxxx       |
| 13  | 294 | 47 | xxxxxxxxxx | xxxxxxxxxx | xxxx   | xxxx       |
| 14  | 302 | 38 | xxxxxxxx   | xxxxxxxxxx | xxxx   |            |
| 15  | 310 | 31 | xxxxxxxx   | xxxxxxxxxx | xxxx   | x          |
| 16  | 318 | 24 | xxxxx      | xxxxx      | xxxx   | xx         |
| 17  | 327 | 18 | xxx        | xxxxxx     | xxxxx  | x          |
| 18  | 336 | 14 | xx         | xxxx       | xxxx   | xx         |
| 19  | 346 | 11 | x          | xxx        | xxxx   | xx         |
| 20  | 356 | 9  |            | xx         | xxx    | xx         |
| 21  | 7   | 10 |            | xx         | xxx    | xxx        |
| 22  | 17  | 11 | x          | xx         | xxxx   | xxx        |
| 23  | 26  | 15 | xx         | xx         | xxxx   | xxxxx      |
| 24  | 36  | 20 | xxxx       | x          | xxxxx  | xxxxxx     |

PREDICTED BEST TIMES FOR QUADRANTIDS SHOWER

travel from the Canadian mainland to the North geographic pole, pulling a specially designed sledge without any assistance from mechanical or animal means. A base camp is to be set up on Ward Hunt Island, 83 deg N, 74 deg W in locator square FR23WB (a rare one indeed!), which lies 450 miles from the north geographic pole and about the same distance from the magnetic pole. The base accommodation will be no more than a canvas hut 15 x 10 feet in temperatures which can fall to -60 degrees C and reach a high of only -10 deg C on a warm day! Ward Hunt Island is the furthest north of all the Canadian islands, and is quite small (5mi x 2mi) with a high point of 1320 feet to the south of the base camp area. The bearing from the UK is plus/minus 350 degrees. This will be the third time that they have been to this site.

The prime purpose of Laurence and Morag's participation is, of course, to cope with a range of technical and administrative problems and to maintain communications along the route with Sir Ranulph, Morag will be in charge of communications, Laurence being Base Commander. However they will be taking equipment for both 144 and 50MHz and hope to devote any spare time attempting vhf contacts. They will monitor 144-123MHz looking especially for auroral, meteor scatter and auroral Es contacts, and they also hope for some F2 propagation on 50MHz, so 50-110 will be monitored. They could be QRV at any time during the 24 hours depending upon other commitments, and will use ssb or cw as required. The QRB to the UK is of course extremely great for 144MHz contacts, but Laurence is anxious to investigate any form of propagation from a site which is so close to the magnetic pole. He suggests that if there is a significant aurora, then listening for Auroral E propagation between two phases could be rewarding. For 144MHz an FT480R will be used, plus a 200W amplifier provided by Microwave Modules, feeding 2 x 5/5 Jaybeam yagis. On 50MHz a FT690R with linear, from South Midlands, will feed a four element Jaybeam yagi. Special low temperature co-axial feeders are being provided by Raychem Ltd. Power will be from 2 x 50 watt 24V wind turbines charging 500 amp/hour 24V secondary batteries and petrol generators.

The team departs on 20 February and expects to set up Base Camp on or about 3 March. Laurence has provided a daytime telephone number for further information before they leave, which is 0224 576155 Ext. 274. It is no good trying to make skeds since their work-load will not permit specific times to be allocated to amateur radio operation. They expect to return mid-May.

I understand that there is no truth in the rumour that a special low-temperature indicator has been developed and supplied to the team by the Brasscom Key Manufacturing Co Ltd.

## SOME F2 DX POSSIBILITIES

If this column starts to sprout some very rare dx call signs in the next few months, don't think that my good friend G3FKM is encroaching on our space. Now that we have the 50MHz band, should the muf go high enough the world is the oyster for the 50MHz operator. Harry Schools, K3AB, who gave so many a contact with St. Pierre FP, last summer, wrote to say that his plans for next year include visits to one (or all!)

## FROM HERE

Carsten Esch, DL6LAU (JO54) recently updated his VUCC 144MHz award by submitting evidence of 262 squares confirmed. There were some interesting prefixes among his cards, demonstrating once again that stations located more centrally in Europe enjoy a much wider catchment area than is available to UK amateurs with the Atlantic dominating the west. Carsten's list included contacts with UA1, UA3, UB5, UT5, UO5, UY5, UV6, UZ5 and OH9 (some of which have been worked from G of course) as well as the usual OK, SP, HG, YU, I, YO, LZ, etc, and made contacts as far north-west as TF, OY, GI, EI, Caithness and Skye. He also worked down as far as to EA6 and Malta, representing an excellent all-round coverage. He works eme, and his cards included a contact with LU7DZ (who recently stirred things up here on 50MHz), W5UN, W7FN, KD8SI, WD9ACA and VE7BQH, all on 144MHz. W5UN's card described his antenna as 48 x 17 element yagis. Few of us have the room for such a giant, but if you have, try one on your local planning officer!

Chris, GM3WOJ (Rosemarkie) worked G4RFR (Dorset) on 70MHz during the 70MHz Trophy on 18 September. The distance was 773km which Chris thinks is probably the new 70MHz tropo record (other claimants please write). However, Chris is convinced that distances in excess of 1000km can be worked on this band, for in the same event he worked five stations at distances over 700km quite easily".

Chris may have broken another record, this time in a 50MHz meteor scatter contact with Tiago, CT1WW on 11 August at 1130gmt, both stations using ssb. At first he thought the propagation might be Es-assisted, but is now convinced that it was purely meteors. The distance of 1841km which is believed to be the current Region 1 50MHz two-way ms record.

Anyone wanting to experiment with the detection of solar flares using the VLF receiver technique referred to in VHF/UHF for October 1988 can purchase a 60kHz receiver kit from Cambridge Kits, 45, Old School Lane, Milton, Cambs., CB4 4BS. Minor modifications to the standard kit are required for it to be used for flare detection, and these are available on request.

of the following:

J3 Grenada  
6Y5 Jamaica  
VP5 Turks & Caicos  
V3 Belize  
VP9 Bermuda

He expects to have his plans fixed by March or April. Harry works very long hours as a police officer and like most of us, has to fit in his amateur radio with the need to earn a living.

Nick, 5B4AZ, beacon keeper for 5B4CY now has a 50MHz rig and has worked into 4 x 4, so he ought to be a potent signal here next summer via sporadic E.

Ted, G4UPS said that KH6HSS/5N9 in Nigeria was awaiting 50MHz equipment and was all set to come up on the band when it arrived. Ted also reported that from Amsterdam Island

Karl G60DT (Northants) worked SP6MLK/6 in JO80JG on 432MHz during the tropo opening on 20 September last. He was using one watt from a FT90R and wonders whether he had broken the record in the kilometres per watt or miles per watt race. This subject was well aired in previous issues and generally given the bird as a valid means of measuring performance. The reasons are obvious. Karl used a 23 element yagi, so the erp was equivalent maybe to 20 watts into a lesser antenna. This is not to knock Karl's achievement. If only everyone used QRP, how much more pleasant the band would be, and the results not stikingly different.

G6JNS (Worcester) has queried the validity of 50MHz contacts with Andorra, saying that the licence terms of that country do not permit operation on the band. This crops up from time to time and is a vexed question. In the past in VHF/UHF News & Views, some details of actual licence documents from Andorra were published which seemed to confirm that 50MHz operation from Andorra was forbidden. Not only that, but the use of the band by visiting amateurs had enraged local amateurs who feared for their licences as a result of what they regarded as illicit operation. Going back a few years, I think it was the Hadrabs group from the UK who operated 50/28 crossband from Andorra, claiming that they had included 50MHz in their application and had been granted a licence which did not forbid it. More recently Awards Manager Jack Hum, G5UM, took up the matter with G4UPS who operated on 50MHz from there last summer, and was informed that this operation had been authorised. Jack then announced, through this column (September 1988) that he would accept cards for contacts with the G4UPS Andorra expedition for 50MHz awards. Perhaps the VHF Committee will need to discuss this one since a dozen or more awards have already been issued which include this country/square in the totals claimed.

In the September 1988 issue of QST, WA2LQQ discussed how VHF signals can be severely attenuated by nearby trees in the firing line of the antenna. These effects are reckoned to be minimal at 144MHz, though if your signal has to penetrate 50ft of foliage, the loss could be as much as 15dB when the leaves are wet, improving to 1 or 2dB when dry. On 70cm, the loss through a similar belt of wet trees can, he

says, be as much as 20dB, while on 23cm, WA2LQQ refers to the losses as "profound", with up to 99% of the signal being absorbed. These figures are for dense clumps of trees, conifers (evergreens) obviously being worse than deciduous trees which lose their leaves during winter. At my previous QTH I had a 55ft Turkish Oak to the north of my antenna and some 15ft distant, and while this made little apparent difference on 144MHz, on 1296MHz it virtually shut me down in that direction, especially after heavy rain. It pays to get your antenna clear of surrounding trees if possible, but as WA2LQQ points out, one must trade off feeder loss against leaf attenuation. At least one USA moonbouncer running very high power to a large antenna has to pick his way through a veritable barricade of trees to see the moon.

The Licensing Authority has approved the frequency of 50-000MHz for the proposed new 6 metre beacon G3BUX to be located in the Sheffield area. This beacon is being designed by Dr. Tony Whitaker, G3RKL, to provide accurate timer markers so that the path-length of some of the longer-haul 50MHz signals can be investigated. It is hoped that this will give information on the number of "hops" made along the path and also permit the height of the reflecting medium to be estimated. One of the Cambridge Kits VLF receivers might be a useful adjunct to the shack equipment when this beacon is QRV since it would permit reception of the Rugby MSF clock, said to be maintained to an accuracy of 300 microseconds per century. That should be good enough for meteor scatter timing too, I reckon!

Hank, W1OOP, commenting on the high cost of overseas mail when sending out a stack of QSL cards, said "If 200lbs of baggage can go from Boston to Heathrow for \$250 US, (that's about 3c per half oz), why is overseas mail so expensive?" Current USA internal postage rates are 25c per oz.

Wishing to extend a standard quarter inch shaft on a potentiometer, G8VR visited the local branch of an internationally famous parts supplier. G8VR: "Do you keep shaft couplers?" Assistant: "Would that be mono or stereo, sir?" Exit G8VR, stage left, to sounds of maniacal laughter.

## AND THERE

that they would be licensed.

Presumably to keep me on my toes, Jan, OH1ZAA, sent two mouth-watering QSL cards, (see opposite), one for Grand Cayman (ZF2KZ), the other for Tahiti (FO0ZA), both his own calls, which with luck he may be able to send in earnest to some lucky UK operators one day. Meanwhile I'll just keep the cards warm for you Jan, you never know! I got another card too, from husband and wife team 9H3EN and 9H3EO. Better known as Maureen GW8ZCP and Alan, GW3LDH, working ZS6 and ZS3 on 50MHz with conspicuous success from Malta.

Please have your copy for the February edition of *Rad Com* to me by 5 December. Meanwhile I would like to wish everyone a happy Christmas.

(in the southern Indian Ocean 37-52 south, 77-32 east) FT5ZB was due to come on during September. (QSL via F6EYS somewhat nearer home.)

Mike, G3SED wrote to say that SM6FZD had told him that Sweden should be issuing 25 special 50MHz licences by about now, while from Egypt, SUZER (Cairo) wants to use the band and the 50MHz Group was endeavouring to find equipment for him. Bob, ZB0E is already active in Gibraltar.

Bud, K2YOF said that J73PD (Dominica), VP2EZ (Windward Is) and PJ9EE (Bonaire) are all QRV on 50MHz and have been worked from the W2 area. Also, N4EJW was lending 50MHz equipment to 9Q5NW in Zaire until he leaves that QRA at the end of 1989.

Amateurs in Luxembourg were also confident

MIKE DIXON G3PFR

## WHITHER ON 10GHz? (PART 3 – ALTERNATIVE GUNN SYSTEMS)

In October I outlined a number of significant improvements which can be made to Gunn-based wideband equipments, principally those using the popular in-line mixer-oscillator assemblies, although many of the improvements suggested are common to other forms of microwave head. What should have become apparent from that discussion is that such assemblies can, when set up and used correctly, yield a pretty good receive performance but are really not on par as transmitters.

Although offering switchless transceive operation, the big disadvantage is the need for retuning between receive and transmit. This is usually the source of one of the greatest uncertainties in wideband operation, particularly with a high i.f. and especially if the mechanical tuning arrangements are incapable of a fairly low tuning rate and high accuracy resettability. In much simple equipment there may not even be any form of meaningful frequency calibration, thus diminishing the chances of contacts!

The "perils" of attempted wide-range tuning by Gunn voltage pushing have already been mentioned: you may well be missing contacts simply because you don't know enough about the characteristics of your gear! Added to any uncertainty in antenna bearings (remembering the very narrow beam widths involved) and the average operator's tendency to "search" with both antenna direction and receiver tuning over very many bandwidths, is it any wonder that many paths which should be workable, with marginal wideband signals, are not worked? The main "gain" in going from a wideband to a narrowband system can be considered to be the ability to know, within narrow limits, where signals are – his and yours! True, there is *real* gain from using better techniques and devices but it must be equally apparent that, as far as propagation is concerned, there is no difference between a wideband or narrowband signal.

In what may well be his last awards update, Jack, G5UM sent news of several new microwave awards to members. Jack is retiring from the post of Awards Manager after several years of sterling service for which we thank him – and his XYL, Grace. May we wish you a long and happy "retirement", Jack?

Anyway, to the awards: 3-4GHz, 20 squares to John, G4BYV. John's achievements on this band must be almost unique . . . stickers number one for 10, 15 and now 20 squares! Well done. On 24GHz, to Peter, G3PHO, goes Intermediate Certificate No. 5 for an 87km wideband QSO with G3ZME/P. What's this, members of the Microwave Committee actually operating? Actually, G3YGF has been operating 10GHz narrowband again and even I've been threatening to re-appear on 10 and 24GHz, so perhaps there is some truth in the rumour that we do actually *do things* with microwaves!

Distance award No. 95 on 10GHz went to Michael, G6KZP/P for a WBFM QSO with GU4EFT/P, this bringing the "season's" claims for this award to seven. Michael remarked that since this WB contact he has worked several

paths in excess of 200km using newly commissioned NB gear and wonders whether we might consider instituting a 250+ award for narrowband. It might be more realistic to consider 400 or 500km for this one in order to encourage troposcatter experiments. What do you think?

The aim should be a minimum of a turn-counting dial mechanism on the mechanical tuning screw, the readings of which can relate directly to frequency. Resettability to better than 50kHz should be easily attainable with a well designed cavity and tuning mechanism. The most successful wideband operators are not only those who choose to operate from good sites, but those who know their equipment and can set their dishes and frequencies well – and maintain both: after all, the world record of well over 1000km was set using QRP wideband equipment, admittedly under superb super-refractive conditions along the Mediterranean! Before that, the 500km-plus record from GM to Cornwall was similarly attained, both instances of super-DX showing clearly that the operators concerned could meet the parameters outlined above.

A better solution to this problem is to devise some form of switching and then use separate receive and transmit oscillators. In this way it is possible to preset the transmit oscillator to a known frequency and, at the same time, use a high powered Gunn device in the transmitter.

Rotary four-port change-over waveguide switches can sometimes be obtained on the surplus market and there have occasionally been coaxial switches also. Failing these, there was a description of a useful moving-vane or "flapper" switch by DC8UG in VHF Communications, Volume 13, number one, pages seven and eight, 1981. Although this does mean some metalwork, it should not be too difficult to reproduce a simplified version of the design using handtools on your garage bench. If all else fails, slow and somewhat cumbersome changeover can be done using the "quick-release" round-flange/locking-ring system using standard components: seldom is there a need for really rapid changeover!

High power Gunn diodes are available in the UK from the usual surplus sources and are capable of continuous 300mW output (or over 1Watt, pulsed) for a dissipation of about 10W. This infers that particular attention must be paid to heat sinking the device. This means that the Gunn device is best mounted in either a specially made thick-walled cavity or finned heatsinks must be attached closely to a cavity built in conventional WG16. Remember that copper has about four (and aluminium two) times the thermal conductivity of brass! The worst consequence of very poor heat-sinking is premature failure of the Gunn. Less than optimum heat-sinking will result in an unstable oscillator which will drift rapidly (and a long way) as the device heats up. Adequate heat-sinking should result in a source with a stability no worse than a well designed low power oscillator. I have successfully built high powered oscillators of adequate stability using ex-doppler cavities (of unknown manufacture) which have a large, cone-shaped, anodised Gunn post and cavity milled from a block of aluminium with walls nearly 12mm thick. Others have successfully used the AEI-Pascal module of similar style which was described in *Practical Wireless* some years ago (now

not readily obtainable).

Three other precautions are necessary when using these devices: first, the usual 7805-type regulator chip *must* be heat-sunked in order to provide the 800 to 1000mA bias current without overheating and going into thermal shutdown. It isn't usually necessary to heatsink the 7805 when used with low-power Gunns which consume about 150mA. Nor will you need any different audio (tone or speech) levels, because the modulation characteristics of QRO Gunns are identical to those of the usual devices.

The second precaution is that the connections to the high powered devices are the reverse of normal: the "flange" end of the usual QRP diode is negative (earthed), with positive bias applied to the non-flanged end. With the QRO diode, apply positive bias to the flanged end and earth the non-flanged end.

Third, and most important, *never, never* look into the cavity with the Gunn running, as power density close to the open end of the cavity will exceed what is considered the safe limit (currently 10mW/sq.cm).

Indeed, it would be good practice, while experimenting with QRO devices, to feed the output into a variable attenuator before it reaches the outside world. If an attenuator is not available, then put a piece of absorptive material into the open end of the cavity. Suitable material is the black anti-static foam in which the pins of CMOS ic's are usually protected. In actual operation, the only precaution is to avoid your (and other's) close proximity to the dish and feed whilst transmitting.

## FROM HERE AND THERE

Sometime back I commented on some rather unique 1.3GHz QSO's which took place in the opening of November 1987, two of them setting Polish and Czechoslovakian national records respectively. Tim, G140PH, has since confirmed that his QSO with SP6GWB/6, at 1580km, was also a record as the first G1/SP contact on the band. More recently further records must have been set by DX into EA8, although my records show that G/EA8 was done quite a long time ago from Cornwall (G6LEU).

Beacon news is good news! The following beacons have now been licensed and should be operative soon: GB3CTC (1.3GHz), GB3WWH, GB3LEV and GB3BSY (2.3GHz) and GB3AZA and GB3LET (10GHz). Some of them have been in the pipeline for rather a long time, so it would appear that the system might have got into gear once again!

While there are a number of "millimetre" bands in the present UK licence eg. 24, 47, 76, 142 and 248GHz, there are others mentioned in the International Radio Regulations which are not yet included in the licence. One of these is the 120GHz band (119-98 to 120-02GHz). The DTI have recently indicated that they would be willing to consider granting permits for this band on a case by case basis. Both the DTI and RSGB would be very pleased to hear from anyone interested in activating the band. QRV 120GHz?

Last month I mentioned the possibility of beacons on 5-7GHz and it seems that the DTI will now consider applications for the band. Will anyone interested please declare their intent to me, c/o RSGB HQ or direct. Thanks to Julian, G3YGF for these last two items. ■

GEORGE DOBBS G3RJV

## MORE OF WHAT'S WATT

In my last column I mentioned W9SCH's homely ways of explaining power to non-amateur radio friends. Sometimes we even need to explain the concept of RF power to radio amateurs. There are mistaken ideas about how power relates to effective communication on the amateur bands. Is increasing power the most effective way to achieve better results on the HF bands? For example: do you ever consider that, in theory, in order to gain 1 "S Unit" the RF output power of a transmitter has to be increased four times.

Consider the chart in Fig 1. I make no excuses for the fact I have been parading versions of this chart before amateur radio audiences for at least 10 years. The chart represents a simple theoretical situation by comparing power against S Units. The starting point is that 1 "S Unit" is equal to a 6dB signal change and the chart is calculated from one of the dB/Power charts found in most radio data books.

The chart begins with an assumption that a radio signal with an output power of 1,000 watts is being received at exactly S9. By how much must the power be reduced in order to drop in increments of 1 S Point? The figures might seem surprising. Perhaps a significant one to pick out is that the signal is still a readable S5 at four watts and at one watt (from 1,000 watts!) the signal is a marginal S4.

It does not take much of a mathematician to see the relationship: 6dB is a four times power change. So in theory power must be increased four times to gain a single S Point and, conversely, reducing the power four times only loses one S Point. Fine in theory, but surely in the battle ground of the HF bands, we need all the power we can muster for the fray? Experience has taught me that in practice the situation is not even as difficult as this chart shows for the low power station. Many seem to do rather better than this chart suggests when operating alongside stations using conventional power.

I suggest that a couple of other factors make a significant difference to the results. The station operator with low levels of power tends to be more circumspect with his use of that power. Many radio amateurs are careless in their arrangements for matching and power transference between their transmitter and the waiting world. Low power operators tend to be very careful about how they dissipate their precious few watts. QRP operators also tend to be cunning operators, or soon learn how to adopt the more successful operating practices. It is difficult to be a bully with a couple of watts, a touch of guile is more useful. Certainly many

operators, beginners and experienced, have been surprised when they have tried reducing power for the first time.

## THE G QRP CLUB CW WINTER SPORTS

Perhaps a good chance to try out some of the above would be to join the annual G QRP Club Winter Sports. For many years the Winter Sports have been the best supported QRP operating event in the UK. Its aim is quite simple. The object is to take part in as many two-way QRP QSOs as possible during that lazy period of our lives between Boxing Day and New Year's Day.

QRP stations are invited to be active as much as possible during the period January 1 to December 26. In the past there have been set operating times and bands but many operators have home built equipment and may be restricted in their choices of bands. The best policy is to use the highest open band. The accepted power level is under five watts and call "CQ QRP" or listen for other QRP stations. The frequencies to use are the International QRP Frequencies: 3560, 7030, 14060, 21060, 28060 and perhaps 1843kHz, dodging other stations and QRM.

The event is *not* a contest, it is what, I think, the Americans call a QSO Party. Two-way QRP contacts are the goal and sometimes lengthy QSOs between old friends are part of the fun. If you are a beginner, can I urge the use of short overs. QSOs carried out under marginal conditions are often not the time for extended greetings or biographies. A lot of information can easily be swapped in frequent short exchanges.

There is a trophy for the more competitive participants, the G4DQP Trophy is awarded to the station submitting the best log of two-way

QRP contacts during the whole period. Logs may be sent to Mr A D Taylor, G8PG, 37 Pickerill Road, Greasby, Merseyside L49 3ND, by February 7. Try this one, you may enjoy it, a lot of us do.

## THE AGCW - DL HAPPY NEW YEAR CONTEST

For those operators who rarely enter contests because they are too long, the Happy New Year Contest is a chance to give contesting a try. It only lasts for three hours and it has a QRP section. The rules are as follows:

**Date/time** January 1. 0900 - 1200 Hrs UTC  
**Frequencies:** 3510-3560, 7010-7040, 14010-14060 (cw only)  
**Classes:** 1 Max Output Power 250W  
 2 Max Output Power 50W  
 3 Max Output Power 57W  
 4 SWL

**Call:** "CQ TEST AGCW/EU"

**Report:** RST + QSO Number (+ AGCW Number for members)

**Points:** Every QSO (or report for swls) = 1pt. Each station may only be worked once per band.

Only EU stations take part and count (DXCC). SWL logs must contain both calls per QSO and at least one complete report.

**Multipliers:** 1 multiply per AGCW member worked

**Score:** Total QSOs x Multipliers for all three bands

**General:** Single operators only. Any speed but slower station governs. Declaration that contest rules have been observed is required.

**Logs:** By January 31 (postmark) to: Fritz Bach Jnr, DK10u, Eichendorffstrasse 15, D-4787 Geseke, West Germany.

## BOOK REVIEW

## EASY-UP ANTENNAS FOR RADIO LISTENERS AND HAMS

BY EDWARD M NOLL, W3JQJ. FIRST PUBLISHED APRIL 1988 BY HOWARD W SAMS & CO, INDIANAPOLIS (UK BY PITMAN PUBLISHING). 176 + X PAGES (278 BY 215MM). UK PRICE £14.95. ISBN 0 672 22495-XX.

A practical, well-illustrated antenna book for those interested in receiving mf, hf, vhf broadcasts, utility services and for two-way amateur radio and for 'scanner listeners', packed with constructional details of antennas that the author claims are "easy to construct, erect, and put into operation . . . inexpensive to build and they stay up. Best of all - They Work!" Chapters 1-11 for radio listeners; chapters 12-16 for transmitting amateurs. At first glance a most attractive book for newcomers and listeners. Tables giving dimensions in feet and inches of resonant antennas for broadcast and amateur hf/vhf bands. Clear diagrams and photographs. Everything made simple, and rule-of-thumb; none of the caveats and complications to be found in more advanced texts.

However, if you really want to *understand* antennas, why they sometimes prove disappointing, how they are affected by site and height factors, radiation patterns, polarisation, matching etc, this "easy-up" book is not the answer. What it does, it does competently and

perhaps a collection of simple constructional details is what today's newcomers want. It is unfair to criticise a book for not doing what it makes no claim to do. For those prepared to study the fascinating subject of antennas just a little more deeply, and more rewardingly, this is not a book on which I would recommend spending £14.95.

**Contents:** Part 1 Radio receiving antennas; 1, Radio services and book plan (4pp); 2, Basic antennas and their construction (16pp); 3, Antenna tests and comparisons (7pp); 4, Vertical variations (8pp); 5, Dipole and longwire variations (8pp); 6, Directional longwire and beam antennas (8pp); 7, Special hf antennas (7pp); 8, Medium - and long-wave antennas (6pp); 9, Confined space and indoor antennas (11pp); 10, Vhf/uhf antennas (11pp); 11, International antenna dimension tables for radio listeners (5pp).

Part 2 Ham radio antennas; 12, Antenna fundamentals and tests (7pp); 13, Antennas for the new novice operator (7pp); 14, Antennas for general - and advanced-class licencees (21pp); 15, Antennas for the new Technician and new vhf/uhf operator (13pp); 16, International antenna dimension tables for ham radio operators (4pp); Appendix - antenna manufacturers, sources and information (US addresses only); Index 5pp.

G3VA

Watts/S Unit Chart  
(1 S unit = 6dB)

|    |                |
|----|----------------|
| S9 | 1000 Watts     |
| S8 | 250 Watts      |
| S7 | 62.5 Watts     |
| S6 | 15.5 Watts     |
| S5 | 4 Watts        |
| S4 | 1 Watt         |
| S3 | 250 Milliwatts |

IAN WADE G3NRW

## FACSIMILE MODEMS

John Nagle at Stanford University reports that there are some interesting modem chip sets available for high-speed half-duplex data transmission. These are intended for fax machines, but are actually general-purpose digital modems. The Rockwell R96MD is a 9600bps half-duplex modem, V.29 compatible, available as a two-chip set on a board for \$175 in one-off quantities. This looks like an interesting unit for specialised applications such as telemetry, amateur packet radio, and so on.

The R96MD is bus-compatible with 8080-type processors, and can be made to talk to other 8-bit paths with the usual support logic. Or it can be operated via an RS-232 interface, bearing in mind that this is a synchronous modem. Rockwell promises a single-chip version next year, the R96MFX. Contact your local Rockwell representative for further information. The Rockwell Modem Products Data Book has all the data sheets.

## NET/BUS - AN RS422 HIGH-SPEED NET/ROM BUS

Mike Tubby, G8TIC and GB7ERA, has developed an RS422 bus cable adaptor for connecting to tncs. This allows a tnc with a modem-disconnect header to be connected to a bus/cable (two twisted pairs) instead of a radio. Named 'NET/BUS', the main aim is to allow more than four ported network nodes ('TheNet' or 'NET/ROM') to be built easily, as you can only go so far with a diode coupler/matrix.

Basically you take a 'node' with, say, four ports, and make one of them talk RS422 instead of to a radio. You then repeat this on another node (in the same building) and connect the RS422 together; the nodes then form one big node with the RS422 "channel" acting like a private radio link.

The main advantage of RS422 is that it can be multi-dropped, and so you can connect many four-port nodes together and make a 'super-node'. RS422 supports speeds of up to 10Mbps over short distances, so the tncs will run out of speed before you run out of bandwidth. 'TheNet' appears happy at 19.2kbps, TXDE-LAY is quite okay set to zero, and you can also connect your 'station tnc' and mailbox services to the 'NET/BUS' via the same adapter board to give them high speed and efficient access to Level 3/4 of 'TheNet' or 'NET/ROM'.

The design uses only three chips (two 75176 RS422 driver chips, and a 74HC00) and operates over two twisted pairs, one for data and one for channel access/DCD arbitration. The bus runs NRZI directly from the tnc and all devices are self-clocked; ie, there is no master clock on the bus. Simple CSMA arbitration is used, implementing PTT/DCD signal on one pair to provide the channel sharing.

Total cost of a NBA ('NET/BUS' Adapter) should be well under £10 and can be built on a small piece of Veroboard. Mike used 5-pin 180-degree DIN audio connectors to make life easy (ready-made connector leads are available from hi-fi shops). More details from Mike at 8 Waterford Close, Worcester WR3 7BL.

## THE 7TH COMPUTER NETWORKING CONFERENCE

The ARRL's Seventh Computer Networking Conference took place in Maryland, USA, on 1 October, and judging from the list of papers presented, packet radio development continues apace. The papers included:

*A Duplex Packet Radio Repeater Approach to Layer One Efficiency (Part 2)* by Scott Avent, N6BGW, and Robert Finch, N6CXB.

*Formal Description in Estelle of AX.25* by Michel Barbeau, VE2BPM.

*International Code Designator for Amateur Radio* by J Gordon Beattie Jr, N2DSY, and Thomas A Moulton, W2VY.

*Amateur Framing Protocol* by J Gordon Beattie Jr, N2DSY, Terry Fox, WB4JFI, and Thomas A Moulton, W2VY.

*A Routing Agent for TCP/IP: RFC 1058 implemented for the KA9Q Internet Protocol Package* by Albert C Broscius, N3FCT.

*Recommended Power and Antenna Height Guidelines for LANs and WANs* by Bob Bruninga, WB4APR.

*A Totally Awesome High-Speed Packet Radio I/O Interface for the IBM PC XT/AT/386 and Macintosh II Computers* by Mike Chepponis, K3MC, and Bernie Mans, AA4CG.

*AMSAT's Microsat/PACSAT Program* by Dr Thomas Clark, W3IWI.

*The DSP Project Update* by Dr Thomas Clark, W3IWI and Dr Robert McGwier, N4HY.

*Digital Radio Networks and Spectrum Management* by Paul A Flaherty, N9FZX.

*Where is my High-Speed RF? Part 2* by Terry Fox, WB4FJI.

*Proposed AX.25 Level 2 Version 2.0 Changes* by Terry Fox, WB4FJI.

*Transmission of IP Datagrams over NET/ROM Networks* by Daniel M Frank, W9NK.

*More and Faster Bits: A Look at Packet Radio's Future* by Bdale Garbee, N3EUA.

*Can We Continue to Ignore Level One?* by Eric S Gustafson, N7CL.

*Fingers - A User Information Lookup Service* by Michael T Horne, KA7AXD.

*Big Sky Telegraph and Other Tales* by Dave Hughes.

*International Routing Designators* by Lew Jenkins, N6VV, David B Toth, VE3GYQ, and H N (Hank) Oredson, W0RLI.

*AX.25 Packet Radio Communications Using Meteor Scatter Propagation* by Thomas Johansson, SM5IXE.

*The AMSAT/TAPR DSP 1 Project: Hardware Design* by Lyle V Johnson, WA7GXD.

*Microsat Project - Flight CPU Hardware* by Lyle V Johnson, WA7GXD, and Charles L Green, N0ADI.

*Radix 95: Binary-to-Text Data Conversion for Packet Radio* by James G Jones, WD5IVD, and Gerald A Knezek, KB5EWV.

*Amateur TCP/IP: An Update* by Phil R Karn, KA9Q.

*Cellular Area Coverage Transport Networks* by Donald V Lemke, WB9MJN.

*9600-baud Packet Radio Modem Design* by James Miller, G3RUH.

*ARES/Data: A Packet Radio Database for*

*Emergency Communications* by W E Moerner, WN6L, and David Palmer, N6KL.

*PACSAT Software* by Harold Price, NK6K, and Dr Robert McGwier, N4HY.

*Overview of ARRL Digital Committee Proposals for Enhancing the AX.25 Protocols into Revision 2.1* by Eric L Scafe, K3NA.

*Introducing System Description Language for AX.25 and Related Protocols* by Eric L Scafe, K3NA.

*AX.25 Data Link State Machine* by Eric L Scafe, K3NA.

*AX.25 Link Multiplexer State Machine* by Eric L Scafe, K3NA.

*Simplex Physical Layer State Machine* by Eric L Scafe, K3NA.

*A Brief Note Proposing Non-ALOHA Access Techniques for PACSATs* by Jeff Ward, G0/K8KA.

*The UoSAT-D Packet Communications Experiment* by Jeff Ward, G0/K8KA.

## A NEW 4800 BPS PACKET MODEM

Jack Botner, VE3LNY, says that the Hamilton Area Packet Network has introduced the HAPN-T, a plug-in 4800bps modem for TAPR tncs and their true clones. The modem is a daughter board that plugs into the tnc's external modem connector. The size of the board is 3.75" x 2.75" and may be mounted inside the tnc.

The modem operates at 4800bps by directly interfacing to the discriminator and modulator of a standard vhf/uhf radio. The modulation is direct fm biphase modulation, and does not require any more bandwidth than conventional 1200bps modem operation. The modem contains a multiplexer that easily switches between the 4800 HAPN-T and the tnc's 1200bps modem.

The HAPN-T modem is available from HAPN (Box 4466, Station D, Hamilton, Ontario, L8V 4S7, Canada) as a bare circuit board (with diagram and instructions) for \$15 US, and as a kit including circuit board and parts for \$45 US. Add \$5 for shipping and handling (\$8 overseas). A \$10 discount applies to orders of five or more of any item.

## GB2ATG NEWS

Bob Andrews, G1JZJ, runs the BARTG news service (under the callsign GB2ATG), has moved to a new address: 52 Linridge Road, Erdington, Birmingham B23 7HX. Bob will welcome items of amateur radio news for possible transmission by GB2ATG. Transmissions take place on the first and third Sunday of each month, on 3.590, 14.090 and 144.600MHz, at various times throughout the day and country. More details from Bob, or from the BARTG Membership Secretary: Mrs Pat Beedie, GW6-MOJ, "Ffynnonlas", Salem, Llandeilo, Dyfed, SA19 7NP (tel: 0558 822286).

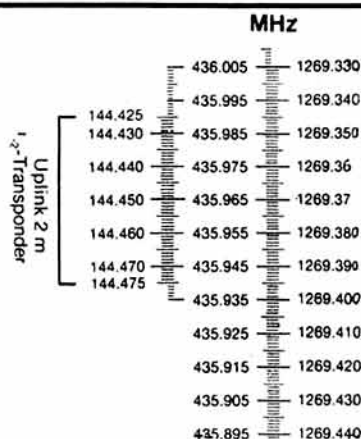
## CARRIAGE RETURN/LINE FEED

Well folks, this is it. I've reached the end of the line. After three years of compiling this column it's time to move over and let someone else have a go. All that remains is to thank all of you who have encouraged and supported me during my time in the hot seat, and to wish my successor (I don't know yet who he/she will be) every success with the column in the future. And, of course, to wish all loyal "Data Comms" readers a very happy Christmas and peaceful New Year. 73.

## RON BROADBENT G3AAJ

Amongst the month's influx of letters was one from an AMSAT-UK member of long standing who wrote to apologise on behalf of himself and a friend for using the 144.450 section of the Oscar 13 Uplink. As they had not realised the significance of the 144 end of 2m and the JL Mode, and also because they had been using 144.450MHz for a long time owing to its lack of population in their part of the Home Counties, even at times of DX conditions, they had not realised it was to be avoided. Furthermore (and this was a point that had not struck me) as they were using high-power, they would unwittingly be interfering with Oscar 13 when it was at low elevation during their normal terrestrial QSO. Both gents have now moved below the JL portion of the band. Thank you Brian and Jack.

It was also suggested that I could do a lot to alleviate the problem, for those who have no interest in Satellites and Oscar 13, by giving details of sub-bands to avoid, plus a schedule of JL times. It's a good idea, but if folk have no interest in satellites it is probable they do not read this column. However, here goes. The best way is for us to print the diagram from Oscar News, and ask satellite users in those countries which do not have a Space allocation in the 144MHz section of 2m not to use these frequencies. Despite what some ill-informed readers may be advocating, UK satellite sub-bands are 145-800 - 146-000MHz on 2 metres and not 144-450MHz at this date.



Regarding a schedule of ON/OFF times, this would be difficult to impart to the casual reader; they will either have to have the two monthly orbital time calendar, or calculate Mean Anomaly. I don't know of a simple answer to that one for the non-satellite user. I also realise that most of the non-satellite users of two metres think we are nut cases anyway for wanting to chase a moving object around the sky just to make a contact.

Had a QSO on 80m last week, and one of the Round Table said something about this column. After a minute or so one of the other members of the QSO said, "I never look at that column, or the DX one, or the vhf one, or hf one, etc, etc. Times have certainly changed. Most amateurs I grew up with read EVERY thing they could lay their eyes on about all aspects of the craft of amateur radio. That and using our

soldering irons was how we progressed to some of the more specialised goings-on in this hobby. Perhaps it's the Telly that does it. One young G0 that lives not a million miles from me says he is too old to learn now, at 40-ish years of age. Lord above help us. I'm about to build a 23cm PA, (my first attempt at this band), and can give him 20 years on top of his age. Perhaps it's just laziness and not the telly after all.

## BACK TO SATELLITES

Details have recently been released, by the satellite group in the USSR via RS3A, that the next series of Russian Sport transponders will be named RS12 and 13. 'Transponders' is the operative word because the amateur radio devices are again to be placed into a satellite being launched for another purpose. This, let's face it, certainly keeps the costs down for the builders of the RS's. We nearly had a ride on a UK scientific/commercial satellite a couple of years back, but it fell through when the UK opted out of the space age. (I hear we are about to go back in again with Leicester University being the 'First' UK Centre for Space research - Daily Telegraph news item). Wonder what Surrey University have been doing since 1978 if it's not Space research. Mind you, they have only designed, built and launched two satellites, both working 100%, and are now building a third.

On that subject, the new UOSAT - Delta. You will recall that I made a plea for a few quid of your hard earned cash to help with the design and operation of the spacecraft which will be in orbit for free access by any one in 1989. I suggested that some of the Packet folk and organisations around the world may wish to help. So far not one penny has been sent to AMSAT-UK from any source other than members of AMSAT. That also includes lack of response from satellite users who take all the information they can get from the Packet networks, placed there by AMSAT-UK, regurgitate same to their friends, corrupt the information and telephone AMSAT-UK for the correct gen. This is all without any consideration, via the computer between their ears, that someone is spending real money for their enjoyment. I have even heard the remark that, "I do not belong to RSGB, BARTG, or AMSAT as I get all my stuff from packet radio." Think on, dear friends. You may find that the info. may suddenly cease when no more money is forthcoming to run the service for you, the freeloader. I have a theory that this is the reason why AMSAT-NA are lacking in funds at this time. Nobody wants to join AMSAT-NA to get 'Amsat Satellite Report' (USA), as the contents are on the local repeaters before the ink is dry.

By the time you read this the Russians should have launched their Shuttle, and given space-watchers another few days of excitement. MIR should also by this date have been placed on the Amateur radio map, as we have just heard that one of the crew of MIR has been outside on a spacewalk to repair the Radio Telescope that failed to get deployed some weeks past. While outside, said gent fitted a 2m antenna to a window in preparation for the first amateur radio contact from the MIR station. As none of the crew members are radio amateurs at the time of writing, one of them is being coached by five amateurs on the ground as the spacecraft goes over Russia. It is hoped that this member of

crew will pass his Ticket and be able to converse with the rest of us as MIR flies overhead. I bet that will cause a pile-up in some parts of the globe. Frequency suggested is 145.550 (S22) fm. Keep ears open as soon as you read this. Updated info. of course on AMSAT nets.

For those who are interested in OSCAR 13 other than the 70cm/2m transponder, you should now be able to use Mode S at least for a few minutes during the orbit. At the time of writing this is 13 minutes of Beacon, and 27 minutes of Transponder. Uplink on 435.601-435.637MHz. Downlink 2400.711-2400.747 MHz. During MA counts of 195 to 209. These are subject to change as and when Command stations are checking spacecraft power budget, or whatever. I would appreciate ANY reports from readers about this mode of operation.

FO-12. During October we were informed that FO-12, the Japanese amateur satellite, would be out of operation until 14 November because of power budget problems. It's hoped that this satellite will be in full operation by this date. It has, all said and done, been a satellite in the forefront of amateur comms. Although NOT the first to supply a forward store and hold packet system (our own UOSAT was the first), it has given a great number of people lots of fun, even if hair-tearing at times. For those who wish to use this digital mode letter box, there is already a small pcb and circuit available for your TNC's to get signals into the Store. The device is available from AMSAT-UK. Enquiries via a sase will get you instant action. (Not, though, at 11.15pm via telephone.)

Still on the subject of JAS-1, I am informed that the new JAS-1B (FUJI-20) will have an improved power supply and antenna system, will be in a SLIGHTLY elliptical orbit (how can it be slightly elliptical? It's either one or t'other) and will be of period 106 minutes duration. So in under an hour your words of wisdom, say 2kbytes long, could be in ZL9XYZ's computer with an answer back to you in minutes.

I have been getting a lot of flak about the new Microsats. Remarks such as, "Do we want them?", "Is this the backdoor way in for some semi-commercial interests to get our band?", "Will the transponders be used only for amateur radio?" are typical. By far the greatest number of remarks come in about the DOVE microsat, funded by Brazil AMSAT and built by AMSAT-NA. This is said to have a transmitter on board which can be programmed to send broadcasts in three languages for reception by anyone with a simple handheld. What worries me, and many others in and out of AMSAT, is the style of broadcast, and do we really want any more of the ether piled up with, "Peace on earth and goodwill to all men" every hour, on the hour? Especially onerous is the fact that it's on the crowded two metre section of the Space Allocation of the Amateur Satellite Service. Also, as the device can, I am assured, be easily programmed, what is to stop said programmers using the 'bird' as a propaganda machine? Another thought for the day: I think we had about eight thousand people at NEC this year. There were 57,000 at the HAM FAIR 1988 in the Tokio Int. Trade Centre in Harumi during two days this last August. This included SIXTEEN non-Japanese visitors. That's all folks. Keep the mail coming - I will answer as fast as I can. G3AAJ.

BOB TREACHER BRS32525

## SWL HANDBOOK

In February, I mentioned the handbook produced for swl's by Arthur Miller BRS88969. As Christmas approaches, it is worth mentioning again as a relatively inexpensive stocking filler.

The handbook is a must for anyone starting out in short wave listening as it provides much data about receivers and antennas, propagation conditions, operating procedures, contests and awards and has many other interesting chapters. It also has many useful tips for the experienced swl. It is certainly a most worthwhile publication which ought to be beside your receiver at all times. Why not buy one as a Christmas present to yourself? Or, better still, drop a few hints so that someone buys it for you! It costs only £6.99. Copies of the book can be obtained from Patrick Stephens Ltd, Denington Estate, Wellingborough, Northants, NN8 2QD.

## AN SWL'S VIEW OF THE HF CONVENTION

David Whitaker BRS25429 was one of those at the Society's HF Convention held in Oxford in late September. He reports that it was an excellent affair with many dx stations present. K3ZO (ex-HS5ABD) was one of those in question. David took a QSL card sent in reply to a 3.5MHz report with him as proof that he had heard HS5ABD in 1970. He could not distract either ON4UN or ZL3GQ who were deeply engaged in 3.5MHz antenna design discussions, but met many well-known British DXers including G3's KMA, HTA, ZAY, XTT, GIO, NOF and OZF; G4's FAM, JVG, LJF and GW4BLE.

David enthused over a slide presentation by W0AIH about the building of a US contest super station, and at the hotel on the previous evening, was entertained by a video of the S0RASD expedition and slides of the recent 0J0 expedition. With luck more swl's will be present in 1989, including, hopefully, your scribe.

## WHITE ROSE SWL CONTEST

I would like to draw listener's attention to the last White Rose Society's low frequency bands contest over the weekend of 14/15 January.

The Society have organised this event for the past nine years, but have decided that the 1989 contest will be their last. It will be sad to lose the event from the calendar as it is always quite well supported, but unless another Society or individual comes forward quickly it will be lost. The organisation is not too onerous and neither is the log checking afterwards. If there are any volunteers, they are invited to write to the Society, c/o G3ZGA at 146 Street Lane, Leeds LS8 2AD.

As for the contest, it starts at 1200 on 14 January and runs until 1200 on 15 January on 7, 3.5 and 1.8MHz. There are separate SSB and CW sections. Full rules can be obtained from G3ZGA at the above address.

## JANUARY CHALLENGE

My If challenge is just around the corner again. Once again, it is being run to see how many

countries can be heard on 7, 3.5 and 1.8MHz in the first month of the year, which traditionally brings some good dx.

Normal contest rules will not apply. The aim of the event is to see how many countries are to be heard on the three lower frequency bands. Only one station from each country can be claimed for points on each band. The points scoring has been amplified this year - one point for each country in your own continent heard on each band, and three points for each dx country heard on each band. Stations do not have to be in qso to be claimed. Reports should be sensible and accurate, and not be less than 3 x 3 on ssb, or 339 on cw. Logs should be sent to me at the address on this page to be postmarked no later than 27 February 1989. Good luck and let's hope for some fine conditions and plenty of entries.

## THE 1989 TABLES

I have thought long and hard about whether to drop the tables for 1989. However, several swl's who were asked thought that with HF conditions likely to be even better than in 1988, they should be retained so that some comparison might be made with tables run in this column towards the peak of the last sunspot cycle.

With such a worthwhile aim, I have decided to continue running all the tables. With more space available, I should be able to find space to produce an HF table each month. However, I am hopeful that with very good conditions likely in 1989 on the HF bands there will be more entries from some of the Society's newer swl's. I do not run the table for just the dedicated few, and it is not a 'closed shop' - anyone can send in an entry.

The 'rules' are again simple. Just send me a note of your band scores for the six main dx bands and the total number of DXCC countries heard. The starting date is 1 January all the way through to 31 December. If in any doubt, just look at how the table looks now and follow the same format. I hope that these few 'rules' are simple enough to attract a more sizeable entry in 1989.

The HF All-Time list will appear at intervals during the year, while the UHF/VHF tables will appear in their current format, once I have some entries.

## G4LJF SWL QSL MANAGER

Ian, G4LJF recently announced what your scribe thinks is a first. He announced that he had appointed G0BTY to handle all qsl requests from swl's for all his expeditions.

G4LJF has operated from many exotic spots in the last few years including G4LJF/EA9, D68AAB, VS6GX, G4LJF/3B8, S79LJ, and last month from V2. Some of the qsl's on offer for swl reports are shown here.

Any expedition qsl from G4LJF is outstanding, as you will see, and the one for the S79 trip which is not shown is no different. Providing reports are accurate, Bob, G0BTY will qsl 100 per cent. Direct cards will be answered the same way, providing there is return postage, while cards sent via the bureau will be returned the same way.

G4LJF/EA9 MELILLA



Ian Shepherd  
EDXC  
CHILTERN DX CLUB  
August 1983

G4LJF/HB9 SWITZERLAND



THREE OF THE QSL CARDS YOU CAN EXPECT FROM  
G4LJF ON HIS TRAVELS.

G0BTY offers a few words of advice. He feels that reports of CQ's do not constitute a valid report and is only of use to the operator if he receives no replies to such a CQ call over a longish period (for expeditions to call CQ and get no takers is very unusual!). A good report should include details of more than one qso and could note the reports given. A report from Europe when reporting on a qso between, say, V2 and ZS would give some useful propagation data which may be useful at a later date, as well as being useful to the QSL Manager as he is a keen dxer.

Bear all these tips in mind and you will be rewarded with a card in return.

## MORE QSLING TIPS

Following the piece in the September column about how to reply to swl reports, I have received further views from GM3AWW and PA3EUS. Their comments are given here. All the points are valid ones and should be noted when writing your reports.

1 Make the date easily understandable to avoid possible confusion. It might be best to quote "1 Dec. 88" as the date instead of "1.12.88", which in some quarters could be taken to be "12 January 88". This is because some stations, notably those from Stateside, put the month before the date.

2 Amateurs complain that the vast number of qsl's they receive from SWL's are from USSR listeners which often only report on qso's with Russian amateurs, thus making the report of little value to the recipient. One reason for this is that in Russia, swl's are allowed to operate from club stations, and I understand, that a certain number of qsl cards from foreign amateurs have to be collected as part of their 'RAE'.



# CONTEST NEWS

## SEPTEMBER 1988 70MHZ TROPHY CONTEST RESULTS

In many ways the comments about this year's contest repeat last year's - only things were 50% better this time!

The introduction of the county multiplier was well received, with several commenting that it had added an extra dimension and aided activity. Most logs were well presented and very few failed to show correctly marked multipliers. Only one entrant failed to claim them (it pays to read the rules) but everybody else included some form of check-list, many thanks.

To quickly answer some questions: yes, G is a multiplier; yes, your county and country can be claimed; the abbreviation for Berkshire is BRK, (not BKS) and GM4SIV were really on dry land in 74TQ not standing in the middle of the Irish Sea in HQ as they were claiming!

A special mention must be made of GW1ATZ/P as all his contacts were on fm. Remembering to look on this mode can bring its reward, especially now that there are so many pockets of activity, even in apparently inactive counties. Lastly, a plea from G8ECI to remember to tune above 70.26 for activity and also to beam to the east and East Anglia occasionally.

This year the trophy goes to GM4THB/P, the leader in the open section. Certificates go to G3UKV - the winner of the fixed section, and runner-up certificates to G3FDW/P and G8XVJ. G4NBS

## 70MH TROPHY RESULTS

### OPEN SECTION

| Pos | CallSign | Points | QSO | Mult | km  | Pwr | Ant    |
|-----|----------|--------|-----|------|-----|-----|--------|
| 1   | GM4THB/P | 109620 | 129 | 63   | 657 | 100 | 4el    |
| 2   | G3FDW/P  | 79170  | 124 | 58   | 612 | 90  | 6el    |
| 3   | GW4MGR/P | 75140  | 150 | 65   | 513 | 130 | 6el    |
| 4   | GW4BVP/P | 72198  | 146 | 63   | 596 | 150 | 2x7el  |
| 5   | G3UAX/P  | 65608  | 119 | 59   | 744 | 100 | 2x5el  |
| 6   | E19FK/P  | 65120  | 82  | 55   | 613 | 100 | 5el    |
| 7   | G8KQW/A  | 64056  | 81  | 51   | 645 | 130 | 6el    |
| 8   | G0FCT/P  | 60239  | 118 | 59   | 763 | 150 | 6el    |
| 9   | G4ADV/P  | 58188  | 83  | 52   | 645 | 80  | 7el    |
| 10  | G4RFR    | 57362  | 121 | 58   | 771 | 160 | 2x12el |
| 11  | G14TCU/P | 52969  | 72  | 47   | 680 | 150 | 2x6el  |
| 12  | GM4SIV/P | 49419  | 82  | 51   | 613 | 140 | 4el    |
| 13  | G3ZXX/P  | 47096  | 112 | 58   | 732 | 12  | 7el    |
| 14  | G8PNN/P  | 35917  | 82  | 49   | 666 | 50  | 2x6el  |
| 15  | G7APD/P  | 34840  | 111 | 52   | 697 | 10  | 7elZL  |
| 16  | GW3WOS/P | 32181  | 92  | 51   | 430 | 7   | 6el    |
| 17  | G4CWF    | 25380  | 77  | 45   | 584 | 20  | 6el    |
| 18  | G10RC/P  | 18720  | 73  | 45   | 509 | 10  | 4el    |
| 19  | G4ATH    | 5404   | 34  | 28   | 420 | 15  | 4el    |
| 20  | GW1ATZ/P | 1215   | 19  | 15   | 283 | 10  | 3el    |

### FIXED SECTION

| Pos | CallSign | Pts   | QSO | Mult | km  | Pwr | Ant    |
|-----|----------|-------|-----|------|-----|-----|--------|
| 1   | G3UKV    | 41776 | 114 | 56   | 551 | 100 | 5el    |
| 2   | G8XVJ    | 35853 | 89  | 57   | 478 | 120 | 7el    |
| 3   | G3NAQ    | 32262 | 104 | 57   | 704 | 100 | 9el    |
| 4   | G8ECI    | 30836 | 75  | 52   | 587 | 140 | 5el    |
| 5   | G4ULS    | 27552 | 102 | 48   | 594 | 100 | 4el    |
| 6   | G4AFJ    | 25387 | 83  | 53   | 457 | 60  | 7el    |
| 7   | G4PMK    | 23130 | 72  | 45   | 547 | 70  | 3el    |
| 8   | G3NKS    | 19932 | 75  | 44   | 472 | 120 | 3el    |
| 9   | G3VIP    | 19782 | 54  | 42   | 593 | 50  | 4el    |
| 10  | G0EHV    | 19227 | 52  | 39   | 646 | 50  | 4el    |
| 11  | G4ZTR    | 14940 | 44  | 36   | 589 | 15  | 5el    |
| 12  | G8FMC    | 12768 | 50  | 42   | 465 | 2.5 | 4el    |
| 13  | G6CSY    | 12600 | 51  | 37   | 588 | 10  | 5el    |
| 14  | G3ZJY    | 12358 | 46  | 37   | 514 | 8   | 4el    |
| 15  | G8DER    | 11544 | 46  | 37   | 443 | 8   | 3el    |
| 16  | GW4HBK   | 11211 | 46  | 37   | 380 | 40  | 6el    |
| 17  | GM3TAL   | 9646  | 27  | 26   | 654 | 20  | 4el    |
| 18  | GM3WOJ   | 9328  | 21  | 22   | 771 | 130 | 5el    |
| 19  | G4XEN    | 9316  | 39  | 34   | 474 | 25  | Dipole |
| 20  | G8IFT    | 7446  | 46  | 34   | 406 | 2   | 5el    |
| 21  | G4RIS    | 6725  | 29  | 25   | 634 | 20  | 3el    |
| 22  | GW4ALG   | 4941  | 29  | 27   | 376 | 30  | 5el    |
| 23  | G4BIK    | 4872  | 26  | 24   | 430 | 12  | 4el    |
| 24  | G3JDM    | 3288  | 27  | 24   | 300 | 4   | 4el    |
| 25  | G1EHF    | 2620  | 21  | 20   | 483 | 10  | HB9CV  |
| 26  | G6MXL    | 1365  | 15  | 15   | 445 | 10  | 3el    |
| 27  | G2DHV    | 832   | 13  | 13   | 410 | 20  | 3el    |
| 28  | G4CAX    | 319   | 55  | -    | 331 | 100 | HB9CV  |

## LISTENER SECTION

| Pos | Station   | Points | QSO | Mult | Best DX | km  |
|-----|-----------|--------|-----|------|---------|-----|
| 1   | BRS32525  | 9418   | 52  | 34   | G8KQW/A | 479 |
| 2   | BRS531976 | 5175   | 34  | 25   | G8KQW/A | 522 |

## 144MHZ LOW POWER CONTEST RESULTS

Once again this proved to be a very popular and well supported contest. However, conditions were poor and this probably accounts for the small drop in entries in all three sections compared with 1987.

Log keeping on the whole was good but some entrants made checking difficult by using old style forms. The current form 427-86 is designed to accommodate contests with multipliers and should be used.

Another adjudicator's problem was the many different ways in which the multiplier calculations were presented but the majority of entrants produced an adequate display of the calculations. However, some were difficult to trace. In one case, no calculations at all were presented. Consideration will again be given to the possibility of producing a standardised system perhaps using a standard form.

Congratulations and certificates go to winners: GW4VEQ (Anglesey) with an outstanding score for a fixed station, single operator, and to GM4RZW/P (Edinburgh & District ARC).

Runners-up: G4PIQ, fixed station (Clacton-on-Sea), and GW4MGR/P (Wirral & District ARC), also receive certificates.

Disappointingly there was only one entrant in the Listener Section, BRS32525, who is a regular supporter of contests. The following are thanked for check logs, G3JCN, G3ZVW, G8XTV, G8MYD/P and PE1EWR.

Disqualification: G1JKX/P, Rule 2.

G3FZL

## Section F - Fixed Stations

| Pos | CallSign | Score  | QSOs | Mult | Best DX  | km   |
|-----|----------|--------|------|------|----------|------|
| 1   | GW4VEQ   | 228646 | 293  | 79   | Y26KI/P  | 1036 |
| 2   | G4PIQ    | 78652  | 194  | 53   | Y25GF/P  | 645  |
| 3   | G3XBY    | 72664  | 202  | 62   | GM0FRT/P | 521  |
| 4   | G7ABI    | 61560  | 181  | 60   | GM0FRT/P | 546  |
| 5   | G3JXN    | 49776  | 194  | 51   | GM4RZW/P | 487  |
| 6   | G6ATW    | 44330  | 164  | 55   | GM8CUX/P | 497  |
| 7   | G0HAS    | 43790  | 139  | 58   | GM4RZW/P | 443  |
| 8   | G6HKM    | 33927  | 133  | 43   | GM0CLN/P | 444  |
| 9   | G8ZRE    | 28167  | 123  | 45   | G6VYH    | 334  |
| 10  | G4ZVA    | 23349  | 90   | 43   | GM0FRT/P | 412  |
| 11  | G6FOZ    | 22905  | 96   | 45   | GM0FRT/P | 585  |
| 12  | G4OFI    | 15192  | 88   | 33   | GM4RZW/P | 487  |
| 13  | GW3POM   | 13320  | 68   | 36   | GIVEH/P  | 360  |
| 14  | G0GVI    | 12402  | 75   | 26   | DD4EB    | 432  |
| 15  | G1YNR    | 11781  | 72   | 33   | G8LNC/P  | 392  |
| 16  | G1HLT    | 11084  | 60   | 34   | GM0FRT/P | 431  |
| 17  | G1WIS    | 9920   | 64   | 32   | GW4VEQ   | 369  |
| 18  | G1OGY    | 9824   | 79   | 32   | GM4RZW/P | 480  |
| 19  | G3YSX    | 9792   | 81   | 32   | GW6XOA   | 344  |
| 20  | G3NSY    | 9124   | 58   | 58   | GM4RZW/P | 310  |
| 21  | G7AVG    | 5304   | 68   | 24   | GW4VEQ   | 382  |
| 22  | G6MXL    | 3894   | 29   | 22   | GW4VEQ   | 327  |
| 23  | G8YGD    | 3734   | 46   | 26   | PE1EWR   | 268  |
| 24  | G8TJZ    | 2412   | 22   | 18   | G4VRL/P  | 397  |
| 25  | G1UAX    | 1860   | 39   | 15   | G8LNC/P  | 319  |
| 26  | G8XYN    | 1360   | 22   | 17   | G4SSO    | 229  |
| 27  | G2DHV    | 960    | 18   | 20   | GW0CDA/P | 280  |
| 28  | G6YLW    | 816    | 39   | 14   | G8LNC/P  | 328  |

## Section O - All other stations

| Pos | CallSign | Score  | QSOs | Mult | Best DX  | km  |
|-----|----------|--------|------|------|----------|-----|
| 1   | GM4RZW/P | 197877 | 232  | 71   | GU1WDT   | 663 |
| 2   | GW4MGR/P | 164695 | 315  | 68   | PA3CWZ   | 606 |
| 3   | G3GQC/P  | 155361 | 327  | 63   | FC1MDZ   | 583 |
| 4   | G8LNC/P  | 149464 | 221  | 68   | GM0FRT/P | 701 |
| 5   | G4VRL/P  | 135072 | 192  | 63   | GM0FRT/P | 714 |
| 6   | GM0CLN/P | 129290 | 169  | 70   | GU1WDT   | 600 |
| 7   | G4RBP/P  | 11932  | 256  | 62   | GM0FRT/P | 649 |
| 8   | G1DVU/P  | 86966  | 224  | 59   | F1FEN/P  | 733 |
| 9   | G1YMF/P  | 85196  | 175  | 56   | GJ7AOG/P | 562 |
| 10  | G4KOT/P  | 70272  | 135  | 64   | GU1AOG/P | 573 |
| 11  | GW8LNR/P | 68882  | 231  | 52   | ON4KST   | 540 |
| 12  | G4TDL/P  | 67032  | 173  | 56   | G1JKX/P  | 493 |
| 13  | G0GRI/P  | 64655  | 173  | 67   | GM0FRT/P | 631 |
| 14  | GM0FRT/P | 62883  | 87   | 51   | G3VXM    | 759 |
| 15  | G3RRS/A  | 61620  | 163  | 62   | GM0FRT/P | 648 |

| Pos | Station | Points | QSO | Mult | Best DX  | km  |
|-----|---------|--------|-----|------|----------|-----|
| 16  | G4SKA/P | 58708  | 163 | 52   | PA0CIS   | 552 |
| 17  | G6ARC/P | 54520  | 179 | 58   | PA3AKM   | 517 |
| 18  | G4CZZ/P | 52800  | 177 | 56   | GM0FRT/P | 568 |
| 19  | G0AEI/P | 49816  | 162 | 52   | GM4RZW/P | 464 |
| 20  | G3FKF/P | 46540  | 153 | 52   | GM0CLN/P | 440 |
| 21  | G4CRA/P | 44976  | 155 | 48   | GM4RZW/P | 493 |
| 22  | G1DWQ/P | 42848  | 136 | 52   | GM4RZW/P | 538 |
| 23  | G4ORC/P | 42718  | 164 | 53   | G6HHS    | 339 |
| 24  | G8YMD/P | 41376  | 113 | 48   | GM0CLN/P | 535 |
| 25  | G8ZHP   | 40194  | 135 | 42   | F6GIF    | 471 |
| 26  | G1SAS/P | 36340  | 144 | 46   | GM0FRT/P | 573 |
| 27  | G6CTU/P | 33528  | 156 | 44   | E12GK    | 459 |
| 28  | G4EQD   | 28776  | 94  | 44   | ON1CDQ   | 441 |
| 29  | G4SSD   | 28014  | 78  | 42   | PA0CIS   | 576 |
| 30  | G8PNN/A | 26480  | 81  | 40   | G8LNC/P  | 518 |
| 31  | G8KGI/P | 23848  | 102 | 44   | GM4RZW/P | 520 |
| 32  | G6GLR   | 20592  | 70  | 36   | G3VRL    | 570 |
| 33  | G1CRH/P | 17667  | 65  | 39   | GM0FRT/P | 515 |
| 34  | G0INF/P | 12441  | 94  | 33   | GM0FRT/P | 389 |
| 35  | G1AYM/P | 11760  | 68  | 35   | GM0FRT/P | 556 |
| 36  | G4CW    | 11286  | 82  | 33   | GM0CLN/P | 463 |
| 37  | G0EVT   | 10890  | 46  | 33   | G3VRL/P  | 408 |
| 38  | G4XOM/P | 9947   | 79  | 29   | GM4RZW/P | 319 |
| 39  | G4DAR   | 9360   | 104 | 30   | GM0FRT/P | 492 |
| 40  | G1XRC/P | 6318   | 30  | 27   | GM0CLN/P | 464 |

## ROPOCO 2 CONTEST RESULTS

This year the HFCC were unable to get the results out in time for the HF Convention and the trophy presentation, as the postal strike hit the incoming mail. The deadline for logs was extended to give all a fair chance. Even with this problem, there were only three fewer logs than last year.

Congratulations to Phil G4OBK using the call of the Central Lancs ARC-G0FDX, for working the most stations. Unfortunately the loss of two points denied him the trophy. There were twice as many perfect logs this year even though some of the postal codes were unbelievable. G4OBK awards the prize to I3ZI. One person commented that the contest was hard work, as he wasn't accustomed to having to think. Others thought too hard and corrected the post codes before they re-transmitted them!

The trophy goes, as usual to the person with the highest scoring most accurate log, and this year Dave G4BUO will be awarded the G3XTJ memorial trophy and miniature. Well done Dave.

The diversity of rigs used by the top three stations was complemented by the uniformity of antenna systems. G0FDX used a TS930s, G4BWP an IC761 and G4BUO a Ten tec OMNI D, all used inverted Vs at differing heights. Not much feedback on conditions was received, George GM3UM thought activity was low at the beginning of the contest and it picked up towards the end. He also heard no other GM stations. Let us hope we hear you all on in Ropoco 1 in the spring. G4JKS

| Pos | CallSign | Checked score | Pos | CallSign | Checked score |
|-----|----------|---------------|-----|----------|---------------|
| 1   | G0FDX    | 658**         | 23  | G0CGB    | 398           |
| 2   | G4BWP    | 636**         | 24  | G31GU    | 378           |
| 3   | G4BUO    | 610*†         | 25  | G4KW1    | 376           |
| 4   | G3JKS    | 548           | 26  | G0CKP    | 368           |
| 5   | G4IUZ    | 536           | 27  | G0IVZ    | 364           |
| 6   | G3VYI    | 534           | 28  | G3HKO    | 364           |
| 7   | G3SJJ    | 530*          | 29  | G4XPE    | 360           |
| 8   | G3NOM    | 506           | 30  | G3MCX    | 336           |
| 9   | G3JJZ    | 500           | 31  | G3AWL    | 306           |
| 10  | G0EOW    | 496           | 32  | GM3UM    | 300*          |
| 11  | G4OGB    | 486           | 33  | G3CQR    | 298           |
| 12  | G4BOU    | 480*          | 34  | G3JSR    | 274           |
| 13  | G4CWH    | 468           | 35  | G4HSD    | 270           |
| 14  | G3GLL    | 468           | 36  | G4PTE    | 266           |
| 15  | G4UOL    | 466           | 37  | G0ATR    | 256           |
| 16  | G4KGL    | 464           | 38  | G4KLQ    | 246           |
| 17  | G3GC     | 456           | 39  | G3GMS    | 226           |
| 18  | G2AFV    | 446           | 40  | GW3JB    | 220*          |
| 19  | G3MA     | 426           | 41  | G0JNS    | 184           |
| 20  | G3MCK    | 420*          | 42  | G4CSB    | 122           |
| 21  | G0DJF    | 410*          | 43  | G4PVB    | 80*           |
| 22  | G3JJG    | 408           |     |          |               |

Check logs received with thanks from G3HJF, G0HJD.

\* = Perfect Logs

† = Trophy winner

\*\* = Certificate

# CONTESTS CALENDAR RSGB HF CONTESTS

|            |  |
|------------|--|
| 1989       |  |
| 7 Jan      | 3-5MHz Cumulative  |
| 8 Jan      | 3-5MHz CW Affiliated Societies Team (Rules in October issue) |
| 8 Jan      | 7MHz Cumulative  |
| 9 Jan      | 1-8MHz Cumulative  |
| 14 Jan     | 7MHz Cumulative  |
| 15 Jan     | 3-5MHz Cumulative  |
| 17 Jan     | 1-8MHz Cumulative  |
| 21 Jan     | 3-5MHz Cumulative  |
| 22 Jan     | 7MHz Cumulative  |
| 25 Jan     | 1-8MHz Cumulative  |
| 28 Jan     | 7MHz Cumulative  |
| 29 Jan     | 3-5MHz Cumulative  |
| 2 Feb      | 1-8MHz Cumulative  |
| 4 Feb      | 3-5MHz Cumulative  |
| 5 Feb      | 7MHz Cumulative  |
| 10 Feb     | 1-8MHz Cumulative  |
| 11 Feb     | 1-8MHz CW  |
| 25, 26 Feb | 7MHz CW (Rules in October issue)                             |
| 11, 12 Mar | Commonwealth Contest   |
| 2 Apr      | Ropoco 1   |
| 10 Apr     | 28MHz Cumulative   |
| 16 Apr     | Low Power Fixed  |
| 18 Apr     | 28MHz Cumulative   |
| 26 Apr     | 28MHz Cumulative   |
| 4 May      | 28MHz Cumulative   |
| 12 May     | 28MHz Cumulative   |
| 21 May     | Region Roundup   |
| 3, 4 Jun   | NFD/Region 1 CW Field Day                                    |
| 24, 25 Jun | Summer 1-8MHz  |
| 8, 9 Jul   | SWL  |
| 16 Jul     | Low Power Field Day  |
| 6 Aug      | Ropoco 2   |
| 20 Aug     | Hopscotch  |
| 2, 3 Sep   | SSB Field Day  |
| 8 Oct      | 21/28MHz Phone   |
| 9 Oct      | 28MHz Cumulative   |
| 15 Oct     | 21MHz CW   |
| 17 Oct     | 28MHz Cumulative   |
| 25 Oct     | 28MHz Cumulative   |
| 2 Nov      | 28MHz Cumulative   |
| 10 Nov     | 28MHz Cumulative   |
| 11 Nov     | 1-8MHz SSB Clubs   |
| 18, 19 Nov | Second 1-8 MHz CW  |

Region Roundup and Hopscotch are under review and may be replaced with similar type events. Please watch RadCom for further information

## RSGB VHF CONTESTS

|            |  |
|------------|--|
| 1 Dec      | 1-3/2-3GHz Cumulative (Rules in August issue)        |
| 4 Dec      | 144MHz Fixed and AFS and SWL (Rules in August issue) |
| 9 Dec      | 432MHz Cumulative (Rules in August issue)            |
| 11 Dec     | 70MHz CW (Rules in August issue)                     |
| 17 Dec     | 1-3/2-3GHz Cumulative (Rules in August issue)        |
| 1989       |  |
| 29 Jan     | 70MHz Cumulative                                     |
| 5 Feb      | 432MHz Fixed & AFS & SWL                             |
| 12 Feb     | 70MHz Cumulative                                     |
| 26 Feb     | 70MHz Cumulative                                     |
| 4, 5 Mar   | 144/432MHz & SWL                                     |
| 12 Mar     | 70MHz Cumulative                                     |
| 26 Mar     | 70MHz Cumulative                                     |
| 9 Apr      | 50MHz Fixed  |
| 9 Apr      | 10GHz Cumulative                                     |
| 6, 7 May   | 432MHz-24GHz Trophy Contests & SWL                   |
| 14 May     | 10GHz Cumulative                                     |
| 27, 28 May | 144MHz & SWL   |
| 18 Jun     | 50MHz Trophy & SWL                                   |
| 25 Jun     | 10GHz Cumulative                                     |
| 1, 2 Jul   | 70MHz Cumulative                                     |
| 16 Jul     | 10GHz Cumulative                                     |
| 5 Aug      | 144MHz Low Power & SWL                               |
| 6 Aug      | 432MHz Low Power & SWL                               |
| 13 Aug     | 10GHz Cumulative                                     |
| 2, 3 Sep   | 144MHz Trophy/1ARU VHF & SWL                         |
| 10 Sep     | 10GHz Cumulative                                     |
| 17 Sep     | 70MHz Trophy & SWL                                   |
| 7, 8 Oct   | 432MHz-24GHz/1ARU UHF/SHF                            |
| 13 Oct     | 432MHz Cumulative                                    |
| 21 Oct     | 1-3/2-3GHz Cumulative                                |
| 29 Oct     | 432MHz Cumulative                                    |
| 4, 5 Nov   | 144MHz CW  |
| 6 Nov      | 1-3/2-3GHz Cumulative                                |
| 14 Nov     | 432MHz Cumulative                                    |
| 22 Nov     | 1-3/2-3GHz Cumulative                                |
| 30 Nov     | 432MHz Cumulative                                    |
| 3 Dec      | 144MHz Fixed & AFS & SWL                             |
| 8 Dec      | 1-3/2-3GHz Cumulative                                |
| 9 Dec      | 50MHz CW   |
| 10 Dec     | 70MHz CW   |

## GRIMSBY DF QUALIFYING EVENT

It has been seventeen years since The Grimsby Amateur Radio Society last ran a qualifying event and were gratified in having a fine warm day to be welcomed back.

Station 'A' operated by G4EBK and G0IOR was 13 Kilometers from the start and located on the bank of a wide tidal estuary which empties into the River Humber. Station 'B' was only 8.5 kilometres away in the opposite direction where G4HZF and G3RXP were concealed in a very boggy wood. Good signals were heard at the start from both stations and the fifteen teams divided into more or less equal numbers in their pursuit of the station they preferred to locate first.

D. Newman was first to arrive at the 'B' station at 1410 and was soon followed by two other competitors; the first to arrive at the 'A' station did so at 1428. There was little or no natural cover at the 'A' station, but it was half an hour's walk along the bank of the estuary before reaching the transmitter, and also difficult to determine on which bank it was located. As usual a number of teams chose the wrong bank and were faced with a long trek to get to the opposite side. One brave young competitor attempted to get across over a 10-inch diameter pipe that spanned the river, the applause was generous when the inevitable happened and he got wet, undeterred he ran to the hidden station only to find that they could not get the soggy piece of paper that he presented to take pen or pencil!

Forty-seven competitors and members enjoyed a splendid tea organised by Xyls of Grimsby ARS members and the usual prize giving closed a very pleasant afternoon's sport. G3TRY

|     |            | Time of arrival |             |
|-----|------------|-----------------|-------------|
| Pos | Name       | Club            | Stn A Stn B |
| 1   | C Plummer  | Mid-Thames      | 1458 1415   |
| 2   | G Whenham  | Coventry        | 1508 1417   |
| 3   | D Newman   | Northampton     | 1509 1410   |
| 4   | A Malbon   | Mid-Thames      | 1524 1433   |
| 5   | A Williams | RSGB            | 1526 1434   |
| 6   | W Pechey   | Mid-Thames      | 1527 1442   |
| 7   | B Bristow  | Mid-Thames      | 1438 1539   |
| 8   | A Collett  | RSGB            | 1434 1543   |
| 9   | G Foster   | Stratford       | 1428 1543   |
| 10  | C Wells    | S Manchester    | 1438 1549   |
| 11  | C Metcalf  | Mid-Thames      | 1604 1437   |
| 12  | G Nichols  | Banbury         | 1441 1607   |
| 13  | T Gage     | Mid-Thames      | 1612 1411   |
| 14  | J Bland    | Grimsby         | - 1418      |

One competitor did not find either station.

D Newman and A Malbon qualify for the National Final in September.

## 432MHZ LOW POWER AND SWL CONTEST RESULTS

Having just completed the first session of the 1988 cumulatives on the band, as this is being written the adjudicator understands the feelings of contestants who found propagation poor in the low power contest.

The usual comments that the band was very quiet, flat, poor with low activity were much in evidence, but then one should not compare 432MHz with 144MHz under average weather conditions, even if the day was fine and sunny.

G6DBX (SXW) noted the Emley Moor beacon 539 early morning but non-existent by the end of the contest. G3JJZ (LDN) noted similar conditions.

G8LNC/P Victory Contest Group (DVN) gave up by mid-day with 29 QSOs, obviously very demoralised by having just worked GW4MGR/P with 75 QSOs a few minutes earlier and threatened not to participate next year.

A plea for stations to beam in the SW direction maybe appropriate at this stage. It will give stations another multiplier. Also do not forget the continent, ON's and PA0's were there. Despite the poor conditions in the southern part of England GW4MGR/P passed no comments at all on the contest and persevered to lead the all other section with G3GQC/P (Derbyshire) being the runner-up, both with a reasonable QSO - multiplier rate for the band. G7ABI (Northamptonshire) amassed an unassailable lead to win the fixed section from G4ZTR (ESX). Congratulations and certificates to these leading stations as well as to BRS32525 in winning and supporting the listener section. G8HHI

## Listener Section

| Psn | Stn      | Pts | QSO | Multi | Loc    | Best DX  | k m |
|-----|----------|-----|-----|-------|--------|----------|-----|
| 1   | BRS32525 | 561 | 15  | 8     | JO02AL | GW4MGR/P | 280 |

Check logs acknowledged with thanks from G6MXL and PE1EWR.

## CONTESTS CALENDAR OTHER CONTESTS

|            |  |
|------------|--|
| 26, 27 Nov | CQWW DX Contest (cw)                               |
| 3, 4 Dec   | URE DX Contest (cw)                                |
| 3, 4 Dec   | ARRL 160 Metre Contest (cw)                        |
| 10, 11 Dec | ARRL 10 Metre Contest                              |
| 1989       |  |
| 1 Jan      | Happy New Year CW Contest (see December issue)     |
| 14, 15 Jan | White Rose LF Bands CW/SSB (see December SWL col.) |
| 14 Jan     | Mid-Winter Contest CW (see December issue)         |
| 15 Jan     | Mid-Winter Contest SSB (see December issue)        |

### FIXED STATIONS SECTION

| Pos | Call Sign | Pts   | QSO's | Multi | Loc    | Best DX  | km  |
|-----|-----------|-------|-------|-------|--------|----------|-----|
| 1   | G7AB1     | 16380 | 84    | 39    | IO92MC | GM0FRT/P | 548 |
| 2   | G4ZTR     | 4725  | 37    | 21    | JO01LV | G8LNC/P  | 367 |
| 3   | G0HAS     | 3552  | 32    | 24    | IO91BN | G0EVT    | 242 |
| 4   | G6HKM     | 2340  | 32    | 15    | JO01FT | PA3EKJ   | 295 |
| 5   | G4DFI     | 1998  | 29    | 16    | JO01BL | G8LNC/P  | 290 |
| 6   | G1OGY     | 1517  | 31    | 16    | JO01GR | GW4MGR/P | 290 |
| 7   | G0EVT     | 1485  | 17    | 15    | IO93GR | G1CWP/P  | 328 |
| 8   | G8JXV     | 1456  | 23    | 16    | IO91VE | GW4MGR/P | 289 |
| 9   | G7AVG     | 1064  | 28    | 14    | IO91XD | G1GHA    | 194 |
| 10  | G6DBX     | 952   | 26    | 14    | IO90WX | G3GQC/P  | 258 |
| 11  | G3JJZ     | 762   | 19    | 13    | JO01AJ | GW4MGR/P | 086 |
| 12  | G6YLV     | 600   | 25    | 15    | JO01HI | G8LNC/P  | 328 |
| 13  | G8YLN     | 342   | 14    | 9     | IO91OM | G3FKF/P  | 103 |
| 14  | G3YSX     | 280   | 14    | 10    | IO91WF | G3FKF/P  | 135 |

### ALL OTHER STATIONS SECTION

| Pos | Call Sign | Pts   | QSO's | Multi | Loc    | Best DX  | km  |
|-----|-----------|-------|-------|-------|--------|----------|-----|
| 1   | GW4MGR/P  | 31410 | 101   | 45    | IO83JA | ON1CAK   | 557 |
| 2   | G3GQC/P   | 20131 | 78    | 41    | IO93EC | ON1CAK   | 466 |
| 3   | G6CSY/P   | 13464 | 84    | 34    | JO01BH | G1GATZ   | 540 |
| 4   | G3FKF/P   | 12576 | 66    | 32    | IO81XA | PA0FRE   | 462 |
| 5   | G1CWP/P   | 9990  | 61    | 30    | IO90WV | GM4RAH/P | 554 |
| 6   | GW6LNR/P  | 9270  | 65    | 30    | IO81KW | G4FUF    | 550 |
| 7   | G6ARC/P   | 8265  | 53    | 29    | IO92FM | PA0FRE   | 413 |
| 8   | GM4RAH/P  | 8100  | 26    | 27    | IO85DJ | G1CWP    | 554 |
| 9   | G0GJV/P   | 6682  | 45    | 26    | IO80ST | PA0FRE   | 496 |
| 10  | G8LNC/P   | 6630  | 29    | 26    | IO80AQ | GM4RAH/P | 524 |
| 11  | G1SAS/P   | 5497  | 55    | 23    | JO02BA | PA3EKJ   | 311 |
| 12  | G6YLV/P   | 5232  | 56    | 24    | IO91QT | PE1HLZ   | 391 |
| 13  | G4XOW/P   | 4554  | 40    | 23    | IO82NN | GM4RAH/P | 319 |
| 14  | G6CTU/P   | 2924  | 62    | 17    | IO91XG | G8LNC/P  | 282 |
| 15  | G3GXU/P   | 2820  | 35    | 20    | IO93AO | G6CSY/P  | 291 |
| 16  | G8KGP/P   | 2709  | 35    | 21    | IO90KX | G3GQC/P  | 239 |
| 17  | G4CW      | 2286  | 29    | 18    | JO01BK | PE1HLZ   | 351 |
| 18  | GM0FRT/P  | 1918  | 11    | 14    | IO86RW | G7ABI    | 546 |
| 19  | G4SSD     | 603   | 11    | 9     | IO80FJ | G7ABI    | 298 |

## LOW POWER FIELD DAY 1988 RESULTS

The month of July used to be noted for those long hot summer days; no longer it seems. This year's event again brought comments about high winds and driving rain. Perhaps we should hold all field days in January!

The Houston Fergus trophy goes to G4JBD/P who achieved first place in section A after several years of perseverance. Section B winner G0BRC/P is the first recipient of the recently donated Southgate trophy and a certificate of merit goes to G4ARI, one of the contests stalwarts but not /P this year, for his contribution of 24 contacts with portable stations.

Whilst support for Section B held up well despite the appalling weather conditions, there was a notable lack of entries in section A, no doubt due to the rule changes excluding equipment with standard 100W output capability. Discussions have been held with several members of the UK QRP fraternity and it is hoped that designs for an outboard PA will be published in RadCom well before next year's event.

Logs were generally good with just two notable exceptions, each computerised but with a distinct lack of care with in-contest and post-contest administration. Points were deducted on all logs using the same criteria as last year's event. An 'e' omitted from the end of a place name would result in the loss of one third of claimed points for that contact.

Several comments were received on the identification of fixed QRP stations. Your adjudicator accepts this is somewhat vague and will endeavour to clarify for next year's event. Otherwise the rule changes have been well received and it is hoped that no further 'tuning' will be required.

Late news - information has been received on kits for a 10W and 3W solid state PA which would appear to make a suitable outboard amplifier. These kits are available from CirKit Distribution Ltd and are also used in the modular multi-band transceiver as described in G3TSO's HF multi-band transceiver which appeared in October and November Rad Coms. G3SJJ

### Narrowband Section

| Pos | Call Sign  | Score | QSO | Best DX  | kms |
|-----|------------|-------|-----|----------|-----|
| 1   | G6KZP/P    | 2502  | 21  | GW8KQW/P | 231 |
| 2   | F6DPH/P    | 2080  | 16  | F6CGB/P  | 375 |
| 3   | G8LSD/P    | 1509  | 18  | GW8KQW/P | 231 |
| 4   | G3YGF/P    | 1461  | 11  | GW8KQW/P | 231 |
| 5   | G3JMB/P    | 1408  | 19  | G8KQW/P  | 197 |
| 6   | F8WN/P     | 1368  | 12  | G8LSD/P  | 176 |
| 7   | G3GRO/P    | 506   | 6   | G6KZP/P  | 156 |
| 8   | G(W)8IFT/P | 489   | 6   | G8KQW/A  | 274 |
| 9   | GU4EFT/P   | 195   | 1   | G6KZP/P  | 195 |
| 10  | G8IFT      | 62    | 1   | G8KQW/P  | 62  |

## FIRST 1.8MHz CONTEST 1989 RULES

1 Date and time: 2100gmt Saturday 11 February to 0100gmt Sunday 12 February 1989.

2 Sections: Single-operator entries only. British Isles entrants must be members of RSGB. (a) British Isles (b) Overseas (including EI).

3 Band and mode: 1820kHz - 1870kHz, cw only.

4 Exchange: RST plus serial number starting 001. British Isles stations must also give their county code.

5 Scoring:

(a) British Isles section: three points for each completed contact, with a bonus of five points for the first contact with each British Isles county and for the first contact with each country outside the British Isles. (b) Overseas Section: three points for a contact with a station in the British Isles (not EI), with a bonus of five points for the first contact with each British Isles county.

6 Documentation: Logs to be headed: date/gmt; call sign; RST/number sent; RST/number received; code received; bonus; points. Duplicates must be clearly marked without claim for points. Unmarked duplicates will be penalised at the rate of 10 times number of points claimed, and 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.

7 Name and address for entries: Address logs to "HF Contests Committee" as follows: British Isles entrants to J. C. Burbanks, G3SJJ, "Southlands", 16 Cotgrave Road, Plumtree, Nottingham NG12 5NX. Overseas entrants to PO Box 73, Lichfield, Staffs WS13 6UJ, England.

8 Date for entries: Logs must be post-marked not later than 15 days after the end of the contest.

9 Awards:

(a) The Somerset Trophy will be awarded to the winning station in the British Isles section, and certificates of merit to second and third placed entrants.

(b) The Maitland Trophy will be awarded to the Scottish entrant with the highest aggregate number of points in this contest combined with the Second 1.8MHz Contest 1988.

(c) Certificates of merit will be sent to the first three stations in the overseas section.

(d) A certificate of merit will be awarded to the highest placed log from an entrant who has not previously entered any RSGB hf contest. Candidates for this award should mark their entry "First-Time Award".

10 Receiving section:

(1) Transmitting section rules 1, 2, 3, 5, 6, 7, 8, 9 will apply.

(2) A station may appear only once 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/time gmt; call sign of station heard; RST/serial number/county code sent by that station; call sign of station being worked.

(3) Certificates of merit will be awarded to the leading three entrants.

(4) Holders of UK Class B licences may enter the receiving section.

11 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 tabulations. If any entrant objects to this they must clearly state their objection on the cover sheet.

## AN ERROR HAS OCCURRED...

In last month's Rad Com the LF CW 3.5MHz Cumulative Contest (1.8, 3.5 and 7MHz) Rules, the frequencies should have read that all contacts are to be made 'between 3520 and 3550'.

# VHF NFD 1988

## THE RESULTS

After last year's excellent weather and conditions, the normal British summer re-asserted itself with a very deep low pressure system bringing wind, rain and thunderstorms, with corresponding poor conditions. Many of the comments made suggested problems with static rain, and one or two unlucky groups suffered some damage from nearby lightning discharges, although no direct strikes were reported. Only stations in the far North West had reasonable weather.

With poor conditions the lower frequency bands were hectic. Activity on 70MHz was good, and although the cw leg could have been better supported, the overall number of contacts made was up on last year. 144MHz gave most groups their major opportunity to pile up contacts, although numbers worked were down – to almost half last year's record tallies. The uhf bands were adversely affected with lower scores and numbers of contacts this year.

### OVERALL RESULTS – OPEN SECTION

| Posn | Group/Club                  | Score | Band Positions |         |         |             |
|------|-----------------------------|-------|----------------|---------|---------|-------------|
|      |                             |       | 70 MHz         | 144 MHz | 432 MHz | 1-3/2-3 GHz |
| 1    | The Hillbillies             | 3310  | 3              | 1       | 5       | 1           |
| 2    | Parallel Lines CG           | 3305  | 16             | 2       | 1       | 2           |
| 3    | MacAdders & Sheppey W CG    | 3001  | 2              | 6       | 3       | 5           |
| 4    | Wulfrun CG                  | 2769  | 5              | 4       | 2       | 3           |
| 5    | HADRABS & TARTS CG          | 2574  | 7              | 3       | 7       | 4           |
| 6    | S of Scotland VHF/UHF CG    | 2550  | 1              | 5       | 6       | 24          |
| 7    | Flight Refuelling ARS       | 1946  | 4              | 8       | 8       | 13          |
| 8    | Scunthorpe VHF CG           | 1772  | 12             | 14      | 13      | 6           |
| 9    | Victory, CRA & Clockwork CG | 1703  | 10             | 9       | 10      | 17          |
| 10   | Bracknell ARC               | 1693  | 6              | 22      | 16      | 8           |
| 11   | Ridgeway CG                 | 1662  | 23             | 20      | 11      | 7           |
| 12   | S Manchester RC             | 1608  | 21             | 13      | 17      | 9           |
| 13   | Exmoor RC                   | 1491  | 27             | 56      | 4       | 11          |
| 14   | Leicester Poly SU ARS       | 1440  | 14             | 11      | 26      | 12          |
| 15   | Horsham ARC                 | 1412  | 22             | 10      | 18      | 19          |
| 16   | Salop ARS                   | 1288  | 24             | 24      | 15      | 23          |
| 17   | Crawley & Reigate           | 1270  | 30             | 23      | 14      | 20          |
| 18   | Reading & D ARC             | 1257  | 11             | 25      | 24      | 18          |
| 19   | Windmill CG                 | 1254  | 13             | —       | 12      | 10          |
| 20   | Isle of Man ARS CG          | 1123  | 8              | 15      | 27      | —           |
| 21   | Southdown ARS               | 1101  | 18             | 18      | 22      | —           |
| 22   | Colchester RA               | 1034  | 29             | 19      | 19      | —           |
| 23   | Hastings E & RC             | 1029  | 28             | 17      | 23      | —           |
| 24   | Hull & Hornsea CG           | 1021  | 9              | 43      | 30      | 15          |
| 25   | Clifton ARS                 | 999   | 26             | 21      | —       | 16          |
| 26   | Aberdeen VHF Group          | 952   | 25             | 16      | 36      | 33          |
| 27   | Ariel Radio G Brookmans Pk  | 947   | —              | 33      | 9       | 14          |
| 28   | Farnborough & D RS          | 833   | 37             | 32      | 20      | 28          |
| 29   | Newquay & D RS              | 810   | 15             | 26      | 45      | —           |
| 30   | Surrey Radio Contact C      | 769   | 39             | 29      | 31      | 26          |
| 31   | Watford CG                  | 745   | 34             | 28      | 32      | —           |
| 32   | Galloway CG                 | 744   | 40             | 7       | —       | —           |
| 33   | Northern Heights ARS        | 681   | 38             | 44      | 28      | 22          |
| 34   | Mid Cheshire ARS            | 665   | 19             | 40      | 40      | —           |
| 35   | 11th Hour CG                | 664   | 45             | 34      | 25      | 21          |
| 36   | White Rose RS               | 652   | 20             | 47      | 39      | 32          |
| 37   | Verulam ARC                 | 540   | 31             | 42      | 43      | —           |
| 38   | Jersey AEC                  | 530   | —              | 12      | 48      | —           |
| 39   | Southgate ARC               | 463   | 35             | 53      | —       | 25          |
| 40   | Macclesfield & D RS         | 463   | —              | 35      | 21      | —           |
| 41   | Doncaster ARS               | 456   | 42             | 41      | 33      | 29          |
| 42   | Stamford & D ARS            | 448   | 43             | 37      | 34      | —           |
| 43   | Gt Yarmouth ARC             | 421   | 33             | 48      | —       | —           |
| 44   | Stevenage CG                | 419   | 48             | 27      | 37      | —           |
| 45   | Maidenhead & D ARC          | 409   | 32             | —       | —       | 27          |
| 46   | Bury St Edmunds RS CG       | 308   | —              | 30      | —       | 30          |
| 47   | Ellesmere Port & D ARS      | 296   | 41             | 46      | —       | —           |
| 48   | Vale of Glamorgan A DXers   | 256   | 47             | 45      | 41      | 31          |
| 49   | Grimsby ARS                 | 253   | 46             | 49      | 47      | —           |
| 50   | NW of Ireland ARS           | 231   | 44             | 51      | 51      | —           |
| 51   | Spalding & D ARS            | 188   | —              | 39      | 49      | —           |
| 52   | Strood DX G                 | 156   | —              | 55      | 42      | —           |
| 53   | Botchill House Trust ARS    | 152   | —              | 52      | 44      | —           |
| 54   | English China Clays RC      | 105   | —              | 50      | 53      | —           |
| 55   | South Devon RC              | 93    | —              | 54      | —       | —           |
| 56   | Cheshunt & D ARC            | 69    | —              | 56      | 49      | —           |
| 57   | Hawick Station              | 56    | —              | 58      | 52      | —           |

### OVERALL RESULTS – RESTRICTED SECTION

| Posn | Group/Club                 | Score | Band Positions |         |         |         |
|------|----------------------------|-------|----------------|---------|---------|---------|
|      |                            |       | 70 MHz         | 144 MHz | 432 MHz | 1-3 GHz |
| 1    | Warrington RC & CG         | 3602  | 3              | 1       | 1       | 2       |
| 2    | East Kent RS               | 2677  | 8              | 4       | 5       | 1       |
| 3    | Wirral & D ARC             | 2410  | 1              | 2       | 2       | —       |
| 4    | S Birmingham RS            | 2258  | 13             | 17      | 3       | 3       |
| 5    | The Splinters              | 2116  | 6              | 3       | 14      | 5       |
| 6    | LRS & RATS                 | 2100  | 11             | 11      | 8       | 4       |
| 7    | Guildford & DRS & UOS EARS | 1880  | 9              | 15      | 11      | 6       |
| 8    | Sheffield & D ARS          | 1546  | 20             | 20      | 15      | 7       |
| 9    | Telford & D ARS            | 1457  | 4              | —       | 9       | 10      |
| 10   | Kidderminster & D ARS      | 1440  | 14             | 14      | 4       | —       |
| 11   | North Kent RS              | 1404  | 16             | 21      | 16      | 9       |
| 12   | Sutton & Cheam RS          | 1384  | 23             | 6       | 10      | 12      |
| 13   | Preston ARS                | 1357  | 2              | 34      | 25      | —       |
| 14   | Edinburgh & D ARC          | 1356  | 10             | 8       | 24      | 23      |
| 15   | Plymouth RC                | 1238  | 5              | 10      | 26      | —       |
| 16   | Five Bells                 | 1220  | 21             | 27      | 20      | 8       |
| 17   | Torbay ARS                 | 1178  | 7              | 16      | 33      | 22      |
| 18   | Bristol & Shirehampton ARC | 1133  | 35             | 9       | 6       | 13      |
| 19   | Goole R & ES               | 1066  | 27             | 7       | 12      | —       |
| 20   | Cambridge & D ARC          | 1039  | 30             | 12      | 18      | 11      |
| 21   | Edgware & D RS             | 1037  | 15             | 18      | 36      | 15      |
| 22   | Basingstoke ARC            | 1021  | 18             | 26      | 19      | 14      |
| 23   | Bristol CG                 | 1019  | 34             | 19      | 7       | 19      |
| 24   | Nunsfield House ARG        | 951   | 17             | 28      | 29      | 16      |
| 25   | Anglesey CG                | 885   | 25             | 5       | 39      | —       |
| 26   | South Lakeland ARS         | 785   | 12             | 24      | —       | —       |
| 27   | Bishops Cleeve ARC         | 761   | 24             | 22      | 28      | —       |
| 28   | RS of Harrow               | 752   | 26             | 31      | 27      | 24      |
| 29   | Burton on Trent & D RS     | 714   | 31             | 23      | 30      | 21      |
| 30   | Darwen ARC                 | 709   | 19             | 30      | 35      | —       |
| 31   | West Kent ARS              | 706   | 28             | 25      | 21      | —       |
| 32   | Three Counties ARC         | 682   | —              | 13      | 17      | —       |
| 33   | Wimbledon & Coulsdon ARS   | 561   | 32             | 32      | 37      | 20      |
| 34   | Edenbridge ARS             | 555   | 36             | 37      | 23      | —       |
| 35   | Oldham CG                  | 506   | 22             | 29      | —       | —       |
| 36   | Dorking & D RS             | 487   | 29             | 44      | 31      | —       |
| 37   | Thornton Cleveleys ARS     | 452   | 39             | 39      | 32      | 18      |
| 38   | The Marie Celeste          | 451   | —              | —       | 13      | 17      |
| 39   | West of Scotland ARS       | 432   | 33             | 33      | 41      | 25      |
| 40   | Nene Valley RC             | 430   | —              | 38      | 22      | —       |
| 41   | Bracon                     | 395   | 37             | 40      | 38      | —       |
| 42   | Hannington 'A' Team        | 316   | —              | 36      | 34      | —       |
| 43   | Weston-Super-Mare RS       | 256   | —              | 35      | 40      | —       |
| 44   | Ripon & D ARS              | 214   | —              | 41      | 44      | —       |
| 45   | Mexborough & D ARS         | 212   | —              | 42      | 43      | —       |
| 46   | Dartmoor RC                | 207   | —              | 43      | 45      | —       |
| 47   | GM3TAL                     | 104   | 38             | —       | 42      | —       |
| 48   | Spenn Valley ARS           | 86    | —              | 45      | 47      | —       |

### OVERALL RESULTS – SWL SECTION

| Posn | Listener | Score | Band Positions |         |         |         |
|------|----------|-------|----------------|---------|---------|---------|
|      |          |       | 70 MHz         | 144 MHz | 432 MHz | 1-3 GHz |
| 1    | BRS52543 | 1241  | 2              | 3       | 2       | —       |
| 2    | BRS31976 | 704   | —              | 2       | 3       | —       |

OPEN SECTION WINNER  
OPEN SECTION RUNNER UP  
RESTRICTED SECTION WINNER  
RESTRICTED SECTION RUNNER UP  
SWL SECTION WINNER

The Hillbillies  
Parallel Lines CG  
Warrington RC & CG  
East Kent RS  
Martin Parry BRS552543

#### OPEN SECTION

70MHz GM3WOJ/P  
144MHz G4APA/P  
432MHz G4CLA/P  
Microwave G4HWA/P  
Leading GM MacAdders & Sheppey CG  
GW Wulfrun CG  
GD Isle of Man ARS  
GI NW of Ireland ARS  
GJ Jersey AEC

#### RESTRICTED SECTION

70MHz GW3UVR/P  
144MHz G3CKR/P  
432MHz G8XVJ/P  
Microwave G4ICM/P  
Leading GM Edinburgh & District ARC  
GW Wirral & District ARC

Despite the change in conditions from last year, the same stations were very much in contention for the top placings in each section. In the Restricted section the Warrington Group showed that a central site is no disadvantage, winning by a large margin over East Kent Radio Society who could not capitalise on their coastal site to the same extent as last year. The Wirral and District Amateur Radio Club did well to take third spot despite only being active on the lower three bands.

The Open section was won by the Hillbillies for the second year in succession, but only by the smallest margin. Close checking of their logs found few errors and did not change their overall position. Considering the poor conditions the Hillbillies did very well to win the Microwave section from such a Northerly site. Runners-up the Parallel Lines Contest Group were let down by a relatively low placing on 70MHz. In third place the MacAdders and Sheppey Contest Group went up to Scotland to make a challenge for the Open section which almost paid off.

#### EQUIPMENT USED BY LEADING STATIONS ON 70MHz

| OPEN SECTION       | Transmitter                                | Receiver                       | Antenna                         |
|--------------------|--|--------------------------------|---------------------------------|
| GM3WOJ/P           | IC730+Transverter<br>+ 4CX250B PA          | IC730+ Transverter<br>3N204 RF | 14 ele @ 40'<br>QTH 450' ASL    |
| GM4BVY/P           | FT7+Transverter<br>+ 4CX250B PA            | FT7+Transverter<br>40622 RF    | 2 x 7 ele @ 10m<br>QTH 197m ASL |
| G3TZT/P            | FT221R+Transverter<br>+ 4CX250B PA         | FT221R+Transverter<br>BFT66 RF | 12 ele @ 15m<br>QTH 260m ASL    |
| RESTRICTED SECTION | Transmitter                                | Receiver                       | Antenna                         |
| GW3UVR/P           | TS430+Transverter<br>+ 4CX250B PA          | TS430+Transverter              | 6 ele @ 10m<br>QTH 600m ASL     |
| G3SYA/P            | FT101+Transverter<br>+ 2N5102 PA           | FT101+Transverter              | 4 ele @ 9m<br>QTH 457m ASL      |
| G0CDA/P            | TS130S+Transverter<br>+ Solid State 25W PA | TS130S+Transverter             | 7 ele @ 10m<br>QTH 465m ASL     |

#### 70 MHz RESULTS - OPEN SECTION

| Posn | Callsign(P) | CW Section Points | Phone Points | Section Points | Total QSOs | Total Loc |
|------|-------------|-------------------|--------------|----------------|------------|-----------|
| 1    | GM3WOJ      | 951               | 1005         | 1956           | 215        | 74NP      |
| 2    | GM4BVY      | 953               | 900          | 1853           | 208        | 74WV      |
| 3    | G3TZT       | 554               | 1196         | 1750           | 166        | 94RJ      |
| 4    | G3PFM       | 634               | 1085         | 1719           | 188        | 90WP      |
| 5    | GW4PBP      | 567               | 1064         | 1621           | 212        | 83KB      |
| 6    | G3UAX       | 635               | 889          | 1524           | 170        | 80ST      |
| 7    | G4BUW       | 570               | 902          | 1472           | 144        | 80CO      |
| 8    | GD3FLH      | 628               | 741          | 1369           | 122        | 74QD      |
| 9    | G4EKT       | 548               | 818          | 1366           | 167        | 93RS      |
| 10   | G0ERS       | 513               | 850          | 1363           | 193        | 90MX      |
| 11   | G3WGV       | 538               | 787          | 1325           | 199        | 91IH      |
| 12   | G4ERG       | 531               | 743          | 1274           | 162        | 93UK      |
| 13   | G3GRS       | 610               | 658          | 1268           | 154        | 01LD      |
| 14   | G3ORY       | 528               | 702          | 1230           | 202        | 92NP      |
| 15   | G4ADV       | 471               | 757          | 1228           | 102        | 70PP      |
| 16   | G4HNS       | 502               | 689          | 1191           | 155        | 03BF      |
| 17   | G3SJV       | 551               | 628          | 1179           | -          | 00DR      |
| 18   | G4CAX       | 482               | 679          | 1161           | 157        | 83PF      |
| 19   | G3PSM       | 564               | 589          | 1153           | 131        | 94CB      |
| 20   | G4HON       | 454               | 673          | 1127           | 173        | 93EH      |
| 21   | G3SWC       | 527               | 587          | 1114           | 165        | 90SV      |
| 22   | G5RP        | 481               | 618          | 1099           | 169        | 91FN      |
| 23   | G3NSY       | 459               | 622          | 1081           | 169        | 82QL      |
| 24   | GM4ZUK      | 420               | 639          | 1059           | 59         | 86RW      |
| 25   | G3JKY       | 407               | 640          | 1047           | 163        | 01DH      |
| 26   | G4RVJ       | 368               | 611          | 979            | 113        | 81CC      |
| 27   | G3YF        | 380               | 589          | 969            | 131        | 00HU      |
| 28   | G3YAJ       | 362               | 578          | 940            | 144        | 01JW      |
| 29   | G4MEL       | 464               | 443          | 907            | 103        | 01OC      |
| 30   | G3LXP       | 404               | 500          | 904            | 154        | 91SR      |
| 31   | G3TWG       | 388               | 453          | 841            | 147        | 91PN      |
| 32   | G3VKM       | 423               | 411          | 834            | 83         | 02VP      |
| 33   | G3YLG       | 365               | 469          | 834            | 154        | 91PS      |
| 34   | G3KTZ       | 332               | 372          | 704            | 129        | 91MA      |
| 35   | G0ETU       | 220               | 471          | 691            | -          | 91PS      |
| 36   | G4DKN       | 342               | 330          | 672            | 118        | 91OF      |
| 37   | G4GAK       | 384               | 228          | 612            | 90         | 93BS      |
| 38   | G4WAY       | 278               | 292          | 570            | 91         | 01JP      |
| 39   | GM0BQM      | 192               | 258          | 450            | 48         | 84AT      |
| 40   | GW4WSE      | 107               | 340          | 447            | 79         | 83JG      |
| 41   | G0GTI       | 0                 | 408          | 408            | 60         | 93JK      |
| 42   | G4OSJ       | 105               | 260          | 365            | 76         | 92PN      |
| 43   | GI4ONL      | 111               | 223          | 334            | 28         | 64LX      |
| 44   | G3NAT       | 0                 | 254          | 254            | 50         | 91XG      |
| 45   | G4KAL       | 102               | 138          | 240            | 47         | 93VJ      |
| 46   | GW0JCB      | 32                | 0            | 32             | 6          | 82FH      |
| 47   | G0HOP       | 0                 | 2            | 2              | 2          | 91TW      |

Checklogs gratefully acknowledged from: G2DHV, G3NKS  
Disqualified: GW4PUP/P (VHF NFD Rule 10a)

#### 70 MHz RESULTS - SWL SECTION

| Posn | Callsign | Points | QSOs | Loc  |
|------|----------|--------|------|------|
| 1    | BRS32525 | 326    | -    | 01AL |
| 2    | BRS52543 | 187    | 27   | 83LT |

#### 70 MHz RESULTS - RESTRICTED SECTION

| Posn | Callsign(P) | CW Section Points | Phone Points | Section Points | Total QSOs | Total Loc |
|------|-------------|-------------------|--------------|----------------|------------|-----------|
| 1    | GW3UVR      | 667               | 1312         | 1979           | 242        | 83JA      |
| 2    | G3SYA       | 792               | 1044         | 1836           | 193        | 84SA      |
| 3    | G0CDA       | 542               | 929          | 1471           | 214        | 93AD      |
| 4    | G3UKV       | 588               | 812          | 1400           | 206        | 82RP      |
| 5    | G3ULN       | 574               | 613          | 1187           | 113        | 80AQ      |
| 6    | G4CIZ       | 409               | 762          | 1171           | 181        | 91GI      |
| 7    | G3LHJ       | 502               | 666          | 1168           | 122        | 80FN      |
| 8    | G3LTY       | 470               | 561          | 1131           | 131        | 01OI      |
| 9    | G4CWH       | 505               | 614          | 1119           | 167        | 91XG      |
| 10   | GM3RFQ      | 539               | 541          | 1080           | 86         | 85DJ      |
| 11   | G3HYH       | 484               | 577          | 1061           | 181        | 92MO      |
| 12   | G3IZD       | 369               | 685          | 1054           | 118        | 84KG      |
| 13   | G4EYD       | 435               | 596          | 1031           | 170        | 82XJ      |
| 14   | G4GXP       | 405               | 593          | 998            | 66         | 82RJ      |
| 15   | G4IUZ       | 356               | 552          | 908            | 154        | 91VR      |
| 16   | G3WMR       | 383               | 499          | 882            | 143        | 01BH      |
| 17   | G3EEO       | 413               | 379          | 792            | 136        | 93BA      |
| 18   | G3ZOI       | 327               | 426          | 753            | 130        | 91KF      |
| 19   | G2AKK       | 277               | 452          | 729            | 101        | 83SQ      |
| 20   | G3WRJ       | 288               | 427          | 715            | 131        | 92VB      |
| 21   | G4EMK       | 227               | 397          | 624            | 102        | 92TR      |
| 22   | G4ORC       | 132               | 437          | 569            | 87         | 93AO      |
| 23   | G3DCZ       | 229               | 293          | 522            | 98         | 93AC      |
| 24   | G3TVW       | 247               | 272          | 519            | 93         | 01CW      |
| 25   | GW4BZD      | 266               | 251          | 517            | 61         | 73SG      |
| 26   | G4JNZ       | 3                 | 455          | 458            | 75         | 90XV      |
| 27   | G0EAT       | 19                | 426          | 445            | 58         | 93PW      |
| 28   | G3WKS       | 170               | 252          | 422            | 104        | 01EC      |
| 29   | G4PNA       | 135               | 227          | 362            | 85         | 91UG      |
| 30   | G2XV        | 73                | 257          | 330            | 70         | 02AD      |
| 31   | G4XKL       | 100               | 224          | 324            | 62         | 92BV      |
| 32   | G3WIM       | 89                | 224          | 313            | 79         | 91VG      |
| 33   | GM4PHG      | 83                | 227          | 310            | 28         | 75QS      |
| 34   | G0GRG       | 74                | 219          | 293            | 53         | 81QJ      |
| 35   | G4FRO       | 0                 | 287          | 287            | 48         | 81TK      |
| 36   | G0EID       | 92                | 156          | 248            | 68         | 01AH      |
| 37   | G4XQW       | 32                | 213          | 245            | 51         | 82XI      |
| 38   | GM3TAL      | 61                | 20           | 81             | 10         | 75IU      |
| 39   | G4ATH       | 5                 | 0            | 5              | 3          | 83LU      |

## EQUIPMENT USED BY LEADING STATIONS ON 144MHZ

| OPEN SECTION       |   |   |   |
|--------------------|---|---|---|
| G4APA/P            | Transmitter<br>FT101ZD + Mutek<br>+ 2 x 4CX250B | Receiver<br>FT101ZD + Mutek<br>+ FT221R | Antenna<br>4 x 9 ele @ 16m<br>4 x 17 ele @ 16m<br>QTH 260m ASL<br>100 ele @ 15m<br>QTH 100m ASL         |
| G4LIP/P            | TS700G<br>+ 2 x 4CX250B                         | TS700G BF981 RF                         |   |
| RESTRICTED SECTION |   |   |   |
| G3CKR/P            | Transmitter<br>IC735 + Mutek<br>+ Tokyo PA      | Receiver<br>IC735 + Mutek<br>MGF1200 RF | Antenna<br>19 ele @ 10m<br>QTH 465m ASL<br>16 ele @ 10m<br>QTH 600m ASL<br>19 ele @ 10m<br>QTH 100m ASL |
| GW4MGR/P           | TS430 + MM Xvtr                                 | TS430 + MM Xvtr                         |   |
| G6EKR/P            | IC275   | IC275                                   |   |

The RSGB Regional Liaison Officers plus members of the Contest Committee undertook some 47 inspections this year, including the majority of the leading stations in each section. In one or two cases the inspector was not entirely happy, but could not find a specific breach of the rules. Contestants are reminded that they must be able to demonstrate to an inspector that they are operating within the rules, which means that power measuring equipment must be available and in use. The use of amplifiers with excessive power capability was more apparent in the Restricted section than the Open section. There is no real justification for devices capable of more than 50W output when a 25W limit is in force.

The inspectors were made to feel welcome by the groups inspected, and thanks go to them all for volunteering for a weekend of driving and walking round their local hill tops.

A number of bad signal complaints were received. Most were isolated incidents not corroborated by other stations, but one disqualification resulted where three independent complaints from entrants were received and there was no acknowledgement of complaints being received in the log of the station involved.

Although very few comments on the subject of 50MHz in VHF NFD were received with the logs, discussions at the NEC shortly after VHF NFD indicated that 50MHz should be considered for 1989. One option under discussion is to have an 8-hour all mode 50MHz section on the Saturday evening, followed by an all mode 70MHz section on the Sunday. This would not increase the overall number of operators needed, and would permit one mast to be used for 50 and 70MHz. On the other hand, some groups may not have 50MHz equipment available, and it does add extra complexity to the event. What are your views? Please write to G3XDY (QTHR) before January 1989 so that next year's event reflects your wishes.

Subject to ratification by Council, the Surrey Trophy will be awarded to the Hillbillies group for the second year in succession. The Arthur Watts Trophy will go to the Warrington Radio Club and Contest Group, and the Tartan Trophy to the MacAdders and Sheppey Contest Group, putting a

## 144 MHz RESULTS - OPEN SECTION

| Posn | Call sign(P) | Points | QSOs | Loc  | Pwr | Ant   | Best DX  | km  |
|------|--------------|--------|------|------|-----|-------|----------|-----|
| 1    | G4APA        | 8614   | 638  | 94RJ | 400 | 4X17  | DF6Y     | 869 |
| 2    | G4LIP        | 7960   | 603  | 03BF | 400 | 100   | OZ1SMA/P | 830 |
| 3    | G4PUB        | 7770   | 643  | 80CO | 400 | 2X16  | DF0CT/P  | 908 |
| 4    | GW3XBY       | 6466   | 634  | 83KB | 400 | 2X17  | DF0RV/P  | 832 |
| 5    | GM3WCS       | 6229   | 487  | 74NP | 400 | 2X16  | F6CTT/P  | 784 |
| 6    | GM4ZAP       | 6035   | 484  | 74WV | 400 | 4X19  | FC1BCD/P | 904 |
| 7    | GM0CLN       | 5070   | 420  | 84AT | 400 | 4X14  | F6CTT/P  | 780 |
| 8    | G4RFR        | 4833   | 436  | 80WP | 400 | 2X19  | Y46CI    | 865 |
| 9    | G8LNC        | 4560   | 486  | 90MX | 400 | 4X19  | DF0CT/P  | 712 |
| 10   | G4HRS        | 4538   | 514  | 90SV | 400 | 2X14  | FF6KQY/P | 876 |
| 11   | G3SDC        | 4474   | 511  | 92NP | 400 | 2X14  | FF6KQV/P | 740 |
| 12   | GJ1TJP       | 4243   | 341  | 89WF | 300 | 16    | GM0FRT/P | 857 |
| 13   | G8SMR        | 4210   | 486  | 93EH | 250 | 2X17  | DF5VL/P  | 905 |
| 14   | G4CDC        | 4128   | 405  | 93UK | 400 | 2X11  | F6EKG    | 760 |
| 15   | GD4IOM       | 4108   | 369  | 74QD | 400 | 2X17  | FC1XS/P  | 735 |
| 16   | GM0FRT       | 3994   | 266  | 88RW | 400 | 17    | GJ1TJP/P | 857 |
| 17   | G6HH         | 3956   | 406  | 00HU | 400 | 17    | DL3LB    | 752 |
| 18   | G1KAR        | 3818   | 350  | 00DR | 300 | 2X16  | DL0NO/P  | 746 |
| 19   | G4CRA        | 3660   | 348  | 01WJ | 400 | 2X21  | DF9VU/P  | 710 |
| 20   | G3PIA        | 3550   | 401  | 91FN | 400 | 2X17  | DL8PD/A  | 756 |
| 21   | G3GHN        | 3497   | 435  | 01DH | 350 | 2X19  | HB9N/P   | 659 |
| 22   | G4BRA        | 3492   | 403  | 80ST | 150 | 2X17  | DD0ZU/P  | 826 |
| 23   | G3WSC        | 3440   | 316  | 01OC | 400 | 2X16  | FF2LLY/P | 738 |
| 24   | G3SRT        | 3278   | 456  | 82QL | 400 | 2X19  | F2FX/P   | 963 |
| 25   | G4CCC        | 3235   | 456  | 91IH | 400 | 17+13 | DL3BAK   | 713 |
| 26   | G4LXS        | 2882   | 284  | 70PP | 250 | 19    | GM8SVB/P | 791 |
| 27   | G4VAT        | 2694   | 375  | 91TW | 180 | 4X9   | F6EKG/P  | 695 |
| 28   | G4VCO        | 2670   | 400  | 91PS | 400 | 18    | DL3LAL   | 740 |
| 29   | G4DDY        | 2546   | 280  | 01JP | 350 | 16    | Y23PP    | 826 |
| 30   | G6BSE        | 2480   | 274  | 02HE | 100 | 16    | DF0XX/P  | 647 |
| 31   | G4RSE        | 2167   | 284  | 01EN | 100 | 19    | E17DJ/P  | 631 |
| 32   | G0FRS        | 2131   | 334  | 91OF | 150 | 2X16  | DF0CT/P  | 704 |
| 33   | G2LO         | 1895   | 328  | 91RU | 100 | 2X8   | GM8SVB/P | 663 |
| 34   | G4AVV        | 1819   | 329  | 91XG | 250 | 19    | GM0FRT/P | 651 |
| 35   | G1MWS        | 1792   | 345  | 83WE | 100 | 2X10  | F6CTT/P  | 582 |
| 36   | G3MDG        | 1735   | 318  | 91PS | 400 | 19    | GM8SVB/P | 663 |
| 37   | G4FPQ        | 1723   | 219  | 92PN | 100 | 18    | DK1JM    | 681 |
| 38   | G1DSP        | 1450   | 172  | 80AQ | 10  | 17    | DK0GM/P  | 803 |
| 39   | G3ZTT        | 1434   | 230  | 83PF | 200 | 17    | F6CTT/P  | 591 |
| 40   | G0ITW        | 1380   | 190  | 93JK | 160 | 17    | DL3KO/P  | 840 |
| 41   | G3VER        | 1372   | 242  | 91SR | 160 | 4X14  | DL8PC/A  | 683 |
| 42   | G8GBY        | 1337   | 197  | 93RS | 350 | 17    | E17DJ/P  | 584 |
| 43   | G2SU         | 1256   | 216  | 93BS | 400 | 2X10  | PA0PB    | 579 |
| 44   | GW8NVN       | 1255   | 163  | 82FH | 80  | 10    | PA3DSB   | 609 |
| 45   | GW3CSA       | 1221   | 227  | 83JG | 25  | 17    | GM8SVB/P | 489 |
| 46   | G8LVQ        | 1166   | 170  | 94CB | 350 | -     | F6KBF/P  | -   |
| 47   | G3YRC        | 1154   | 107  | 02VP | 70  | 8     | G8TRS/P  | 775 |
| 48   | G3CNX        | 1112   | 167  | 93VJ | 100 | 2X8/8 | DF5VL/P  | 674 |
| 49   | G0ECC        | 885    | 100  | 70OG | 150 | 2X8/8 | F6EKG/P  | 768 |
| 50   | G13CFH       | 856    | 67   | 64LX | 100 | 17    | G0FBB/P  | 683 |
| 51   | G0EMU        | 842    | 104  | 80DO | 200 | 9     | F6EKG/P  | 938 |
| 52   | G3SFG        | 840    | 182  | 91MA | 100 | 2X16  | -        | -   |
| 53   | G4SSD        | 804    | 100  | 80BL | 160 | 2X17  | PE1LBX   | 622 |
| 54   | G1OFM        | 722    | 110  | 01IL | 10  | 17    | G1AGTY/P | 561 |
| 55   | G6OPW        | 575    | 72   | 81CC | 10  | 16    | F6EKG/P  | 743 |
| 56   | G4ECT        | 446    | 94   | 91XQ | 200 | 16    | DK0SE/P  | 472 |
| 57   | GM1JKJ       | 353    | 33   | 85PJ | 100 | 6     | G4LXS/P  | 544 |

Checklogs gratefully acknowledged from: G8ZRE, G8XTV, G6DZH, G4OUT, G1YTY, G2DHV, G1GGT/P, G3WXP/P, G0ERA/P, G4RBP/P, G4RBP/P.  
Disqualified: GW0CCR/P (VHF NFD Rule 10a) G0FBB/P, G3ZME/P (General Rule 3).

## 144 MHz RESULTS - SWL SECTION

| Posn | Call sign | Points | QSOs | Loc  |
|------|-----------|--------|------|------|
| 1    | BR532525  | 695    | 110  | 01AL |
| 2    | BR531976  | 343    | 55   | 01HO |
| 3    | BR52543   | 7      | 21   | 83LT |

## 144 MHz RESULTS - RESTRICTED SECTION

| Posn | Call sign(P) | Points | QSOs | Loc  | Pwr | Ant | Best DX  | km  |
|------|--------------|--------|------|------|-----|-----|----------|-----|
| 1    | G3CKR        | 3856   | 484  | 93AD | 25  | 19  | F6EKG/P  | 794 |
| 2    | GW4MGR       | 2946   | 398  | 83JA | 25  | 16  | DK0SE/P  | 736 |
| 3    | G3WOI        | 2304   | 342  | 91GI | 25  | 17  | FF6EQV/P | 702 |
| 4    | G6EKR        | 2092   | 222  | 01OI | 25  | 19  | DF3SE    | 640 |
| 5    | GW4VEQ       | 2044   | 215  | 73SG | 25  | 8   | -        | -   |
| 6    | G4ADM        | 2004   | 332  | 93AC | 25  | 14  | F6EKG/P  | 792 |
| 7    | G0GLE        | 1902   | 231  | 93PW | 25  | 17  | F6CTT/P  | 665 |
| 8    | GM4HAM       | 1872   | 206  | 85DJ | 25  | 17  | ON4ASL/A | 706 |
| 9    | G4AHG        | 1586   | 263  | 81TK | 20  | 17  | GM0FRT/P | 611 |
| 10   | G3PRC        | 1566   | 172  | 80AQ | 10  | 17  | DK0GM/P  | 803 |
| 11   | G4APD        | 1463   | 262  | 92MO | 25  | 16  | E17M/P   | 570 |
| 12   | G8EYV        | 1449   | 177  | 02AD | 25  | 17  | E17DJ/P  | 603 |
| 13   | G4WWR        | 1435   | 274  | 91ME | 25  | 17  | GM0FRT/P | 647 |
| 14   | G5RS         | 1359   | 220  | 91XG | 25  | 17  | DK3UZ    | 724 |
| 15   | G3NJA        | 1306   | 158  | 80FM | 25  | 17  | DJ0SE/P  | 422 |
| 16   | G1OHM        | 1296   | 263  | 82XJ | 10  | 19  | PA0GUS/P | 511 |
| 17   | G3ASR        | 1286   | 181  | 91VR | 25  | 13  | E17M/P   | 617 |
| 18   | G4WAW        | 1263   | 255  | 81QJ | 25  | 18  | -        | -   |
| 19   | G3FJE        | 1197   | 181  | 92VB | 25  | -   | DL0CK/P  | 532 |
| 20   | G4CW         | 1121   | 212  | 01BH | 25  | 19  | -        | -   |
| 21   | G5ZG         | 1083   | 141  | 01CW | 25  | 13  | E17M/P   | 647 |
| 22   | G3NFC        | 1004   | 158  | 92BV | 10  | -   | PA3CEG/P | 558 |
| 23   | G6LKB        | 970    | 149  | 84KG | 10  | 13  | FA1LIX/P | 611 |
| 24   | G1WKS        | 896    | 126  | 01EC | 12  | 19  | DK9JK    | 534 |
| 25   | G3TCR        | 885    | 137  | 91KF | 25  | 17  | -        | -   |
| 26   | G8NWM        | 870    | 104  | 92TR | 25  | 16  | DF5VL/P  | 638 |
| 27   | G3ZBI        | 845    | 150  | 93BA | 10  | 13  | PA3BLS   | 457 |
| 28   | G1ORC        | 842    | 144  | 93AO | 10  | 17  | DF0RE    | 648 |
| 29   | G4JS         | 820    | 133  | 83SQ | 10  | 18  | FA1LIX/P | 532 |
| 30   | G3EFX        | 815    | 145  | 90XV | 25  | 16  | GM4ZAP/P | 522 |
| 31   | G4FUR        | 780    | 162  | 91VG | 25  | 8/8 | F6EKG/P  | 559 |
| 32   | GM4AGG       | 767    | 90   | 75QS | 25  | 8/8 | FF6KBF/P | 752 |
| 33   | G3KUE        | 752    | 102  | 84SA | 25  | 13  | F6CTT/P  | 676 |
| 34   | G4WSM        | 704    | 90   | 81PH | 25  | 10  | DL0RG    | 659 |
| 35   | G8PHN        | 695    | 113  | 01GP | 10  | 10  | GM3WCS/P | 500 |
| 36   | G0JCC        | 688    | 146  | 01AH | 25  | 17  | GM3WCS/P | 495 |
| 37   | G4NWZ        | 686    | 110  | 92PG | 25  | 14  | GM0FRT/P | 532 |
| 38   | G6GMW        | 671    | 115  | 83LU | 10  | 16  | FA1LIX/P | 571 |
| 39   | G4XOT        | 663    | 133  | 82XI | 10  | 14  | GM0FRT/P | 510 |
| 40   | G1WCY        | 600    | 71   | 94DD | 17  | 17  | GJ1TJP/P | 566 |
| 41   | G4BTS        | 587    | 116  | 93JN | 10  | 23  | DL0WU    | 625 |
| 42   | G1RCD        | 573    | 75   | 70XN | 25  | 17  | PE0MAR/P | 588 |
| 43   | G3CZU        | 443    | 91   | 91UG | 25  | 13  | GM3WCS/P | 484 |
| 44   | G3SVC        | 255    | 49   | 93DH | 25  | 16  | -        | -   |
| 45   | GW0IRP       | 254    | 31   | 81EP | 10  | 4   | FF6KBF   | 525 |

# **EQUIPMENT USED BY LEADING STATIONS ON 432MHZ**

## **OPEN SECTION**

|          | Transmitter         | Receiver        | Antenna                           |
|----------|---------------------|-----------------|-----------------------------------|
| G4CLA/P  | TS770 + 2 x 4CX250B | TS770 + MGF1402 | 12 x 21 ele @ 15m<br>QTH 100m ASL |
| GW8KQW/P | TS811E + 3CX800A7   | BFQ69 + TS811E  | 8 x 19 ele @ 10m<br>QTH 549m ASL  |
| GM8TFI/P | TS707 + 2 x 4CX250B | TS780 + MGF1402 | 8 x 19 ele @ 15m<br>QTH 196m ASL  |

## **RESTRICTED SECTION**

|          | Transmitter                        | Receiver            | Antenna                      |
|----------|------------------------------------|---------------------|------------------------------|
| G8XVJ/P  | TS780 + MM 50W PA                  | TS780 + MGF1402     | 21 ele @ 10m<br>QTH 465m ASL |
| GW0DVP/P | FT221 + Transverter<br>+ MM 50W PA | FT221 + Transverter | 21 ele @ 10m<br>QTH 600m ASL |
| G8OHM/P  | IC402 + 7289 PA                    | IC402 + MGF1202     | 21 ele @ 9m<br>QTH 290m ASL  |

new name on this trophy for the first time in many years. In the SWL Section the lack of a summary sheet meant that BRS32525 was not eligible for the overall award, which this year goes to Martin Parry BRS52543. Congratulations to them and also to the winners and runners up on each band, and the country winners, who will all receive certificates. A special Jubilee Certificate will also go to all Affiliated Societies that took part. G3XDY

## **70MHz**

This year's VHF NFD saw very poor conditions and generally awful weather. Both were especially bad during the cw section; one station commented that he thought he had lost his front end until propagation returned to something like normal on the Sunday phone session. During the cw section most stations were working contacts right until the end of the session, showing they were time limited. During the phone section many contacts were made in the last hour showing again the timings were just about correct.

All entrants who commented mentioned heavy QRN and S9+ static rain. Only those in the North had any weather like 1987 VHF NFD, with Scottish stations having warm dry weather until the last few hours whereas G0HOP reported "sunny, cloudy, dry, rain, hail, and windy, all in all a typical summer's weekend" (well, 1988 style anyway).

Overall comments were favourable on the content and style of the event, no entrants asking for the inclusion of 6 metres and only one group asking for the option of dropping either 4m or 13cm making VHF NFD a four-band event. Possibly they should enter the four band restricted section. The adjudicator suspects most stations are having difficulty supplying equipment and manning 4/5 stations without the inclusion of a fifth or sixth band. Your comments please to help shape VHF NFD 1989.

Activity was quite high this year with many new call signs appearing in the logs. Four metres seems to have become quite popular and this has

## **432 MHz RESULTS - OPEN SECTION**

| Posn | Callsign(P) | Points | QSOs | Loc  | Best DX  | km  |
|------|-------------|--------|------|------|----------|-----|
| 1    | G4CLA       | 3086   | 290  | 03BF | DK6AS    | 721 |
| 2    | GW8KQW      | 2508   | 305  | 83KB | DF0DA/P  | 751 |
| 3    | GM8TFI      | 2389   | 200  | 74WV | PA0EZ    | 683 |
| 4    | G4HGU       | 2339   | 236  | 81CC | DA1UM    | 795 |
| 5    | G4THB       | 2185   | 182  | 94RJ | DH0FAP/P | 833 |
| 6    | GM4TXX      | 2112   | 177  | 74NP | PA3EKJ   | 669 |
| 7    | G4JAR       | 1662   | 178  | 80CO | PA0PB    | 735 |
| 8    | G0FRR       | 1600   | 189  | 80WP | GM4CAN/P | 700 |
| 9    | G4IXT       | 1515   | 236  | 91RU | DK9VD/A  | 588 |
| 10   | G1KMI       | 1467   | 201  | 90MX | GM4CAN/P | 670 |
| 11   | G3SEK       | 1459   | 200  | 91FN | DK3FB    | 637 |
| 12   | G4FAM       | 1392   | 172  | 01LD | DG6BM    | 588 |
| 13   | G0JRB       | 1282   | 171  | 93UK | DJ9DL    | 568 |
| 14   | G5LK        | 1187   | 135  | 01OC | GM4TXX/P | 566 |
| 15   | G1SPU       | 1177   | 209  | 82QL | DK9VD/A  | 723 |
| 16   | G4TDL       | 1144   | 158  | 80ST | PA0GUS/P | 501 |
| 17   | G3FVA       | 1079   | 172  | 93EH | DK0JK/P  | 721 |
| 18   | G3WZT       | 985    | 159  | 90SV | DA1UM    | 565 |
| 19   | G4WFR       | 882    | 113  | 01JW | DL6WU    | 597 |
| 20   | G6FRS       | 804    | 154  | 91OF | DJ9DL    | 552 |
| 21   | G1GYC       | 788    | 144  | 83WE | GM4CAN/P | 418 |
| 22   | G3WQK       | 777    | 110  | 00DR | DL0FH/P  | 608 |
| 23   | G1HHH       | 731    | 107  | 00HU | GM4TXX/P | 561 |
| 24   | G0CCC       | 722    | 153  | 91IH | PI4EME   | 547 |
| 25   | G6CSY       | 621    | 143  | 91XG | GM4TXX/P | 495 |
| 26   | G6IFU       | 600    | 127  | 92NP | PA0PLY   | 402 |
| 27   | GD4GNH      | 541    | 55   | 74QD | G0DCG/P  | 473 |
| 28   | G4EMW       | 519    | 85   | 93BS | G4JAR/P  | 442 |
| 29   | G1MDG       | 499    | 119  | 91PS | GM8TFI/P | 415 |
| 30   | G3AMW       | 497    | 85   | 93RS | PE0MAR/P | 371 |
| 31   | G3ZPB       | 486    | 81   | 01JP | GM4TXX/P | 503 |
| 32   | G6YLJ       | 456    | 122  | 91PS | DA1UM    | 579 |
| 33   | G8JJR       | 401    | 74   | 93JK | GM4CAN/P | 402 |
| 34   | G6AFT       | 376    | 91   | 92NP | PA0PLY   | 391 |
| 35   | G6YLW       | 349    | 72   | 01HI | GM8TFI/P | 505 |
| 36   | GM4CAN      | 334    | 25   | 86RW | G0FRR/P  | 700 |
| 37   | G0FCU       | 325    | 70   | 91TW | GM4TXX/P | 424 |
| 38   | G4MIC       | 318    | 49   | 94CB | PE0MAR/P | -   |
| 39   | G4ZTT       | 309    | 68   | 83PF | G5LK/P   | 357 |
| 40   | GW7AGW      | 243    | 36   | 82FH | PE0MAR/P | 524 |
| 41   | G1UXA       | 221    | 49   | 01IL | PA0GUS/P | 372 |
| 42   | G8VER       | 215    | 71   | 91SR | PE0MAR/P | 315 |
| 43   | G1ZBJ       | 167    | 31   | 80DO | PE0MAR/P | 564 |
| 44   | G0HXX       | 163    | 22   | 70PP | GM8TFI/P | 474 |
| 45   | G6RSE       | 163    | 48   | 01EN | G4HGU/P  | 293 |
| 46   | G4EBK       | 125    | 39   | 93VJ | GM4TXX/P | 332 |
| 47   | GJ6TMM      | 113    | 15   | 89WF | GM8TFI/P | 644 |
| 48   | G4DSP       | 63     | 18   | 02BV | PE0MAR/P | 298 |
| 49   | G6CRC       | 53     | 25   | 91XQ | G4HGU/P  | 262 |
| 50   | G4OUN       | 52     | 6    | 84LX | G4CLA/P  | 506 |
| 51   | GM1AQV      | 47     | 7    | 85PJ | EI2WW/P  | 338 |
| 52   | G4MXB       | 5      | 3    | 70OG | G8CMG    | 55  |

Checklog gratefully acknowledged from G6DZH

Disqualified: GW1RCC/P (VHF NFD Rule 10a) G0CDB/P, G3ZVW/P (General Rule 3) G0DCG/P (General Rule 13.19).

## **432 MHz RESULTS - SWL SECTION**

| Posn | Callsign | Points | QSOs | Loc  |
|------|----------|--------|------|------|
| 1    | BRS32525 | 138    | 36   | 01AL |
| 2    | BRS52543 | 78     | 17   | 83LT |
| 3    | BRS31976 | 29     | 14   | 01HO |

## **432 MHz RESULTS - RESTRICTED SECTION**

| Posn | Callsign(P) | Points | QSOs | Loc  | Best DX  | km  |
|------|-------------|--------|------|------|----------|-----|
| 1    | G8XVJ       | 1396   | 187  | 93AD | DK9VD/A  | 734 |
| 2    | GW0DVP      | 902    | 130  | 83JA | ON7WR/A  | 584 |
| 3    | G8OHM       | 795    | 146  | 83XJ | DK0VS/P  | 690 |
| 4    | G3LZT       | 787    | 150  | 82RJ | ON7WR/A  | 516 |
| 5    | G0EKR       | 785    | 101  | 01OI | DL2NO    | 554 |
| 6    | G3TAD       | 611    | 107  | 81TK | DL2KBB   | 596 |
| 7    | G4GCT       | 607    | 111  | 81QJ | ON7WR/A  | 496 |
| 8    | G3LRS       | 603    | 125  | 92MO | DK9BB/A  | 647 |
| 9    | G6ZME       | 601    | 108  | 82RP | PA0PLY   | 514 |
| 10   | G0BWW       | 575    | 125  | 93AC | PE0MAR/P | 454 |
| 11   | G8AHK       | 531    | 126  | 91XG | DL6UM/P  | 533 |
| 12   | G8HSG       | 486    | 66   | 93PW | G4JAR/P  | 447 |
| 13   | G4ILI       | 476    | 95   | 92CA | PA0PLY   | 466 |
| 14   | G4UHF       | 476    | 95   | 91GI | DJ9DL    | 598 |
| 15   | G4JLP       | 465    | 94   | 92VB | GM4TXX/P | 422 |
| 16   | G8TNK       | 437    | 103  | 01BH | GM4TXX/P | 499 |
| 17   | G6WWR       | 433    | 88   | 91ME | DJ9RX    | 742 |
| 18   | G6ASH       | 386    | 64   | 02AD | PA0PB    | 437 |
| 19   | G4XIP       | 382    | 100  | 91KF | GM4TXX/P | 455 |
| 20   | G4YHF       | 368    | 76   | 92TR | PI4EME   | 417 |
| 21   | G4RPQ       | 365    | 67   | 01EC | GM4TXX/P | 527 |
| 22   | G6GWZ       | 352    | 77   | 92PG | GM4TXX/P | 381 |
| 23   | G8PPQ       | 352    | 76   | 01AH | GM4TXX/P | 495 |
| 24   | GM4RZW      | 336    | 38   | 85DJ | G4JAR/P  | 533 |
| 25   | G8RIP       | 326    | 42   | 84SA | G6FAM/P  | 486 |
| 26   | G4HTD       | 324    | 51   | 80AQ | PE0MAR/P | 479 |
| 27   | G4AUF       | 321    | 66   | 90XV | GM8TFI/P | 522 |
| 28   | G4YWA       | 305    | 57   | 01CW | GM4TXX/P | 452 |
| 29   | G8KGC       | 303    | 63   | 93BA | PA0PLY   | 472 |
| 30   | G4SXE       | 285    | 64   | 92BV | PE0MAR/P | 420 |
| 31   | G6XVW       | 264    | 71   | 91UG | GM8TFI/P | 477 |
| 32   | G6WVG       | 231    | 52   | 83LU | G4FAM/P  | 404 |
| 33   | G8NJA       | 231    | 32   | 80FN | PE0MAR/P | 556 |
| 34   | G8PHN       | 190    | 46   | 01GP | G4HGU/P  | 305 |
| 35   | G1ECC       | 178    | 41   | 83SQ | G1KMI/P  | 317 |
| 36   | G4RMD       | 169    | 46   | 91VR | G4THB/P  | 297 |
| 37   | G6HC        | 141    | 41   | 91VG | PE0MAR/P | 309 |
| 38   | G1SEW       | 138    | 38   | 82XI | G4JAR/P  | 229 |
| 39   | GW0HGN      | 131    | 24   | 73SG | E15FK    | 315 |
| 40   | G4WSM       | 102    | 27   | 81PH | G4WFR/P  | 252 |
| 41   | GM0GAS      | 98     | 13   | 75QS | G4CLA/P  | 416 |
| 42   | GM3TAL      | 88     | 9    | 75IU | G4CLA/P  | 410 |
| 43   | G6FUM       | 84     | 23   | 93JM | G4HGU/P  | 321 |
| 44   | G4SJM       | 81     | 16   | 70XN | GM8TFI/P | 481 |
| 45   | G1RCD       | 81     | 18   | 94DD | PA0PLY   | 493 |
| 46   | GW3SSK      | 28     | 8    | 81EP | G4JAR/P  | 205 |
| 47   | G0HGL       | 28     | 11   | 93DH | GW8KQW/P | 116 |

# MICROWAVE RESULTS - OPEN SECTION

| Posn | Callsign(P) | Total | Loc  | Points | QSOs | Pwr | 1.3 GHz |      |      | 2.3 GHz |      |     |
|------|-------------|-------|------|--------|------|-----|---------|------|------|---------|------|-----|
|      |             |       |      |        |      |     | Points  | QSOs | Pwr  | Points  | QSOs | Pwr |
| 1    | G4HWA       | 1328  | 94RJ | 1024   | 92   | 300 | 304     | 28   | 100  |         |      |     |
| 2    | G4CBW       | 1290  | 03BF | 991    | 114  | 400 | 299     | 37   | 100  |         |      |     |
| 3    | GW8IFT      | 859   | 83KB | 721    | 100  | 100 | 138     | 20   | 15   |         |      |     |
| 4    | G0ALE       | 832   | 80CO | 772    | 69   | 400 | 60      | 9    | 35   |         |      |     |
| 5    | GM0FRE      | 745   | 74WV | 645    | 55   | 180 | 100     | 10   | 35   |         |      |     |
| 6    | G4CCH       | 584   | 93UK | 522    | 72   | 100 | 62      | 12   | 25   |         |      |     |
| 7    | G3NNG       | 530   | 91FN | 433    | 74   | 180 | 97      | 20   | 30   |         |      |     |
| 8    | G4DDN       | 522   | 80ST | 468    | 65   | 150 | 54      | 10   | 10   |         |      |     |
| 9    | G3UHF       | 506   | 93EH | 473    | 78   | 85  | 33      | 9    | 3.7  |         |      |     |
| 10   | G8XIR       | 487   | 01LD | 481    | 68   | 200 | 6       | 2    | .025 |         |      |     |
| 11   | G4JKN       | 437   | 81CC | 374    | 37   | 160 | 63      | 10   | 64   |         |      |     |
| 12   | G4OQR       | 404   | 92NP | 321    | 66   | 40  | 83      | 16   | 1    |         |      |     |
| 13   | G4WHO       | 366   | 80WP | 341    | 54   | 400 | 25      | 7    | 50   |         |      |     |
| 14   | G3YKI       | 313   | 91RU | 306    | 67   | 100 | 7       | 4    | .1   |         |      |     |
| 15   | G3ZTR       | 312   | 93RS | 291    | 50   | 40  | 21      | 7    | 20   |         |      |     |
| 16   | G3BSN       | 310   | 01DH | 297    | 59   | 80  | 13      | 5    | 30   |         |      |     |
| 17   | G8VOI       | 305   | 90MX | 234    | 52   | 35  | 71      | 15   | 2.5  |         |      |     |
| 18   | G3ULT       | 253   | 91IH | 234    | 66   | 50  | 19      | 7    | 2    |         |      |     |
| 19   | G3NPF       | 243   | 90SV | 243    | 50   | 50  |         |      |      |         |      |     |
| 20   | G3GRO       | 231   | 01OC | 231    | 33   | 100 |         |      |      |         |      |     |
| 21   | G4TAW       | 219   | 91XG | 155    | 46   | 25  | 64      | 14   | 3    |         |      |     |
| 22   | G4ENR       | 207   | 93BS | 207    | 35   | 30  |         |      |      |         |      |     |
| 23   | G0HCU       | 204   | 82QL | 204    | 48   | 100 |         |      |      |         |      |     |
| 24   | GM4BYF      | 190   | 74NP | 163    | 23   | 200 | 27      | 3    | 10   |         |      |     |
| 25   | G4AEZ       | 188   | 91MA | 163    | 36   | 4   | 25      | 7    | .5   |         |      |     |
| 26   | G8TB        | 160   | 01JP | 159    | 44   | 35  | 1       | 1    | 2    |         |      |     |
| 27   | G3VCT       | 159   | 91PN | 159    | 37   | 20  |         |      |      |         |      |     |
| 28   | G4FRS       | 125   | 91OF | 125    | 39   | 150 |         |      |      |         |      |     |
| 29   | G4CYA       | 34    | 93JK | 34     | 16   | .05 |         |      |      |         |      |     |
| 30   | G4UCW       | 29    | 02HE | 29     | 7    | 1   |         |      |      |         |      |     |
| 31   | GW8CMU      | 27    | 82FH | 27     | 6    | 4   |         |      |      |         |      |     |
| 32   | G3PYB       | 23    | 94CB | 23     | 8    | 2   |         |      |      |         |      |     |
| 33   | GM6MGS      | 21    | 86RW | 21     | 3    | 5   |         |      |      |         |      |     |

Checklog gratefully acknowledged from G8CHW

# MICROWAVE RESULTS - RESTRICTED SECTION

| Pos | Callsign(P) | Points | QSOs | Loc  | Pwr |
|-----|-------------|--------|------|------|-----|
| 1   | G4ICM       | 489    | 67   | 01OI | 25  |
| 2   | G4WDL       | 420    | 68   | 93AD | 20  |
| 3   | G3OHM       | 407    | 73   | 82XJ | 20  |
| 4   | G4JDI       | 368    | 68   | 92MO | 25  |
| 5   | G4PSU       | 286    | 63   | 91GI | 20  |
| 6   | G3IGQ       | 285    | 63   | 91XG | 25  |
| 7   | G4TXG       | 265    | 52   | 92VB | 20  |
| 8   | G4ODA       | 203    | 31   | 92TR | 25  |
| 9   | G8BHD       | 173    | 44   | 01BH | 1.2 |
| 10  | G3JKX       | 156    | 35   | 82RP | 20  |
| 11  | G6KWA       | 107    | 22   | 02AD | .15 |
| 12  | G0GZQ       | 92     | 32   | 93AC | 25  |
| 13  | G0CFM       | 68     | 18   | 81TK | 25  |
| 14  | G3CBU       | 67     | 23   | 91KF | 25  |
| 15  | G4RMD       | 60     | 23   | 91VR | 10  |
| 16  | G6KUI       | 56     | 26   | 93BA | 2   |
| 17  | G1EME       | 54     | 18   | 92CA | 2   |
| 18  | G8KBH       | 54     | 15   | 83LU | 1.3 |
| 19  | G0BCG       | 53     | 15   | 81QJ | 10  |
| 20  | G8WIM       | 49     | 20   | 91VG | 4   |
| 21  | G8OZP       | 42     | 17   | 92BV | 5   |
| 22  | G4ELZ       | 41     | 8    | 80FN | 10  |
| 23  | GM4RAH      | 41     | 7    | 85DJ | 10  |
| 24  | G6DOF       | 39     | 13   | 80CO | 1   |
| 25  | GM0GCG      | 3      | 2    | 75QS | 18  |

very hard with less continentals worked by lower powered or stations sited further away, with signals in and out of the QSB.

Logging inaccuracies lost many stations points and resultant table positions. Last year's comment, "It is essential for both parties to exchange and confirm both callsigns and other information accurately" again applied. In some instances computer printing or program errors and lack of checking before posting were also to blame.

Several comments were made about quality of signals, and it was pleasing to see that efforts were made by groups to note complaints in the log with the corrective action taken. In some cases close proximity of sites was accepted by groups as causing problems. In a contest such as this groups should also check compatibility of different members' equipment before the day, as in several cases technical problems were encountered and noted as problems, including a dud PP3 battery for alc control.

Congratulations to the winners and runners up in each section. G8HHI

# MICROWAVES

"Awful", "Abysmal", "Appalling", doubtless there are other words from the beginning of the dictionary that contestants could have used to describe conditions during this contest. Most contestants, particularly in the restricted section, found it very hard work, and, for many these were the worst conditions on the microwave bands that they had experienced. Low activity did not help.

Only one contestant sought a change in the rules, requesting that 13cm count as a separate band to take account of the effort made in setting up the station. There were no calls for the reintroduction of 13cm to the restricted section.

Little of interest was noted although GM0FRE/P reported that aircraft scatter was very prominent on all signals from southern England, peaking S9 for short periods.

To sum up: "A long hard slog", G4HWA/P: "Most dismal I can remember", G8TB/P. G4WAD

created a demand for commercial equipment. It is good to see many UK companies producing transverters for this most interesting band.

Congratulations again go to GM3WOJ/P for again winning the Open section, although GM4BVY/P gave them a good run for their money, also to GW3UVR/P for winning the restricted section with G3SYA/P as runner up. Certificates will go to all those mentioned. G8TFI

# 144MHz

The number of entrants this year was very similar to last year's event. However, the bad weather and static rain were responsible for the lack of contacts and difficulty in completing them.

Logging standards were abysmal, the main cause being incorrectly received callsigns (mainly /P). Remember that both stations lose all points for the contact for this type of error. To a lesser extent there were a large number of unmarked duplicates with a resultant loss of 10

times the claimed score. There has been a growing trend for stations to omit details on the cover sheets, eg power, antenna. Please remember to fill in all the details otherwise disqualification may occur.

It was encouraging to see stations logging comments received (good and bad) on the quality of signals. There were a few isolated comments, but generally no problems were encountered.

In the Open section the 4CX family of valves was prominent with 24 stations using various combinations of them. Fifteen stations were using solid state amplifiers, and only two stations were used very large valve PAs.

Congratulations to G4APA/P for holding onto the lead in the Open section, and to G3CKR/P in the Restricted section. GM8MJV

# 432MHz

This year conditions were variously described as very poor, totally flat, or abysmal, in complete contrast to last year. Certainly the going was

# EQUIPMENT USED BY LEADING STATIONS ON MICROWAVES

## OPEN SECTION

|         | Band   | Transmitter                       | Receiver                    | Antenna                      |
|---------|--------|-----------------------------------|-----------------------------|------------------------------|
| G4HWA/P | 1.3GHz | IC751+Transverter + 6 x 2C39A PA  | IC751+Transverter + NE72089 | 16 x 23 ele @ 15m            |
|         | 2.3GHz | FT726+Transverter + 2C39BA PA     | FT726+Transverter + MGF1303 | 2m Dish @ 9m QTH 260m ASL    |
| G4CBW/P | 1.3GHz | TS700+Transverter + 2 x 2C39BA PA | TS700+Transverter + NE72089 | 8 x 55 ele @ 10m             |
|         | 2.3GHz | TS700+Transverter + 2C39BA PA     | TS700+Transverter + MGF1412 | 2.4m Dish @ 10m QTH 100m ASL |

## RESTRICTED SECTION

|         | Transmitter                        | Receiver                    | Antenna                   |
|---------|------------------------------------|-----------------------------|---------------------------|
| G4ICM/P | IC271+Transverter + 2C39 PA        | IC271+Transverter           | 2m Dish @ 7m QTH 100m ASL |
| G4WDL/P | TS700+Transverter + Solid State PA | TS700+Transverter + MGF1402 | 55 ele @ 9m QTH 465m ASL  |

# COUNCIL BRIEFS

BRIEF REPORTS OF COUNCIL MEETINGS EARLIER THIS YEAR

## COUNCIL BRIEF 12 MARCH 1988

Council considered the question of increasing the membership subscription fees, noting that this had been the subject of much discussion within recent meetings of the Finance & Staff Committee. Council agreed the new figures, the basic home corporate subscription to be £20.50. The new rates were to take effect from 1 July 1988.

The Secretary reported that the Publications Management Group had been considering the purchase of desk-top publishing equipment, to enable some Society publications to be produced in-house. Various systems had been investigated and it was hoped to introduce the equipment in a few months' time.

The question of book pricing methods had been the subject of a detailed report by the Secretary for the Finance & Staff Committee. An extract of this report was put to Council and it was noted that the matter had been dealt with by the Finance & Staff Committee. The Secretary announced his wish to recommend a junior membership section, which would have its own newsletter or magazine. This idea was endorsed by Council and the Secretary was asked to proceed with his plans.

Council noted progress made by the Training & Education Advisory Working Group on the subject of a possible student licence.

Council expressed its appreciation to Mr Hutchinson, who was to retire shortly, after 19 years of service as the Editor of *Radio Communication*.

The Society's response to the CSPI Report was outlined. This would be summarised in a forthcoming issue of *Radio Communication*.

It was agreed that the casual vacancy on Council, arising from the appointment of Mr B O'Brien, G2AMV, should be filled by the co-option for the remainder of the year of Mr G Benbow, G3HB.

Council discussed plans for the 75th Anniversary celebrations.

In response to criticism of unanswered correspondence, it was noted that a survey of all mail received at HQ was being undertaken. The secretary reported that over 100 letters a day were despatched from his office alone, and he requested details of specific complaints, which could then be investigated.

## COUNCIL BRIEF 12 MAY 1988

Much time was devoted to a full discussion on a report of the Training & Education Advisory Group. This outlined the Group's proposals for introducing newcomers, particularly youngsters, to amateur radio. The report dealt with aspects such as training, special publications, the possible introduction of a student licence and the establishment of an examination board. Council noted that introduction of a student licence would commit HQ to a considerably increased workload. Council was informed by the Honorary Treasurer of the satisfactory financial situation shown in the Management Accounts for March 1988. A considerable amount had already been earmarked for repairs to the headquarters building and tax. Council then looked at figures which indicated the trends over the last ten

years of such items as council/committee expenses, book sales and breakdowns of income and expenditure.

The Secretary reported on staff changes being considered by the Finance & Staff Committee. The HQ Manager would be leaving at the end of June and his responsibilities would be divided into amateur radio matters and non-amateur radio matters. It was reported that the new Editor of *Radio Communication* was to be Mr Trevor Preece, G3TRP, who had worked for the Society in the 1960's. Council also noted that Mr Mike Dennison, G3DXV, would be joining the staff shortly as an Assistant to the Secretary. Council was informed of recent progress with work in connection with the licence review, 75th Anniversary arrangements and new publications.

Council approved a committee recommendation concerning the attendance of Mr R J Hughes, G3GVV (Chairman of the Society's IARU Committee) at the IARU Region 3 Conference, to be held in Seoul in October. Other committee recommendations concerning awards were also dealt with.

Council agreed the re-appointment of the Society's Morse examiners for a further term of office.

Following recent RLO elections, the appointments were ratified. A list of remaining vacancies was to be published in *Radio Communication*.

## ANNUAL REPORT ADDENDUM

Owing to pressure of space in the Annual Report document published in the November issue of *RadCom*, some information had to be held over.

It is normal practice to include in the Annual Report a list showing which Council members attended which meetings of Council. Note that a "-" means that the member is not present and that an "X" means that the number was present.

### Council Attendance 1987/88

|                   |        | 11/7                | 1987<br>10/9        | 26/11                      | 30/1                  | 1988<br>12/3 | 12/5 |
|-------------------|--------|---------------------|---------------------|----------------------------|-----------------------|--------------|------|
| Mr E J Allaway    | G3FKM  | x                   | x                   | x                          | -                     | x            | x    |
| Mr J Allen        | G3DOT  | Joined Council 1/88 |                     |                            | x                     | x            | x    |
| Mr J T Barnes     | G13USS | x                   | x                   | x                          | x                     | x            | x    |
| Mr G Benbow       | G3HB   | *****               | Joined Council 3/88 |                            |                       | *****        | x    |
| Mr N G Brinkworth | G3UFB  | x                   | x                   | x                          | x                     | x            | x    |
| Mr E J Case       | GW4HWR | x                   | -                   | x                          | x                     | x            | x    |
| Mr P F D Cornish  | G3COR  | -                   | -                   | Resigned as Hon. Treasurer |                       |              |      |
| Mr Richard Davies | G2XM   | x                   | x                   | -                          | x                     | x            | x    |
| Mr J N Gannaway   | G3YGF  | x                   | x                   | x                          | x                     | x            | x    |
| Mr J Greenwell    | G3AEZ  | x                   | x                   | x                          | -                     | x            | x    |
| Mr F D Hall       | GM8BZX | x                   | x                   | x                          | x                     | x            | x    |
| Mrs J Heathershaw | G4CHH  | x                   | x                   | x                          | x                     | x            | x    |
| Mr J D Heys       | G3BDQ  | x                   | -                   | x                          | x                     | x            | x    |
| Mr G R Jessop     | G6JP   | x                   | x                   | x                          | -                     | x            | x    |
| Mr W J McClintock | G3VPK  | x                   | -                   | x                          | Retired Council 12/87 |              |      |
| Mr A A McKenzie   | G3OSS  | x                   | x                   | -                          | x                     | x            | x    |
| Mr B O'Brien      | G2AMV  | x                   | x                   | -                          | -                     | -            | x    |
| Mr N F O'Brien    | G3LP   | -                   | x                   | -                          | x                     | x            | x    |
| Mr H S Pinchin    | G3VPE  | x                   | x                   | x                          | Retired Council 12/87 |              |      |
| Mr F S G Rose     | G2DRT  | x                   | -                   | x                          | x                     | x            | x    |
| Mr D S Smith      | G4DAX  | x                   | x                   | x                          | Retired Council 12/87 |              |      |
| Mr G R Smith      | G4AJJ  | Joined Council 1/88 |                     |                            | x                     | x            | x    |

## IN MEMORIAM

### William Arthur Scarr, MA, FBIS, G2WS

Past President and Honorary Member Bill, as a young schoolmaster in Leeds, was actively interested in wireless and often gave helpful talks to some of the boys including 6NB. He was happily preoccupied in the higher frequencies when he became Director of Education at Ilkerton. Here he was very often seen tramping the Derbyshire hills with his portable 5 metre station becoming known as "Two Walking Suitcases". Later, when he had taken up a similar post at Beckenham in Kent he spent much time helping younger members of the local club with their wireless problems, becoming a member of the Society's Council in 1941.

After the war when the five metre band was restored, he continued his activities and went on to two metres and 70cm, so when the five metre band was lost to Television he concentrated his portable work on 70cm, notably on the North Downs in Surrey. When the Post Office proposed to introduce an examination for the amateur licence and the City and Guilds Institute of London set its Advisory and Moderating Committee, Bill led the three RSGB representatives. He was elected chairman of this committee, a position he held for very many years.

In 1948 the British National Committee for Scientific Radio were in need of information, the Society set-up its Scientific Observation Committee, later known as Scientific Studies Committee, now known as Propagation Studies Committee, with Bill as its chairman. As a result of his active work in the affairs of the Society, he was elected President 1950-51. His Presidential address to the members at the Institution of Electrical Engineers, entitled "The Amateur Horizon" was enthusiastically received by the large audience. In May 1950, the Silver Jubilee conference of IARU was held in Paris, Bill as President of the RSGB, was elected conference Chairman.

As an educationalist Bill was sent to India by the British Council. This event inspired him on his retirement from the Society to present the "Calcutta Key", awarded annually by the Council for International Friendship (1953). On his return from India he picked up his connections with the Society and was soon elected a Council member, representing South Western England 1971-1978. In 1979 Bill became chairman of the Radio Amateur Invalid and Blind Club. In this capacity and that of RSGB representative at City and Guilds for the RAE, he was instrumental in arranging for a taped course for the visually handicapped.

The Society has lost a wise and generous counsellor, all those who knew him will miss his welcoming smile at Society events, goodbye to an old friend. The Society was represented at the service by the Hon. Treasurer G2AMV, Basil O'Brien and his wife G3WIO, together with Eric Palmer G3FVC. GRJ

# 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.

● ICOM IC290D 2M Multimode. One owner since new 1W - 25W. Original packing less than 50 hours use. c/w mobile bracket £275. John 01-857 8096

● KATSUMI EK150 Electronic Keyer £70 inc postage also GPV 70cm 3/5/8 Colinear 6 months old. £30 inc postage. GW3WSU QTHR Tel: 04468 261

● TRIO TS711E base mint condition hardly used £650. Genuine reason for selling. Yaesu FT290M-kill brand new with new nicads unused still boxed. Offers? Jaybeam C870cm Colinear still boxed £50.00 G1REG. Tel: 01-540 3959

● TRIO VFO240 £50. SP230 £28. SP70 £18. MML144-40 £25. 813's x 3 £7.50 each. All items plus postage. Beam TH3JN hygain BN86 coax £100. Buyer collects. Details Dave G3MWV Tel: (Cromer) 0263 512872. Not QTHR.

● SALT ELECTRONICS main RX MR 1411 with handbook and circuit in good condition. £350 ono. G4PZJ. Tel: 01-785 7871 after 5pm.

● YAESU FT709R 70cm handheld with NC9C charger and PVC case. Original box and instructions £175. Also Oscar 358 70cm mobile antenna £20. All items little used. G4RSR. Tel: (Poole) 0202 687248. Not QTHR.

● DRAKE TR7A CW 3 filters and FA7, P57, CW FA7, RV7, MS7, MN75 CW balun, Shure 201, trap dipole, boxes, manuals, spares £1100 ono. Dressler D2005 linear £450. Datong MK morse key-board c/w PSU £50. G4JBH Tel: 0935 824225 QTHR.

● FT690R Sommerkamp Mk1 as new hardly used, boxed £200. Five ele Yagi for 6m. £25. Buyer collects. G4RIO Tel: 021-747 7116. QTHR.

● RACAL 1GHz frequency counter 9025. High accuracy with crystal ovened standard. 8 digit display. Good working order £80. HP8443B trap generator 100kHz to 110MHz for use with HP8553B-141T spectrum analyser £400. HP9872A HP-GL A3 plotter £300. John G8BXH. Tel: 01-428 0974.

● HEWLETT-PACKARD HP41CV calculator £75. 8214A card reader for HP41CV £50. 82162A HP1L printer for HP41CV £75. 82161A digital cassette drive for HP41CV £80. 82160A HP-IL interface module £30. All of above new, boxed and unused. John G8BXH. Tel: 01-428 0974.

● TRIO TR9000 1/10W 2m all-mode tcvr. B09 plinth. PS20 PSU. All as new and boxed. Very rarely used. Never mobile. As one lot £375. G3GEU. Tel: (Hartlepool) 0429 275807.

● 4 Daiwa motor motors. Normal speed version need attention £15 each. G0CJX. Tel: 0254 673184-94

● FAX-1 weather facsimile immaculate boxed £200. Also Matmos/Alphatron CPM 64K computer 2xDS DD disk drives including word processor little used £200. Philips monitor 80 £50. G3VGO. QTHR.

● WRASSE keyboard for SC-1 £150. Acoustic Research Legend turntable, Ortofon VMS20EII cartridge £110 with Linn LVM arm (or £150 with Rega RB300 arm). Gone CD. All excellent condition. Sorry no phone, write all letters answered. Mark G1ANI. Bamsley. QTHR.

● YAESU FT102 boxed, instructions FM/AM board fitted hardly used £585 ono. 70cm 88 ele parabean £20. 2m 6 ele quad £15. Trio 751E 2m multimode boxed manual £475. G1FJN. Tel: (Crawley) 0293 548299 evenings. QTHR.

● YAESU FT780 70cm multimode mobile tcvr 1/10W output. Excellent condition. Including mobile bracket and MH188 scanning mic £295 ovno. G0EUC. Tel: 0204 57137. QTHR.

● STRUMECH electric winch for use on 40' or 60' towers. Excellent condition with 110V transformer. Take the work out of raising your tower. Cost new £400. For sale at £200. No offers. Buyer to collect or arrange carriage. GM4EAW. QTHR.

● GLEGG 7NCVR 143/149HF 0-25W variable output 28/144 Tnvr Dawe output meter National

Radio School RAE course 5 volumes Hylec computer radio course books Capco 300 ATU not old type. Wanted Kenwood AT230 or exchange some of above items. G4YUG. Tel: 0473 830147 anytime. QTHR.

● TW4000 2m/70cm dual band VHF/UHF transceiver with voice frequency readout unit. Mint condition, boxed with manual and original accessories. 5W/25W power output mainly base station use only £300. G0B11. Tel: (Oxford) 0865 880229 after 7pm. QTHR.

● HF SSB transceivers Yaesu FT401 and FT101 500 and 170W P.E.P. offers over £200 each. 2m and 70cm tcvrs FDK 700E and Palm IV £115, £60 also beams for each 20 ele. David G0FDV. Tel: (Dunstable) 0582 606173 anytime.

● SCANNER Realistic PRO32, nicads, charger, mains power supply £125. Mutex board for FT290 £10. Converted Ham International 10m transceiver, 10W £25. Discone antenna £15. Met 2m beam - as new £15. Mike G0CRQ. Tel: (Nottingham) 0602 250195. QTHR.

● COLOUR TV camera. Panasonic WV3000E. 200m lens, electronic viewfinder (also works as monitor). Standard 10pin camera plug. 12V in gives sound and composite video out. With service manual £100. G4EML. Tel: 0483 223351. QTHR.

● FT101ZD MkIII fan FM WARC bands narrow c/w mike boxed. Spare valves £475. Jim G0AOT. Tel: 0895 632377 evenings.

● ICOM IC751 HF general coverage TX/RX. Complete with additional FL33 high performance AM filter. Absolutely mint condition £925. Capco SPC300 ATU. Mint £175. Rascal dual diversity unit MA168B with handbook £45. Carriage extra. G3HWX. Tel: 0704 840328. QTHR.

● LAFAYETTE HE80 RX £60. Plessey 1551RX spares. FR101RX spares. Drake CW filter. Vintage radios and components. Exchange for Eddystone 940RX or similar. J. Wright, 54 Queen Mary Avenue, Basingstoke. Tel: 0256 468649.

● HEWLETT Packard 8558B spectrum analyser in 182T CRO, frame with manual etc in VGC. Sensible offers invited or will consider exchange with cash adjustment for VHF/UHF base station equipment. Tel: 01-348 6405.

● BNOS power supply 13-8V 12amp perfect condition £85. Channel Master HD9508 rotator good condition £40. Hi-mound HK-704 morse key £20. G0IXA. Tel: (Doncaster) 0302 876154.

● SOMMERKAMP FTD500 80-10m SSB CW AM complete with spare PA valves plus handbook £180 ono. Buyer inspects and collects. Dave. Tel: 0757 618943

● KENPRO KT-400 UHF handheld thumbwheel synthesized inc battery and charger £175. ICS AMT-2 multimode terminal unit RS-232 interface with software for IBM-PC. Works with other micros £100. Roger G6KBN. Tel: 0902 609285. Not QTHR.

● HALLICRAFTERS SR 2000 Hurricane 1kW output transceiver. One of the greatest ever made - complete station with external VFO/VSWR, unit and Hallicrafters electronic keyer. Many spare valves. Wanted - original HRO speaker. G4GEN. Tel: 082571 2205. QTHR.

● TNC 220 packet radio controller HF VHF, full manual £110 ono or will consider exchange for HF ATU, 100W or above. Tony G6CMF. Tel: (Guildford) 0483 33144 weekends and evenings or 0252 318711 ext 5709. QTHR.

● BRAND new Heathkit explorer HF line amplifier output up to 1kW bargain £1040. Brand new DX antenna 10/15/20m vertical with tubular trapped radials £70 Tri-Star. G3JZL. Tel: 0203 543382

● TRIO TS811E 70cm multimode £750. Microwave modules MML144/50S 2m 50W linear, 10W input £70. MML432/50 70cm 50W linear, 10W input £100. BNOS LPM432/10/50 70cm 50W linear, 10W input £150. All working, good condition. Prices inc delivery. SAE enquiries. G6CQC. QTHR.

● PYE PMR M293 LB 68-88MHz AM 12.5kHz C/S op6W complete £135. Pye MF5 AM 68-88MHz AM 12.5kHz C/S op4W £25. G1NOL. Tel: (Bishops Cleeve) 0506996. QTHR.

● UHF handhelds. Pye PF2UB 3 channel complete with nicads, mike etc. Perfect. Data included £32 each. GM4LCP. Tel: Daytime 041 564 6079. Evenings 041 880 5904.

● YAESU FT902DM HF all-mode transceiver £625. Yaesu FT225RD 2m multimode transceiver £525. Both as new. Tel: 0707 54905 after 6pm.

● ELEVATIONAL rotor KR-500 180degree vertical rotation for satellite tracking. Little used. Bargain £70. G4RMM. Tel: (Ruislip) 0895 631240. QTHR.

● FL2100Z linear. Excellent condition £500. G4NQL. Tel: 0302 782616.

● SB200 1k linear amplifier plus HW101 complete with manuals and dummy load £350. Tel: (Paignton) 0803 555549.

● ICOM IC271E home base all-mode tcvr. Mint condition in box £520. G0FLF. Tel: 0736 762159 evenings.

● PIONEER VE-M800 camcorder. Sony CCDV-8AF cone. Complete with hard case and accessories. Audio video input, insert edit £595. Consider exchange for HF rig. HF5 band vertical £25. 48EL 70cm beam £30. Colour Genie computer RTTY/CW £95. G4UNR. Tel: 0203 404088. QTHR.

● ICOM ICR70 receiver FM manual, mint £395. Thandar TF200 counter, case, TP600 600MHz pre-scaler manuals, mint £110. Drake MS-4 speaker, good condition £20. No offers. G6AQC. Tel: (Oxford) 0865 243634. QTHR.

● VALVE sale, shack clearout. 1200 valves, 400 types all tested some new. Reasonable prices. Battery, miniature, octal, local, TV, VHF, transmitting, stabilisers, rectifiers etc. First class see for list. G3MDQ. Tel: 021-354 9972.

● FRG7 Yaesu fitted SSB filter & FM 2m converter provision for others. With FRT7700 ATU £150. KW2000A with mains and 12V power supplies. Lots of spares. GWO £200 ono. Terry G8UAP. Tel: (Hants) 0794 23635. QTHR.

● TRIO JR310 COM RX with 160m. Xtal marker. Speaker. Appearance as new. Excellent order cash sale. Buyer collects £100. DX40 TX CW only 10-80m. 60W re-wound mains transformer. Offers. G3FK. Tel: (Farnham) 0202 873175. QTHR.

● AR88D communications receiver, original speaker, S-meter and spare valves. VGC £65. Commodore 64 c/w cassette, joystick and loads of software (educational and leisure) VGC £100 ono. SMC SWR-meter (unused), 2m converter (repairable). Andrew. Tel: (Mansfield) 0623 559680.

● FT727R complete with spare nicad pack, speaker mike and base charger. In total this would cost £560. Expanded coverage on both bands £395 ono inc insured delivery in the UK. G6JNS. Tel: 0905 620041.

● FT102 VGC + box etc £525. 18AVT trap vertical. Offers. G4D0H. Tel: (Poole) 0202 681253 after 6pm. Not QTHR.

● PK232 C64/128 software from ICS unused £50. Complete with lead and instructions. ST5C mains powered £50. G3YBK. Tel: (Exeter) 0392 78710. QTHR.

● YAESU FT-902DM just overhauled £500. Yaesu FL-2100Z mint plus 2kW ATU £600. 1.0mfd 2700V caps £5. G5HMX. Tel: 0203 412397. QTHR.

● EDDYSTONE EC10 £50. EA12 £150. Both with manuals. J.Beams 4m 4 ele, 2m 6 ele, 70cm 8+8 £40. Microwave modules 2m AM TX £15. Radcoms 1970-1975 bond, 1976-1987 Offers. Buyer to inspect and collect. G8GHB. Tel: 0302 770944. QTHR.

● DAIWA 500W auto ATU serviced, realigned by Lowe. Bill to prove £90. MM28/144 transverter, used with Icom 720A £70. RTTY set up, Creed 444 and silent case, ST5 built-in dialing unit, vry nice bit of kit, matching paper window and tape, paper, 50/45.45 Baud cogs and scope £100 or £50 without scope. Complete triband 10/15/20 whip £25. Newish. Or P/EX for Digital mem unit, ext speaker, CW filter, monitor scope and 270/6m module unit for FT1012D Mk3. G0JAU. Tel: (Banbury) 0295 50169. QTHR.

● YAESU FT-726R CW 70cm/2m and satellite board £725. FT101B, 160-10m inc all WARC bands, mods by G3LLL, CW filter, RF clipper £300. FT225 multimode (analog) 2m XCVR £400. Pakratt

FAX/CW/RTTY multimode data controller £180. BBC/B computer Opus challenger 3 disc drive, Microvitec monitor CUB452, Canon matrix printer PW1080A and paper £400. Microwave modules 100W linears 70cm MML432/100 £180. 144MHz MML 144/100S £80. J-Beam 10-XY £15. AR-40 rotor £65. KR500 elevation rotor with cable £100. Tel: 0543 481202.

● YAESU FT780R 70cm transceiver mint condition £300 ono. MML 144/100S linear amp £80 ono. G4TAP. Tel: 0232 620728. QTHR.

● ICOM IC505 very good working order. Genuine reason for sale £399 ovno. G0CCH. Tel: (Stratford-on-Avon) 0789 204580. QTHR.

● SCOPEX 4D25 scope with manual £50. Offers for Marconi digital frequency meter. 0/500MHz Hewlett-Packard signal generator. 0/520MHz Hewlett-Packard power meter. 432A Rascal modulation meter. 9008 Sony B/W video camera. G0HED. Tel: (Clavering) 619.

● FT101ZD MkIII with fan and FM. This rig is a terrific performer and completely unmarked, original packing £500. G4WNG. Tel: (Northumberland) 0670 822172. QTHR.

● KENWOOD transceivers TS830S £650. TS520SE £320. Kenwood station monitor SM220 £250. Kenwood HS5 phones £20. Hanson peak reading wattmeter £20. Complete cine outfit camera, projector, editor, stand, screen. Tel: (Leicestershire) 0455 272624.

● TS430S with 500Hz CW filter and FM board fitted £650. AT230 ATU £150. Homebrew 20amp PSU £50. All good condition. G0MBKX. Tel: 0290 24016.

● VARIAC 230V 2KVA 9 amps £70. Transformers double wound 240V to 110V 4.55 amps output. Secondary winding is centre tapped. Tel: (Droitwich) 794399.

● FT200B + FP200 HF TCVR. 10-80m 100W, mic, fan, spare valves, box, manual as new £240. BBC B 32k computer disc drive, B/W monitor view W/P, box, manual as new £260. Tel: 021 730 2001.

● ST5MC RTTY terminal unit. Has TTL RS232 170 425 850 standards. Very clean condition. Documentation, leads and software for BBC micro £50. Buyer collects. G4KWH. Tel: (Bedford) 56139.

● KENWOOD AT130 ATU manual mobile brackets £130. Tel: (Newport Shrops) 0952 815983.

● WESTERN tower 40' lattice construction good condition £160. ono. Radicon construction kit ideal for beginners as new £20 ono. Steve G6UXN. Tel: 01-427 4667 after 6.30pm weekdays. QTHR.

● C58 standard portable 2m multimode, nicads, charger, mobile mount. Recent professional service. Complete with matching power amplifier 10W out. Immaculate condition £260. G4KIQ. Tel: (Essex) 0375 678833.

● FT707, FC707, FV707DM, all in good condition. Selling due to lack of use £500. no offers, no split. Mark G4RGB. Tel: (Medway Kent) 0634 30822 evenings/wends. QTHR.

● MIDLAND base station CB converted 28-29MHz SSB £75. Ham concord all mode 28-29MHz £85. Spectrum 6m transverter TRX 6-10 boxed, used with above £45. Modular 3-25V 144MHz linear £25. G4JXK. Tel: (Fareham) 0329 230737.

● YAESU FT70912 £100. FT70312 £85. Bearcat 20/20FB £125. MML 432/30L linear £100. 19 ele tonna 435MHz boxed £10. Tel: 0823 490913.

● KW Atlanta HF high power tcvr inc PSU, spares and full circuit diagrams £220. G4DSX. Tel: (Bradford) 0274 879615.

● FREE to collector RADCOMS 1961 to 1987 first 13 volumes bound. Mosley TA33JNR £50. Carriage extra. G3VLL. Tel: 0302 820028 Ext 3297 daytime. 857339 evening. QTHR.

● VFO 5205 with manual VGC £65. DSB TX and PS 80/160m 6146 finals £35. PW audio processor, matches TX £10. Bremi BRL200 10m mains powered linear, new valves and fan fitted £55. All post paid. GM4EWM. Tel: 0343 86 435.

● FRG7000 coms receiver digital readout. 25-30MHz FB condition £175. Cash buyer inspects and collects. G3TJQ. Tel: 0227 363345. QTHR.

● LT235 1296MHz transverter. 28MHz IF plus

high stability oscillator. 6 mths old and unused £325. Ian. Tel: 0268 794252 after 6pm.

● **TRIO R600** immaculate £230. ATU coupler AT100 £25. 144MHz converter £35. Tel: 051 737 1185.

● **YAESU FRG7700M** with memory. FRV7700 VHF converter, quantity 2. FRG7700 DC conversion kit. Muzhuo KX2 antenna tuner. Datong AD270 active receiver antenna £350. Will separate. RS88557. Tel: (Chester) 0244 373132.

● **RADCOM** unbound volumes 1967-1976 @ £8 per year and bound volumes 1977-1980 @ £9.75 per year. Also UKW Berichte VHF comms 1969-1971 bound £5.75 (inc postage). G3GMY. QTHR.

● **DRAKE TR7** and **PS7**. Immaculate. Original packing. Instruction books £675. Prefer buyer collects or carriage extra. G3GVV. Tel: (Tonbridge) 0732 353360, QTHR.

● **HY-GAIN 3** ele TH3JR beam for 10,15,20m with instruction booklet £145. Prefer buyer collects or carriage extra. G3GVV. Tel: (Tonbridge) 0732 353360.

● **VIC 20** 16k memory extension. Commodore tape recorder 1515. Commodore printer with 500 sheets of paper approx. RTTY c/w interface and program no monitor included. Own monitor required £100. Can be seen operating. G0EJV. Tel: 0522 683113. QTHR.

● **YAESU** separates FR-50B/FL-50B TX RX. Instruction manuals, original box. Good condition. Buyer collects £120. G4FVD. Tel: (Windsor) 856678. QTHR.

● **YAESU FT-727R** dual bander new condition £270. MML144/100 linear 10W drive. Big heatsink version £75. Farnell 13.8V 15A PSU £35. Linear with PSU £100. Dave. Tel: 0705 267540 evenings.

● **AMSTRAD CPC464** complete system. Colour monitor, disk drive, printer, manuals, books, magazines, programs £300. G3RPA. Tel: (Herts) 0442 865618.

● **SV610** Shibaden pro reel-to-reel video tape recorder. Needs service, ideal for amateur TV station. Offers or swap GWO TX/RX HF separates or HF RX considered. W.H.Y? G0CIG. Tel: 01-906 4206. QTHR.

● **PYE Westminster** low band FM suitable 70MHz £30. UHF suitable 70cm £39. Pye sig'gens VHF £75, UHF £75. Audio generator £15. 15MHz dual beam scope mint £125. Headphones £2. Shure mike £10. Many other items. G4YVJ. Tel: (Lincs) 050785 203. QTHR.

● **ALINCO TNO** metre transceiver immaculate condition never used mobile. Receiver extended 138-174MHz £190. Cap Co ATU SPC 300 superb matching network immaculate condition £160. Trio DM801 grid DIP oscillator as new £40. Daiwa NS860P £85. Call John G4YDM Tel 091 4162606 QTHR.

● **DRAKE TR7, DR7, AUX7, PS7, speaker** £600 ono. G3XVR not QTHR. Tel: (Glos) 0452 740046.

● **DATONG** Morse tone box as new £30. Katsumi electronic keyer EK 150 £35. Spectrum 48K computer £35. G0ELG. Tel: 01-689 7432 QTHR.

● **AR2002** scanning receiver 25-550MHz NFM, 800-1300MHz AM, WFM. Complete with 12V PSU mobile mount telescopic whip and spare power lead £350 ono. G4KWT. Tel: 0734 698526 QTHR.

● **AEA** model CK2 contest keyer; 10 memories; autorepeat; programmable; etc. £80. G3JLB. Tel: 0474 534694 QTHR.

● **FT1012D** with FM and FAN V.G. condition warc bands £450. FRG9600 little used with discone £325. G4HQ. Tel: 01-508 1620 QTHR.

● **ICOM 1200E** 23cms FM (as new) 10W out. Latest model £430. Trio W200A SWR/PWR meter plus SWC2 (70cms) extra head £110 mint. Jaybeam 015 23cms Yagi (new) £32. Welz 2 way antenna switch (new) £20. G4XHF. Tel: Paul 0293 515201 QTHR.

● **AR88LF** Eddystone EC10. Both GWO and with circuits and manuals £40 each. G3UJZ. Tel: (Glos) 367 52286 QTHR.

● **ICOM IC02E** handheld, good condition, c/w two power packs, charger, 25.50 whips, speaker mike £165. MTV 435 70cms. ATU 20W transmitter, 70cms ATU converter, UHF output £125. G4OWM. Tel: 01-647 8399 QTHR.

● **CODAR AT5** remote mobile control unit H.B. £10. Prefer buyer collects. G3PJX. Tel: 444 4312 QTHR.

● **26MHz -1300MHz PRO2004** UHF-VHF scanner 300 memories, one of the best on the market £260 ono. Woodpecker blanker £40 ono. G4RCG. Tel: (Wakfield) 0924 362144.

● **ICOM AT 500 AT** £315. Datong Morse tone as new £75. WANTED Icom 735. Tel: Chris (Cuffley) 0707 874494.

● **JST125** transceiver & p/supply all filters as new, what offers? or exchange for NRD 525 RX with filters or converter. Pye W15AM not modified with p/supply/spf25 ono. G1MSYA. Tel: 041-649 4345 QTHR.

● **2m and 70cm** handhelds AOR240, 1W, thumb-w-

heel, carry case and charger, £90. FDK multipalm 1V, 1W, 6 channel, 70cms handheld, all channels simplex or +/- repeater shift switchable, complete with charger plus manual £80. G0JVC. Tel: Mike (Hertfordshire) 0438 353040 QTHR.

● **YAESU FT23R** 2m handheld with FNB-10 nicad pack, soft case and NC-28C charger, little used £190 ono. G1ULB. Tel: Graham (Manchester area) 061 789 1604 QTHR.

● **MTV 435ATV TX20W PSP, MMC435** ATV converter, Hitachi CCTV camera with built on B/W monitor, 200mm lens tripod, super lynx B/W camera with 200mm lens, will exchange for portable or handheld. G0JUV. Tel: (Ripley) 580242 (evenings) QTHR.

● **TRIO 430S** with instruction manual, filters and F.M. board fitted £650. AT250 auto antenna tuner (price new £366) £240 ono. Mint cond. all original boxes. G0DWD. Tel: 0734 694040 QTHR.

● **TRANSVERTERS** MMT 144/28 and 432/28 respectively, each 10W output, both unused with data £200. Linc 2 SSB and Belcom PSU and G8CQP 40W linear £100. Valves 813 4-65A and bases boxed unused £25 each. 6L6M 807 £3 each. G2BPC. Tel: 0638 742998 QTHR.

● **TS830S** with 500Hz CW filter, MC-30S mike, instruction and service manuals, plus two new unused sets of 12B77As and 6146Bs. Little used, bargain at £750. G4MYX. Tel: (Tadcaster) 832061 QTHR.

● **FT1012 MK3** warc F.M. 10-160m with fan, mike, manual in mint condition and boxed £450 ono. G6COB. Tel: John (Cheshire) 0606 550258 (after 6pm or weekends please).

● **IC740**, INT PSU & FM marker, IC02E c/w case, charger, spare battery packs, standard C78 70cms 1W portable only synthesised, sola 2m 100w base station amplifier, MML432/30-L 1-3W I/P, 30W O/P. Offers. P&P extra. G4ETN. Tel: (Bridgewater) 0278 452743.

● **HF SSB** transceivers still for sale. FT1012D £395 looks like new. FT101 £225 very punchy rig! Also 2m FM TR 7850 45W! £140 and FDR 700E £125 25W FM - all ono. Will accept sensible offers. G0FDV. Tel: (Dunstable) 0582 606173 (anytime).

● **YAESU FT77** HF tcvr 100W VGC mic, hand-book, FM, CW filter fitted. Boxed £380. G4M0SS. Tel: 0560 83800 QTHR.

● **TRIO TS515** HF tcvr 80 - 10m PSU, handbook, original packing £200. Army Redifon 100W no-tune linear amplifier 1W or 10 - 15W drive requirement £65 ono. Geloso 64/105 Xial/mixer VFO 80 - 10m 6CL6 output £15. G3JFC. Tel: 0474 872743.

● **QUALITY Hi-Fi** system Rega Player -3 turntable with A & R P77 cartridge. Mission Cyrus-1 amplifier. Nakamichi 150E Dolby B-C etc. tape deck. Boxed. Used to record 20LPs on to tape only. Virtually as new £340. G4PAR. Tel: (Beds) 0525 222163.

● **ICOM IC720A** gen. coverage HF tcvr, ex condx, matching speaker, £500 or exchange for FT22-5RD, IC251E, IC211E w/ mutek. MM 10m - 70 cm 1/verter £60. G8YTF. Tel: (Bacup) 0706 878675.

● **FT780R** £300. FT290R-1 with nicads £240. BNOS LPM144-3-100 £120. Taxan KX1201B 12" green screen monitor £80. Argonix X1201B 12" NEC PC8201A with portable disk drive £250. Apple II + 2 disk drives 80cm card Z80 etc £250. AMT 1 £100. MML432/100 £180. G4GUO. Tel: 0245 469382.

● **KR250** antenna rotor in use for one season only £35. G1LKG. Tel: (Southport) 0704 69410.

● **FT102** tcvr, FC102 ATU, FV102DM VFO, SP102 spkr, MD1 mic, excellent condition, manuals, will not separate £950. RN electronics transverter 144/50MHz, as new £150. FT225RD multimode, AC/DC leads, manual, excellent £550. G1EUA. Tel: 06267 78554 (after 6pm) QTHR.

● **YAESU FRG7** good condx, boxed, manual frequency counter £120 or vno. Yaesu FT203R, VHF handi, FNB-3 nicad, MH 12A&B mike, NC 9C charger, PA-3 car charger, all boxed £150. or vno. G11VB. NOT QTHR. Tel: (Fareham) 0329 285384.

● **NEUBURY** 7000 computer VDU terminal unit Switched baud rates plus modem £60 or offers. Monochrome TV converted for band II 625 sporadic DX monitor £20. 70cm MBM46 £15. Mono TV camera not wkg £15. Drcyt 20 A.H. 20. GW4BZD. Tel: 0248 600241 QTHR.

● **AR88D** HF receiver, matching speaker, headphones, manual, very good condx, covers 550kHz - 31.9MHz, ideal beginners set £65 ono. Wanted ham jumbo or similar set converted or unconverted to ten metres. G1PWE. Tel: Pete (Northwich) 0606 882826 (evenings) QTHR.

● **TWO** Mullard TY4-400 triodes never used £35 each or £65 for both. G3UGL. Tel: 0234 750055 QTHR.

● **MUTEX** TVV 144A 28-144 transverter £220. S.S.B. LT25 28-144 transverter (unused) £375. S.S.B. PM 1300A power meter £200. E.M.E. UHF coupler £50. E.M.E. VHF coupler £50. BIRD 43 meter with 1 KW. and 50W VHF elements £250.

H.F. 400 relay (unused) £50. 1 - S.S.B. DX144 preamp (unused) £60. 4 way 144 power divider £30. Kenpro KR 500 elevator £80. 17 el Tonna £20. REVCO Discone £20. G4OPH. Tel: Tim 02477 58425.

● **FT1012D** 1ar/mic, CW filter, spare valves, AM board, £395. FC902 ATU, fitted silent condition as very little used. Would prefer buyer inspects/collects. G4LAP. Tel: (Horsham) 0403 790513 QTHR.

● **YAESU FV901DM** synthesised VFO, orig pkg, £150. Yaesu NC-8 battery charger £35. FT208R handheld £120. All in mint condx. G4XWZ. Tel: David (Stroud) 04536 70267 (after 6pm) QTHR.

● **KR500** elevation rotator £50. Bremz power supply 10 amp £25. Morse key HK-708 £10. G4YJH. Tel: 0749 840492 QTHR.

● **R & S** Sigen smlr, scopes, many items test gear HF RX's property of silent key. S.A.E. full list from W.B. Mansell, 12 Dunstan Road, Thatcham, Berks, RG13 3QS.

● **STANDARD** C78 transv FM UHF with matching CPB78 port. and mobile carrier sold complete £260 ono. Cash buyer to examine and collect. GWN100P. Not QTHR. Tel: (Port Talbot) 0639 895250.

● **Z88** Cambridge computer, 128K rampack, RS232 and parallel printer leads, cost £375 accept £250 as new. Texas scientific calculator T133 with rechargeable batteries £10. Morse keys always wanted for collection. G3IRM. Tel: 0284 754318 QTHR.

● **PRACTICA** LLC. SLR. electric lens, 200mm and 50mm plus 2 x teleconverter, E.R. case, alloy gadget case, small tripod, UV filter, auto flash, mains battery reversing ring. All as new £85 ono. G3EXU. Tel: 0772 616929 QTHR.

● **TS530S** 500Hz and 270Hz filters, VFO120 £650. Hallicrafters super skydrill, skychampion, BC348 offers. IC-2E with bits £120 ono. Newbrain computer (built in display) £25. G4PDQ. Tel: 0242 42336 QTHR.

● **YAESU FT757GX** including Yaesu w/d hand mic in excellent condition, original box and packing, plus manual £600. G0HAO. Tel: Frank (Cotes) 0983 293402 QTHR.

● **COMPLETE** record collection must go! Fantastic variety - something for everyone - popular, classical, synthesiser etc. All LP's in unmarked original condition. You won't find secondhand LP's ANYWHERE in as good condition. LARGE SASE for a complete listing. G3M3WA. QTHR.

● **ICOM IC211E** (2 metre all mode base station) with IC-RM3 remote controller and microphone. All immaculate condition and fault free. Original packaging and manuals. £350 cash (in advance) or visit and inspect working. G3BBK. Tel: (East Sussex) 04352 6129 QTHR.

● **TONO M150W** 2m linear amp SSB/FM 10W input, led indicators, switchable preamp, boxed, good condition £85 or sent by Securicor £95. Also ICOM 290D. G4WLD. Tel: John 01-657 8096.

● **BBC B.** comp. disc drive, discs, rty on rom. toolkit rom. ST5C Tu. All OK £350. Yaesu YD844A desk mic. dual imp. as new £22. Prefer buyer collect. G4HZF. Tel: (Grimsby) 71215 QTHR.

● **K.W.** 200B plus PSU good condition recently aligned. New valves plus P.A.S. by K.W. Price £250. G6VSU. Tel: 0302 859451.

● **TS520S** with VFO250 exc. condx. £350. HF linear 813's grounded grid c/w separate 2'2KV PSU, built to professional standards £250. Europa Ctrvr £35. Curtis chip keyer c/w built-in electronic paddle £40. Howes A55 audio filter, cased with built-in PSU £20. PR. Wight traps £5. CDE rotator control unit £5. Split stator w/c capacitor £10. Lowe 10MHz kit for TS520S £5. Kenpro rotator KR 250 plus 9EL. 2m. Tonna plus 20m control cable £50. All carriage extra. G3RFB. Tel: (Tyneside) 091 253054 QTHR.

● **TRIO TS780** 144/432MHz tcvr, full service history and manuals, VGC £750. Icom IC251E 144 multimode, gd condx £310. Tokyo HL160V s/state amp for 144MHz £150. 144MHz amplifiers W2GN pair 4CX250 RF section, screen and bias supplies incl. only EHT needed £220. Sincze 4CX250 amp o/p 300W + £195. G8LMW 1296/144 transverter kit partially completed, all components and assembly instructions £55. M/modes 1296/28MHz converter £25. Tonna 16 ele mostly new elements incl driven £20. G4HGI. Tel: Richard 0625 34823 (daytime).

● **KENPRO** KR250 rotator complete with cable £40 J Beam 8 ele, 2 metre beam £10. 2 metre receive converter 4-6MHz I.F. £10. Postage extra on all items. G0IQN. Tel: Chris 04022 50307.

● **KDK 740** 70cms FM 5/25 W 16 memories band/memory scan, almost new boxed and handbook £150. PRO 2004 AM/FM base scanner RX 300 prog memories Freq. 25-520MHz 760-13 GHz £260 ono. G4MH mini beam offers. G3QJA. Tel: 061 445 1026 QTHR.

● **STANDARD** C58 £230. Pye W15V dashmount 10 ch, RB14 £50. PF5014 UHF 5W £60. PF85 3

ch, as new, T band £150. CTVR 40 46MHz 5W modifiable 50MHz £70. Sait VHF Marine, front ch, hence £60. GEC 666 lowband AM 10 ch, OK 4 metres £30. G4VCO. Tel: 0923 224752.

● **TRIO TR9130** 2m multimode £325 ono. Eddystone EC10 Gen-Cov HF RX £50 ono. Mobile ant with wingmount £15 ono. Met 7-ele beam £15 ono. (both 2m). Small rotator £10. G1OJS. Tel: (Chesterfield) 589217.

● **SOMMERKAMP** 2m FM handheld 80 channel transceiver, digital scanner squelch repeater control, 2W/0.1W output, charger, batteries, case, handbook, v. good £75. CORNELL AR22XL bell antenna rotor with control box will turn lightweight H.F. Beam/Quad. V. good £45. G3MTBV. Tel: 0250 2520 QTHR.

● **IC251E** with Mutek front end and loom desk microphone, VGC, boxed £450. Linear 144/LS 100W output, boxed £100. G6UPW. Tel: Barry. QTHR.

● **FT208R** 2m h/veld 2 sets n/Cads, mobile PSU, headset mic £150. Datong D75 speech processor £25. Datong RF clipper £15. Adonis HX8 mobile mic noise cancelling £20. G3MEW. Tel: (Porthmou) 0705 820315 QTHR.

● **TRIO TR3200** 70 chs FM trans, portable, nicads, boxed mint £100. Yaesu CPU2500R 2m FM mobile trans, keyboard mic, VGC £125. G4OWY. Tel: 0305 773240.

● **FT208R**, YM24A speaker mike, leather case and strap, 2 FNB2 n/Cads, boxed with instruction manual, in clean condition, PA3 unit for 12V working, Kenwood 10W power amplifier £175. FT708R, YM24A speaker mike, 2 FNB2 nicads, boxed with instruction manual in clean condition, PA3 unit for 12V working, NC8 stand with trickle-normal-quick-charge and power supply, FBA2 battery pack adapter, FL7010 10W linear amplifier to match £225. G8LNY. Tel: 0903 32880.

● **DRAKE SSR-1** communications receiver £50. KW 107ATU £95. Buyer collects. No offers. G3KIV. Tel: 0734 713644 QTHR.

● **TRIO 2500** VHF handheld £145. Trio 3500 UHF handheld £145. Both in excellent working order. Various accessories also available. GMOETC. Tel: 041 639 3340 QTHR.

● **COMPLETE** clearance: all parts for several really serious linear amplifiers - part built PSU on trolley - prefer sell as one lot. Absolutely mint Dentrone ML4 2500B HF linear - brand new Eimac valves. Sensible offers. G3M3WA. Tel: Mike 03306 613 (evenings after 7pm).

● **FT708R** handheld with NC-9C charger plus YM-24A speaker mike and MMB-10 handle bracket £150. 23cms 4X250e Tonnas stacking frame and power splitter. 70cms 17 ele met long Yagi plus 24 ele parabean £100 the lot. G6JHR. Tel: 047482 4224.

● **ICOM 4E** 70cms handheld complete with base charger BC35 2 x BP3 battery packs IC HM9 microphone, IC DCI converter boxed with manuals less than 6 months old £240 ono. G6UXN. Tel: Steve 01 427 4667 (after 7pm) QTHR.

● **VHF** linear amplifiers (Pye type A200) ideal for 2m. 5W in 25W out. 12V operation, R.F. activated. Suitable for handheld P.A. 2W in 10W out. £35 each. Ray Price, 36 Hadleigh Rise, Pontefract, W. Yorks. G3VTD. Tel: 0977 706213 (evenings).

● **TRIO 9130** 2m multimode mobile bracket, mic, handbook £299. MM 50W linear G6. YAESU 790R 70cm multimode with nicads charger, case, handbook £235. G6PRL. Tel: 0480 57167 QTHR.

● **TRANSVERTER** MMT144/28MHz 2m to 10m all modes complete with plugs, alternator and manual. Recently performance tested by manufacturer and Lowe Electronics. Reason for sale, surplus to current requirements £60. G3BA. Tel: 021 353 1893 QTHR.

● **TRIO 9130** 2m multi boxed manual mobile bracket mic etc. 5/25W VGC. Limited use £350 ono. 10EL 2m parabean and rotator VGC £45 ono. G6WOKM. Tel: (Gwynedd) 0758 740171.

● **TEN-ATU** 2000/200 W: dual range SWR/ power meter; freq. range 1.8-30 MHz; includes Balun for open wire feeders; 4 Coax outlets; silver plated roller inductor and heavy duty switch contacts; mint; £155. G3UVE. Tel: 0424 215983 QTHR.

● **ICL** serial line printer works but requires RS232 interface £50. TH3JNR 3 ELE tribander 6 weeks old £200. Two 12m telescopic masts complete with baseplate, guyes, pegs, bag, hammer £120 each. G0HHT. Tel: Dave (Darlington) 0325 58745.

● **TRIO TS550** HF TX/RX AC/DC PSU and CW filter £275 ono. Cabinet containing 2-match ATU LP filter SWR bridge and dummy load £50. G7BLF. Tel: 0279 870903.

● **KW 77** amateur bands receiver £75. SB 401 Heathkit 80 - 10m transmitter £60. AR 88 D receiver £45. Model railway collection gauge 00 2-rail including 11 engines, coaches goods, track, controllers £350. G3UCR. Tel: (Tadworth, Surrey) 0737 813252 (evenings)

995

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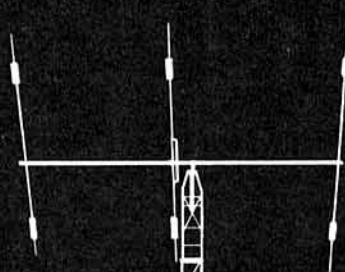
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# Versatower: First Choice 1963 - XXV - 1988



## VERSATOWER RANGE

|              | Sections | Retracted | Extended |
|--------------|----------|-----------|----------|
|              | No.      | M.        | M.       |
| Mini Series  | 3        | 4.5       | 9.0      |
| "E" Series   | 3        | 6.7       | 13.7     |
| Standard     |          |           |          |
| Series 13M20 | 2        | 7.8       | 12.0     |
|              | 3        | 8.0       | 18.0     |
| * 4 + Tube   |          | 8.15      | 24.0     |
| Heavy Duty   |          |           |          |
| 16M20        | 2        | 7.8       | 12.0     |
|              | 3        | 8.0       | 18.0     |
| * 4 + H.U.   |          | 8.15      | 24.0     |
| * 5 + Tube   |          | 8.25      | 30.0     |

Retracted - Extended heights listed, nominal only

Extended Height: Ground level to centre of Array.

All applications subject to:

Maximum permissible head load - weight/area.

Exposure of location - maximum wind speed.

Note models marked \* supplied with obligatory Guys.

All models - choice of ground mounting.

Technical Staff available to advise on model selection.



Available from  
**Strumech Versatower Limited,**  
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Telephone (0543) 452321  
Telex: 335243 SEL G.  
Fax (0543) 361050



# B.N.O.S. PRODUCTS

## 2M LINEAR AMPLIFIERS

|               |                                      |        |
|---------------|--------------------------------------|--------|
| L144-3-25     | *New Linear 3w input 25w output      | 74.75  |
| LP144-3-50    | Linear/Preamp 3w input 50w output    | 138.00 |
| LP144-10-50   | Linear/Preamp 10w input 50w output   | 138.00 |
| LPM144-3-100  | Linear/Preamp/Meter 2w i/p 100w o/p  | 235.00 |
| LPM144-10-100 | Linear/Preamp/Meter 10w i/p 100w o/p | 205.00 |
| LPM144-10-180 | Linear/Preamp/Meter 10w i/p 180w o/p | 355.00 |
| LPM144-25-180 | Linear/Preamp/Meter 25w i/p 180w o/p | 305.00 |

## 4M LINEAR AMPLIFIERS

|              |                                  |        |
|--------------|----------------------------------|--------|
| LPM70-10-100 | Lin./Preamp/Met 10w i/p 100w o/p | 235.00 |
|--------------|----------------------------------|--------|

## 70CM LINEAR AMPLIFIERS

|               |                                  |        |
|---------------|----------------------------------|--------|
| L432-1-10     | *New Linear 1w input 10w output  | 74.75  |
| LPM432-1-50   | Lin./Preamp/Met 1w i/p 50w o/p   | 255.00 |
| LPM432-3-50   | Lin./Preamp/Met 3w i/p 50w o/p   | 255.00 |
| LPM432-3-100  | Lin./Preamp/Met 3w i/p 100w o/p  | 395.00 |
| LPM432-10-100 | Lin./Preamp/Met 10w i/p 100w o/p | 395.00 |

## 6M LINEAR AMPLIFIERS

|              |                                    |        |
|--------------|------------------------------------|--------|
| L50-3-25     | *New Linear 3w i/p 25w o/p         | 74.75  |
| LP50-3-50    | Linear/Preamp 3w i/p 50w o/p       | 138.00 |
| LP50-10-50   | Linear/Preamp 10w i/p 50w o/p      | 138.00 |
| LPM50-10-100 | Linear/Preamp/Met 10w i/p 100w o/p | 235.00 |

## TRANSVERTERS

|             |              |        |
|-------------|--------------|--------|
| TL50-28-25  | 6M/28MHz IF  | 316.25 |
| TL50-144-25 | 6M/144MHz IF | 299.00 |
| TL70-28-25  | 4M/28MHz IF  | 316.25 |
| TL70-144-25 | 4M/144MHz IF | 299.00 |
| TL144-28-25 | 2M/28MHz IF  | 345.00 |

## POWER SUPPLIES

|        |                             |        |
|--------|-----------------------------|--------|
| 12/6A  | 13.8V 6A cont 7A max        | 78.20  |
| 12/12A | 13.8V 12A cont 15A max      | 129.95 |
| 12/25A | 13.8V 25A cont 30A max      | 193.20 |
| 12/40A | 13.8V 40A cont 50A max      | 423.20 |
| 12/5E  | *New 13.8V 5A cont 6A max   | 57.50  |
| 12/10E | *New 13.8V 10A cont 12A max | 97.75  |
| 12/20E | *New 13.8V 20A cont 24A max | 132.25 |
| 12/30E | *New 13.8V 30A cont 35A max | 195.50 |

# CUE DEE PRODUCTS

## VHF/UHF ANTENNAS

|              |                                 |        |
|--------------|---------------------------------|--------|
| VHF-DUO 650A | 6.5 Ele 6d Bd                   | 129.95 |
|              | NEW 6M 6 ele 6dBd               | 91.15  |
| 4144A        | 4 ele 8dBd S0239                | 26.45  |
| 4144AE       | 4 ele end mount 8dBd S0239      | 27.60  |
| 10144A       | 10 ele 11.4dBd S0239            | 50.60  |
| 10144AN      | 10 ele 11.4dBd N female         | 57.50  |
| 10X144A      | 10 ele crossed 11.4dBd S0239    | 74.75  |
| 10X144AN     | 10 ele crossed 11.4dBd N female | 86.25  |
| 15144A       | 15 ele 14dBd S0239              | 73.60  |
| 15144AN      | 15 ele 14dBd N female           | 78.20  |
| 15X144A      | 15 ele crossed 14dBd S0239      | 98.90  |
| 15X144AN     | 15 ele crossed 14dBd N female   | 110.40 |
| 17432AN      | 17 ele 14.5dBd N female         | 51.75  |
| 17X432AN     | 17 ele crossed 14.5dBd N female | 82.80  |
| 23432AN      | 23 ele 15.5dBd N female         | 63.25  |

## STACKED SYSTEMS

|            |                       |         |
|------------|-----------------------|---------|
| 10144A2H   | 2 x 10 ele horizontal | 228.85  |
| 10144AN2H  | 2 x 10 ele horizontal | 243.80  |
| 15144A2H   | 2 x 15 ele horizontal | 277.15  |
| 15144AN2H  | 2 x 15 ele horizontal | 293.25  |
| 10144A4H   | 4 x 10 ele            | 405.95  |
| 10144AN4H  | 4 x 10 ele            | 447.35  |
| 15144A4H   | 4 x 15 ele            | 501.40  |
| 15144AN4H  | 4 x 15 ele            | 537.05  |
| 15144A8H   | 8 x 15 ele            | 1436.35 |
| 15144AN8H  | 8 x 15 ele            | 1511.10 |
| 15144A16H  | 16 x 15 ele           | 3382.15 |
| 15144AN16H | 16 x 15 ele           | 3496.00 |
| 17432AN2H  | 2 x 17 ele horizontal | 194.35  |
| 17432AN4H  | 4 x 17 ele            | 334.65  |
| 17432AN8H  | 8 x 17 ele            | 583.05  |
| 17432AN16H | 16 x 17 ele           | P.O.A.  |
| 23432AN2H  | 2 x 23 ele horizontal | 212.75  |
| 23432AN4H  | 4 x 23 ele            | 379.50  |
| 23432AN8H  | 8 x 23 ele            | 645.15  |
| 23432AN16H | 16 x 23 ele           | P.O.A.  |

## STACKING FRAME KITS

|      |           |        |
|------|-----------|--------|
| 4S2  | 2 x 4144  | 39.10  |
| 10S2 | 2 x 10144 | 59.80  |
| 15S2 | 2 x 15144 | 66.70  |
| 10S4 | 4 x 10144 | 109.25 |
| 15S4 | 4 x 15144 | 123.05 |
| 71S2 | 2 x 17432 | 39.10  |
| 23S2 | 2 x 23432 | 40.25  |
| 17S4 | 4 x 17432 | 59.80  |
| 23S4 | 4 x 23432 | 63.25  |

## PHASING HARNESSES INCLUDING POWER SPLITTER

|       |                    |        |
|-------|--------------------|--------|
| 4L2   | 2 x 4144A & 4144AE | 72.45  |
| 10L2  | 2 x 10144A         | 74.75  |
| 10L2N | 2 x 10144AN        | 81.65  |
| 10L4  | 4 x 10144A         | 112.70 |
| 10L4N | 4 x 10144AN        | 129.95 |
| 15L2  | 2 x 15144A         | 77.05  |
| 15L2N | 2 x 15144AN        | 87.40  |
| 15L4  | 4 x 15144A         | 112.70 |
| 15L4N | 4 x 15144AN        | 129.95 |
| 17L2N | 2 x 17432AN        | 70.15  |
| 17L4N | 4 x 17432AN        | 109.25 |
| 23L2N | 2 x 23432AN        | 70.15  |
| 23L4N | 4 x 23432AN        | 109.25 |

## POWER SPLITTERS

|        |                       |        |
|--------|-----------------------|--------|
| 2-144  | 2 way 144MHz S0239    | 37.96  |
| 2-144N | 2 way 144MHz N female | 42.55  |
| 4-144  | 4 way 144MHz S0239    | 41.40  |
| 4-144N | 4 way 144MHz N female | 48.30  |
| 6-144  | 6 way 144MHz S0239    | 57.50  |
| 6-144N | 6 way 144MHz N female | 87.40  |
| 8-144  | 8 way 144MHz S0239    | 63.25  |
| 8-144N | 8 way 144MHz N female | 100.05 |
| 2-432N | 2 way 432MHz N female | 34.50  |
| 4-432N | 4 way 432MHz N female | 41.40  |
| 6-432N | 6 way 432MHz N female | 83.95  |
| 8-432N | 8 way 432MHz N female | 93.15  |

## MONOBAND YAGIS

|      |                     |        |
|------|---------------------|--------|
| 27G  | 7MHz 2 ele 5.6dBd   | 581.90 |
| 37G  | 7MHz 3 ele 7.0dBd   | 861.35 |
| 314G | 14MHz 3 ele 7.0dBd  | 216.20 |
| 414G | 14MHz 4 ele 8.0dBd  | 249.55 |
| 414  | 14MHz 4 ele 8.0dBd  | 294.40 |
| 514G | 14MHz 5 ele 9.0dBd  | 364.55 |
| 614G | 14MHz 6 ele 10.0dBd | 515.20 |
| 321  | 21MHz 3 ele 7.0dBd  | 148.35 |
| 421  | 21MHz 4 ele 8.0dBd  | 169.05 |
| 521  | 21MHz 5 ele 9.0dBd  | 264.50 |
| 621G | 21MHz 6 ele 10.0dBd | 331.20 |
| 721G | 21MHz 7 ele 10.3dBd | 416.30 |
| 328  | 28MHz 3 ele 7.0dBd  | 93.15  |
| 428  | 28MHz 4 ele 8.0dBd  | 116.15 |
| 528  | 28MHz 5 ele 9.0dBd  | 161.00 |
| 628G | 28MHz 6 ele 10.0dBd | 207.00 |
| 628  | 28MHz 6 ele 10.0dBd | 249.55 |
| 728G | 28MHz 7 ele 10.3dBd | 309.35 |
| 928G | 28MHz 9 ele 10.6dBd | 416.30 |

## DUOBAND YAGIS

|       |                         |        |
|-------|-------------------------|--------|
| DUO2G | 14/21MHz 5/4 ele 9.8dBd | 483.00 |
| DUO3  | 21/28MHz 4/4 ele 8.8dBd | 264.50 |
| DUO4  | 14/21MHz 4/4 ele 8.8dBd | 426.65 |

## VERTICALS

|       |                                     |        |
|-------|-------------------------------------|--------|
| VA40  | 7MHz inc guy wire & ground mount    | 93.15  |
| 2VA40 | 7MHz full 1/4 wave, complete        | 323.15 |
| VA80  | 3.5MHz inc guy wires & ground mount | 324.30 |
| 2VA80 | 3.5MHz full 1/4 wave, complete      | 796.95 |

## PHASING HARNESSES FOR CIRCULAR POLARIZATION

|        |                         |       |
|--------|-------------------------|-------|
| IC144  | 10 x 144A & 15 x 144A   | 37.95 |
| IC144N | 10 x 144AN & 15 x 144AN | 52.90 |
| IC432N | 17 x 432AN              | 51.75 |

# SHF PRODUCTS

## SHF ANTENNAS

|          |                     |        |
|----------|---------------------|--------|
| SHF 9644 | 1296MHz 44 ele      | 123.05 |
| SHF 9667 | 1296MHz 67 ele      | 148.35 |
| SHF 1693 | 67 ele (meteosat)   | 167.90 |
| SHF 2320 | 2300-2350MHz 67 ele | 202.40 |

### HOW TO ORDER

By Phone: using your Access or Visa Barclaycard  
By Mail: Cheque, Postal Orders or Credit Card  
Or from your local BNOS Authorized Dealer

Post, Packing & Insurance should be added to order totals as below  
3 Working day delivery service  
Orders with a value less than £50 add £2.50 to total  
Orders with a value more than £50 add £5.00 to total  
Orders with a value more than £250 add £7.50 to total  
Orders with a value more than £500 add £10.00 to total  
Next day delivery service  
Any value add £15.00 to order total



# PKW PRODUCTS

## VHF/UHF ANTENNA'S

|        |                                   |       |
|--------|-----------------------------------|-------|
| 2GP58  | 144MHz 5/8 groundplane 3.2dBd     | 39.10 |
| 2GP258 | 144MHz 2 x 5/8 groundplane 5.7dBd | 70.15 |
| 7GP58  | 432MHz 5/8 groundplane 3.2dBd     | 39.10 |
| 7GP258 | 432MHz 2 x 5/8 colinear 5.7dBd    | 59.80 |

## HF DIPOLES

|       |                     |        |
|-------|---------------------|--------|
| DP 01 | 3.5/14MHz           | 59.80  |
| DP 02 | 3.5/7MHz            | 59.80  |
| DP 03 | 1.8/7MHz            | 59.80  |
| DP 04 | 1.8/5.5MHz          | 101.20 |
| DP 05 | 14/21/28MHz         | 70.15  |
| DP 06 | 1.8/3.5/14/21/28MHz | 110.40 |

## HF MULTIBAND BEAMS

|         |                               |        |
|---------|-------------------------------|--------|
| THF 1E  | 1 ele (dipole) 14/21/28MHz    | 83.95  |
| THF 2E  | 2 ele 14/21/28MHz             | 213.90 |
| THF 3E  | 3 ele 14/21/28MHz             | 264.50 |
| THF 5E  | 5 ele 14/21/28MHz             | 384.10 |
| THF 6E  | 6 ele 14/21/28MHz             | 571.55 |
| THF 7E  | 7 ele 14/21/28MHz             | 741.75 |
| THF 8E  | 8 ele 14/21/28MHz             | 878.60 |
| SPQ 2E  | 2 ele Spider Quad 14/21/28MHz | 408.25 |
| LPO 12E | 12 ele Log Periodic 13-30MHz  | 918.85 |

## HF GROUNDPLANE

|        |                        |        |
|--------|------------------------|--------|
| GP 38  | 14/21/28MHz            | 81.65  |
| K Type | NEW 35/7MHz + 14/21/28 | 261.05 |

COAXIAL CABLE Pope H100 80p/metre RG213 62p/metre RG58 28p/metre New Plastic Coated Phosphor Bronze Antenna Wire 56p/metre.

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## New kits and winter projects!

Building your own equipment is one of the most satisfying aspects of amateur radio. Now that the darker evenings are with us, this is the time of the year to have a look through our new catalogue for an interesting project. The latest edition has quite a few new kits to choose from. In addition to our well known CW QRP equipment, this year we have given in to popular demand, and introduced a simple transmitter, complete with modulator! Homebrew Top Band AM - that's REAL Radio!

### AT160 80 AND 160 METER AM/DSB/CW TRANSMITTER

This new transmitter offers both 'phone and CW on 80 and 160 Meter bands. Ideal for the club Top Band net, and general local nattering, as well as a nice sounding CW note for those longer distance contacts. There are front panel controls provided for both carrier level and RF output power (up to 10W PEP output). Broad-band circuitry eliminates the need for any tuned circuit alignment, whilst relay switched elliptical output filters are used on each band to ensure a clean signal. A PTT operated antenna relay is provided. A matching microphone amplifier, type MA4 has been introduced to suit this TX. We have been asked time and time again "when are you going to introduce a simple 'phone rig?", well here it is. It is not just a 'phone rig though, the CW is also rather good. We hope you like it.

AT160 Kit: £34.90

Assembled PCB: £53.90

### AA2 ACTIVE ANTENNA AMPLIFIER

The new HOWES AA2 kit enables you to build yourself a really compact HF reception antenna that can be accommodated in even the smallest QTH. Even if you have room for large antennas, you will still find this kit useful for building a rotary antenna for the lower frequency bands. Have you got a rotatable Top Band antenna? The advantage in being able to "null" QRM with a miniature rotary dipole should not be discounted. The AA2 has facilities for both short single wire and dipole inputs, the antenna length can be varied to suit your requirements, but about 6 to 8 feet is a good maximum length. The PCB is designed to fit inside standard 1.5" waste water pipe, so making for easy weather proof construction if required. Direct or Coaxial powering can be used, so the unit can be located next to the receiver, or remotely on a mast, chimney etc. It is also ideal for building a telescopic antenna facility into a homebrew portable. Features include a two stage amplifier with FET input, 50 Ohm coax output and two gain settings, it covers long wave to 30MHz applications.

AA2 Kit: £7.50

Assembled PCB: £11.50

### MA4 MICROPHONE AMPLIFIER

The MA4 has been introduced to suit the modulation input of the new AT160 transmitter. It is designed to use a normal low or medium impedance hand mic, our CM2 desk/mobile mic kit or even an AP3 speech processor. The four stage circuit includes two stages of active low-pass filtering to help keep your transmitted signal bandwidth within tight limits. A gain control and RF filtering on the input are provided.

MA4 Kit: £5.60

Assembled PCB: £9.90

### MBRX MARINE BAND COMMUNICATIONS RECEIVER

The new HOWES MBRX kit is designed to enable you to build a receiver covering the whole Marine band from 1.6 to 3.95MHz, including both the 160 and 80 Meter amateur bands. Modes covered are SSB and CW, although you can also use it for RTTY, FAX etc if you have a suitable terminal.

**Features include:-** ★ Switched input attenuator ★ RF stage ★ Balanced, Direct Conversion mixer ★ 2 stage active SSB filter ★ Stable FET oscillator ★ Fine tune control ★ Fast and Slow AGC ★ 1W audio output ★ Optional filters, signal meter etc are available. Requires two 365pF (or 500pF) tuning capacitors. A kit to build a real communications receiver with good facilities and performance at a sensible price.

MBRX Kit: £29.90

Assembled PCB: £44.90

Just four of our new kits are outlined above, we also have receiver kits from £14.80, and transmitters from £13.80 plus a whole range of accessories (ATU, side-tone, calibrator, converters, transverters, filters etc) so there should be a project to interest you in our new catalogue.

All HOWES kits come with full, clear instructions, good quality glass fibre PCB (drilled and tinned with screen printed parts locations) and all board mounted components. Delivery is normally within 7 days, and we hope to have all the new kits in stock by the time this appears in print. Help, advice and sales are only a phone call away (office hours), but please send an SAE if you would like a catalogue, or specific product information sheets.

P&P is £1.00 per order.

73 from Dave G4KGH, Technical Manager.



# NORBRECK RADIO AND ELECTRONICS EXHIBITION

by the Northern Amateur Radio Societies Association

at the

**NORBRECK CASTLE HOTEL EXHIBITION CENTRE**  
**QUEENS PROMENADE, NORTH SHORE, BLACKPOOL**  
(Formerly held at Belle Vue, Manchester)

on **Sunday, January 29th, 1989**

Doors open at 11 am

The North's Premier Amateur Radio & Electronics Event

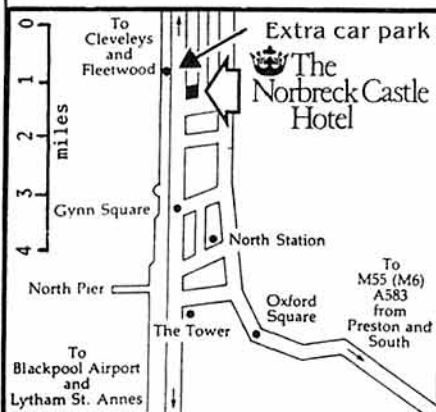
- ★ Construction Competition ★ Grand Raffle ★ Restaurant & Bar
- ★ Bring & Buy Stall ★ Amateur Computer Stands ★ Free car parking
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For **VIC20** we have our RTTY/CW transceive program. Tape £20.

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This is still a best-selling program and it's easy to see why. Superb performance on 4 modes, switch modes at a keypress to catch all the action. Text and picture store with dump to screen, printer or tape/disc. An essential piece of software for trawling the bands. Needs interface. **BBC-B/Master**, **CBM64** tape £25, disc £27. **VIC20** tape £25. **SPECTRUM** tape £40, + 3 disc £42 inc. adapter board (needs interface also). The **SPECTRUM** software-only version (input to EAR socket) is still available £25, + 3 disc £27.

**TIF1 INTERFACE** Perfect for TX3 and RX4, it has 2-stage RTTY and CW filters and computer noise reduction for excellent reception. Transmit outputs for MIC, PTT and KEY. Kit £20 (assembled PCB+cables, connectors) or ready-made £40, boxed with all connections. Extra MIC leads for extra rigs £3 each. State rigs(s). Interface only available with TX-3 or RX-4 Software.

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In 1890 Horace Martin searched for relief from the "glass arm" telegraph operators were getting from pounding the straight keys. His answer, the Vibroplex Original was an instant success. The vibrating lever bar automatically produces dots while dashes are made manually. Still popular today, the distinctive sound of the "Bug" can still be heard. It is the signature of the true C.W. expert.

All of our keys are available in Standard and Deluxe models. The Original and the Iambic are also available in the Presentation models.

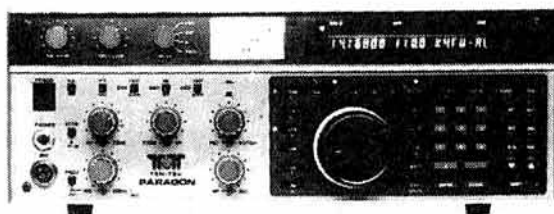
**Standard Model:** All Standard models come with a neat, crisp, textured, painted base with polished and chromed top parts. Attention to detail in the finishing process gives Vibroplex an unexcelled quality appearance. Highly conductive large coin-silver contacts provide a clear, sharp signal, and non-skid rubber feet keep the keyer in its place.

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| Ringo Ranger 2m antenna.....         | £42.95  |

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| SP940 Speaker with filters.....  | £87.55   |
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| AT440 Automatic Antenna tuner.....   | £144.82  |
| PS50 20 amp power supply.....  | £222.49  |
| TS140S HF Transceiver.....   | £862.00  |
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| D70 Morse Tutor.....              | £54.63 |

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| ★★★★★                                      | ★★★★★          |

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- ★ Size: 153mm x 33mm. Requires 10-14v DC supply.

**PRICES:**  
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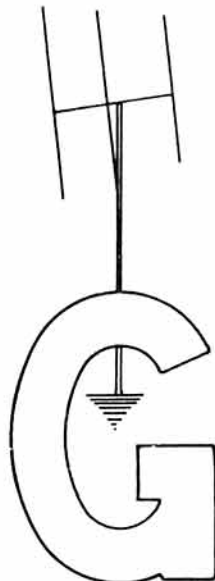
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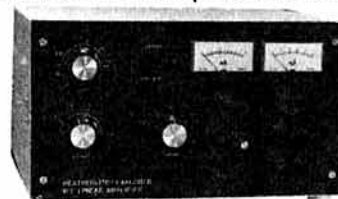
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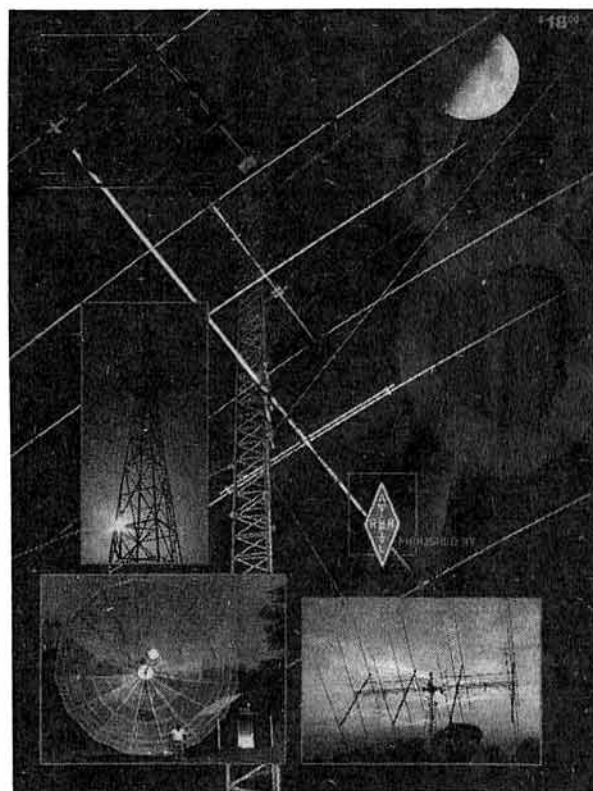
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## THE VALUE OF A DUMMY LOAD

Recent correspondence from amateurs which has appeared in various publications suggests that a dummy load is useless. Admittedly a solid-state transceiver does not need loading, and on that basis there seems to be no requirement for a dummy load. However, before owners of solid-state equipment sell their dummy loads, may I suggest that they consider the reasons why I suggest a dummy load should be kept?

The basic step in eliminating all forms of breakthrough is to connect the transmitter to a dummy load. Not having a dummy load makes it extremely difficult to prove that the transmitter is not in need of extra screening. Adjustments of the power output, microphone gain, two-tone tests etc should all be carried out into a dummy load – not on the air.

We all can tell of the amateur who does all his/her adjustments on a live antenna. Perhaps they ought to be invited to join the QRM club!

As one who runs a solid-state transceiver, I use a dummy load as an integral part of my pre-live antenna checks for power and microphone gain or cw adjustments. In this way, two years ago, I discovered that a p.a. transistor had gone u/s. As my atu is home-brew, the

only way to test this was into a dummy load. My antennas are built and tested by myself; on air tests are confined to times when the band is dead. Only then do I obtain my vswr curves, field strengths, radiation patterns and atu settings. G A Valley GM4YRS

## BACK IN TOUCH

Please find enclosed my cheque to cover my personal subscription for the coming year. It may be of interest to note that I was not planning to remain a member as frankly I feel that the RSGB is completely out of touch with what the ordinary amateur seeks to achieve in the hobby. However, after reading RadCom last month about the forthcoming licence I will stick it out another year and things may get better. What a nice change it was to see RadCom full of facts for a change and not the usual load of page-filling drivel patting each other on the back (You know, the first Anglo-French 144MHz QSO while sitting at the top of Ben Nevis wearing silly-hats).

What I want from a national society are hard facts. Leave the rest to the radio comics – you know the ones in W H Smiths which you can read in a full 30 seconds without having to buy them!

Paul Johnson

## KEEP OFF THE CALLING FREQUENCIES

There are a few amateurs operating on 6m who do not regard 50(dp)2MHz as the calling frequency. They are to be heard most evenings occupying this frequency even under flat-band conditions. This is very antisocial behaviour on a weak-signal band, when there is sufficient space above and below where they can QSY. This would not cause any problems to the more serious 50MHz operators. Why do they not QSY? One of two even tell the station calling them that 50(dp)2MHz is "the centre of activity" and other such rubbish. Would they do the same on, say, S20 on 2m?

It is necessary to have calling frequencies on vhf and uhf and this includes 50MHz. When these bands are wide open, then and only then does a calling frequency become defunct. Perhaps these anti-social operators are too used to 3.5 and 14MHz!

Can I appeal to the anti-social amateurs and the ones they mislead? When you make a contact on 50(dp)MHz, please QSY and leave the rest of us with a listening and calling frequency. It will not hurt you.

L M Mansfield G2SP

## HOBBY OR BUSINESS?

I am beginning to wonder whether amateur radio is still a hobby or whether it is fast becoming a lucrative business. In the past six months I have worked two new countries where activity is quite rare, and consequently have asked for QSL cards direct as requested by the respective operators, by sending a self-addressed envelope and two 10p stamps to cover postage.

I one case I duly received my QSL card direct but accompanied by five other cards for 'G' stations, with a request for me to post them to the stations indicated.

I complied, of course, and invariably received reimbursement of the postage incurred although not requested by me.

This made the cost of receiving a QSL card quite high, as the stations to whom I posted cards also indicated that they had sent 10p to the DX station. In addition, I received a card from the second new country via a 'G' station who had also been nominated as 'postman' by the operator concerned. He had, of course, kept the incoming 10p's.

I can only say that there must be some extremely rich 'rare ones' in the hobby – making their profits by retaining the 10p's and allowing others to do the posting.

The most notorious 10p collector was a well-known DX'er in the middle east; he would never QSL an swl report despite the number of 10p's sent to him. I know of several other ex-swls (now licensed) in this area who had attempted to obtain a QSL card from the operator concerned by forwarding up to six 10p's. But to no avail. Thank goodness the defaulter has now moved on.

My hobby within a hobby is collecting awards, and the same situation exists here with the average award outside the UK costing at least £5, but non-receipt of the award is quite common. I have one award from 1982 outstanding, one from 1983, two from 1984, two from 1986 and one from 1987; for the earlier applications I have sent written reminders to no avail. It's a costly exercise on my part, but for the recipient of the 10p's, dollars etc, a good business. Could this be another reason for youngsters not being interested in becoming radio amateurs? A Milham G3OPL

## KEEPING THE NEIGHBOURS HAPPY. AND YOUR WIFE

The letter from G4FTP in the October issue of RadCom about the erection of antennas by stealth reminded me of an experience I had which might amuse fellow members.

Many years ago at another QTH I had ambitions to erect a triband cubical quad. When doing a mock-up on the ground, I came to realise the enormous size of the thing and took fright. So, with a cowardly discretion, I compromised and decided to make it for 15 and 10 only. As the work proceeded the inevitable questions came from the XYL and were answered by me in what I hoped were disarming and disinteresting words. Eventually, as the true purpose of my endeavours dawned upon her, I found myself in a state of verbal warfare on the theme of "you are not putting that thing on our roof!"

It just so happened that at the time some nearby friends were having matrimonial difficulties and one Saturday morning the husband walked out leaving his wife with three small daughters. My wife's reaction was one of great sorrow and concern. But, more than that, there came to her the realisation of what a good and faithful husband she had; a sentiment which she expressed in the most beautiful words I have ever heard – "you can put up whatever you like, love". I had that quad in place inside 24 hours

and it stayed there for 18 years while I worked the world!

I do not advocate the wrecking of someone's marriage in order to achieve your ends but it does appear that with a little bit of stealth and an enormous amount of luck, it is amazing what you can get away with! J V Hoban, G3EGC

## SUPPORT THE RALLIES

This is an open letter to all Amateur Radio retailers. I am instructed by the Committee of the Telford Amateur Radio Rally Group to express our disquiet at the lack of major Amateur Radio traders at recent Amateur Radio rallies, including our own major event in September.

Many visitors to the rally approached us with the same view, and we feel it necessary to bring this opinion to the attention of the traders concerned.

While we fully understand that the overriding concern in this competitive world is to have a commercially viable operation, we would like to put forward the view that perhaps Amateur Radio, and indeed the traders themselves, were done a disservice by this absence. One appreciates that perhaps a prospective buyer is not inclined to conclude a deal for an expensive piece of equipment in the hurly burly of a Radio Rally. We do, however, feel that such an event can be the showcase for such equipment, and the viewing and comparison of the goods available is to the advantage of all.

Please, traders concerned, carefully weigh up this view, which originates not only from ourselves, the organisers, but also those who they should value the most, their prospective customers, when they consider Rally attendance. Come along next year, Gentlemen. We will be pleased to see you! Telford Rally Committee (Martyn Vincent, G3UKV, Hon. Sec.)

## TELL US WHERE TO BUY THE PARTS

The modular transceiver article in October's RadCom is noted with interest. However, I am sure that fellow homebrewers will probably have had a similar experience regarding supply of components and metalwork as this part of any project to my mind is the most difficult. I note the comment in the same issue that HL Smith are no longer chassis bashing(?) and further, and that the G4CLF board is not in the CirKit catalogue. A published alternative supplier would be appreciated.

Readers might like to note that aluminium and steel boxes, panels and project cases can be obtained from Minford Engineering, Sun Street, Ffestiniog, Gwynedd, LL41 4NE Tel: 076676 2572; and Radio Component Specialists, 3237 Whitehorse Road, Croydon, Surrey Tel: 01-684 1665.

Your 'helpline' page should be encouraging members to mention supply houses; for instance kites in spinnaker nylon, small to large, cost between £6 and £20 from The Kite & Balloon Co. Ltd, The Old Church, 160 Eardley Road, Streatham, SW16 5TC (01-679 8844 for a free catalogue).

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Polypropylene rope (do specify this, not cord or string) in various sizes, eg 220m in blue 4mm is about £17 from Ian Campbell & Co. Ltd. 7-9 Chaucer Industrial Estate, Watery Lane, Kemsing, Sevenoaks, Kent, TN15 6PL (0732 62544). I am not suggesting using this rope to fly a kite – that's better served with monofilament fishing line available from any fishing tackle shop, eg 150m 40lb breaking strain is about £3.

A few more similar supply houses published in Helpline and who knows, in a few months we could compile a superb directory of suppliers which may take out some of the frustration of "where to get it".  
G Clarkson, G3RHM

## FRENETIC PHONETICS

Apropos the recent correspondence about phonetic alphabets, you may be interested to see this old letter which I have just unearthed. It appears that "Clarry" wasn't much impressed by the NATO alphabet either .....

'Dear OM, having studied the NATO Phonetic Alphabet which you were kind to send me under date of 20 August 20, I am of the opinion that it would be unwise for the Society to give publicity to it in the Bulletin. I feel convinced that the average

amateur would not adopt an alphabet which uses such curious works as JULIETT, SIERRA, TANGO and UNIFORM.

'Whilst some confusion no doubt exists at the moment the position would rapidly become worse if the RSGB began to campaign for the use of the NATO alphabet.

'The alphabet reproduced in the Amateur Radio Handbook was in common use when that book was published prior to the war. Since then all sorts of queer alphabets have been introduced including the one adopted at the ITU Conference in Atlantic City during 1947. If there is an official AMATEUR RADIO alphabet it is that one, but who is likely to use such words as Edison, Upsala and Xantippe?' John Clarricoats, Editor (dated 22 August 1957).

## THE HUMAN ELEMENT

Receiving my belated copy of October's RadCom I studied the front cover depicting Andrew, G1XYE, the 'Young Amateur of the Year', and Cecil Parkinson with interest. I noted their immaculate dress – both in smart suits and the picture of sartorial elegance. The operating position at GB75RS was clean and tidy too. Not a speck of dust on the equipment, woodwork gleaming; bench and shelves uncluttered and tidy – an example to us all. Ruefully, I started to feel ashamed of my littered shack. Then I glanced at the bottom left of the picture, saw a familiar sight, and took heart.

**SMC LTD really are the kind of benefactors who are donating a YAESU FT770RH 70cm fm transceiver, and ARE Communications Ltd are the generous providers of an FT23R 2m transceiver**

in the RSGB's 75th Anniversary Lottery, despite the confusion generated by advertisements to the contrary in recent issues. Quite how your editor's records never quite got it right we'll never know, but what is certain is the strength of our most sincere apologies to both companies for any inconvenience or annoyance caused by the mix-ups.

As you read this, the draw should be imminent. We are certain that the lucky winners will appreciate their splendid prizes.

It eased my conscience no end, I can tell you, and made me feel a whole lot better, to see the tangle of wires tucked under the bench!  
P M Massheder, G0EIF

## SECURITY IN CONTACTS

We ran the Special Events Station GB75BPW from this QTH in early July; sponsorship was from a local burglar alarm company who offered to supply and install £250-worth of burglar alarm within 50 miles of Bexleyheath.

We organised a draw from QSL cards received by us before 1.9.88 and the lucky winner was George Haylock, G2DHY. I would appreciate mention of this in RadCom for the benefit of readers who contacted us and sent in QSL cards. The alarm company who supported us was Bluebird Security of Crayford, Kent.

The SES had 629 contacts and 43 countries. Of the contacts 373 were in our target area London and the South East.  
Peter, G0HUM

## IN PRAISE OF CW. AGAIN

Occasionally in RadCom I see a letter from someone saying how antiquated and out of date cw operation is. A typical example of this was the letter from G1SIG in the September issue. What he and many others seem to forget is that there are many people, myself included, who because of speech difficulties, would find the use for a 'phone rig totally impossible. I suffer from a rather embarrassing stutter, so although at present I am only a listener, no doubt within the next couple of years I will be 'on the air', and when I am there is no way I could use ssb. It will have to be strictly cw for me. I do not believe that this fact makes me either a museum piece, or a suitable candidate for a geriatric home.  
Alex Dodd, BRS48178

The September issue of Radio Communication is out of print, and several members are in need of copies. Please let the editor know if you have a copy spare.

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"They said I couldn't work DX with just 100 watts. Especially with a radio that has less than 1000 switches on the front panel.

But the truth is, I'm working lots of DX, more than some of these blockbuster types, thanks to my Yaesu FT-747GX.

You see, my no-nonsense FT-747GX was designed with me in mind, so I can hop around the band fast to nail those DX stations. While the other hams are warming up their amplifiers, I'm working the new country!

My FT-747GX has a super receiver, with a directly-driven mixer for great overload protection. And, Yaesu included the CW filter in the purchase price

(I used the money I saved on postage for the QSL cards!).

And my FT-747GX is loaded with other features. The receiver works from 100kHz straight through 30MHz, and it's a fantastic shortwave broadcast receiver. I can use all twenty memories for that alone! Plus it's got dual VFOs. A noise blanker. Split frequency operation for the pile-ups. And scanning up the band helps me check out openings as they happen.

I just put in the optional crystal oven, and next month I'm going to pick up the FM board.

And with the money I saved when I bought my FT-747GX, I got a second ten-metre antenna for satellite work on the high end of the band. I use my personal

computer to tell me what satellites are going by, and the computer even sets the frequencies on the radio for me.

Now my friends are getting FT-747GX rigs, too. I knew they'd figure out my secret weapon sooner or later. But now I'm setting the pace!

Thanks, Yaesu. You've made a rig that makes sense, at a price I can afford."

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