Radio Communication

The Journal of the Radio Society of Great Britain

December 1992

Volume 68 No 12

THE VOICE OF AMATEUR RADIO FOR 79 YEARS

HIGH THERE!

JOTA 92 FROM THE BT TOWER

Peter Hart Reviews the Lowe HF150 – page 41

For the very best in Communications Receivers
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LOWE HF RECEIVERS DO IT AGAIN!

HF-225 voted "RECEIVER OF THE YEAR" in 1990 by W.R.T.H.
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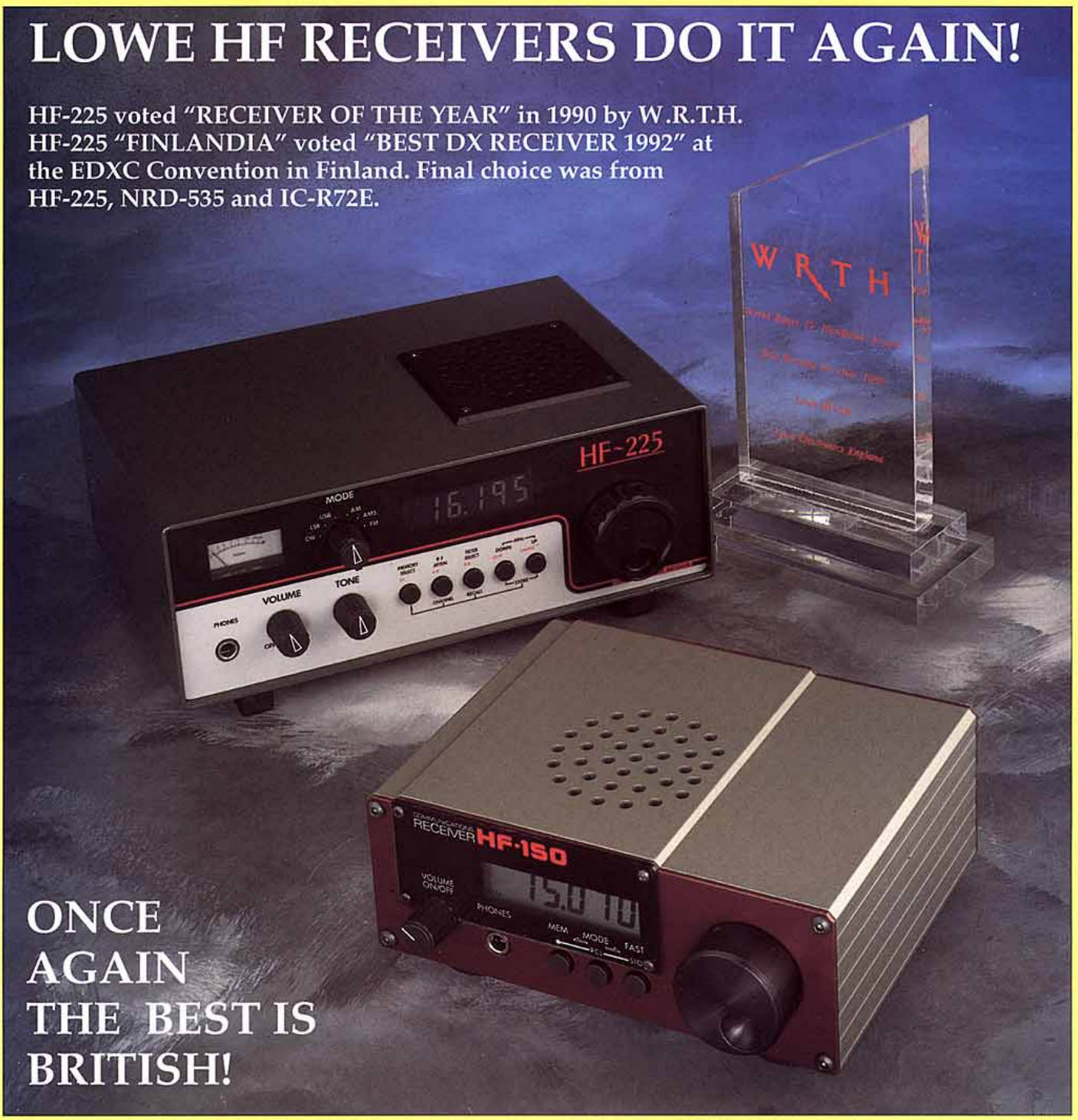

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Radio Communication

Food for thought

This month we have a couple of unusual uses for food containers. Take a look at the *QRP* column (page 58) for a new way to use an After Eight Mint tin, and the 'GDO' feature (page 34) for what to do with a discarded baked bean can. Happy eating.

Getting better all the time

We have plans to improve *RadCom* even further during 1993, including some new columns, new regular contributors and, by popular demand, *Propagation Predictions* in colour. Watch this space.

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One of the most useful pieces of shack test gear is a GDO. Jack Hardcastle, G3JIR, gives full constructional details. A colour feature.

41 THE PETER HART REVIEW: HF-150 Receiver
This month's in-depth review by G3SJX appraises this budget-priced receiver designed and manufactured by Lowe Electronics Ltd. A colour feature.

49 EUROTEK - ideas from abroad
Gerard Scheepers, PA0GMS, wrote an article for *Electron (NL)* on a simple 70cm power amplifier with RF VOX, designed to boost a Pye Pocketphone to 15W. Erwin David, G4LQI, has translated and abridged it for *RadCom* readers. In colour.

COVER PICTURE:
Several of this year's Jamboree on the Air stations operated from the great towers of the world. GB2BT was on the 34th floor of London's British Telecom Tower, just below the 'BT' sign. Colour feature - page 8.

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RADIO SOCIETY OF GREAT BRITAIN

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

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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

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UK associate member under 18: £15.00. Family member: £12.00
Corporate (Concessionary): £25.00 over 65 or full time student under 25. (Applications should provide proof of age at last renewal date and/or include evidence of student status.)
Affiliated club or society/registered group (UK): £15.00 (including *Radio Commmunication*). (Subscriptions include VAT where applicable.)

Special arrangements exist for blind and disabled persons. Details are available from RSGB HQ.

Membership application forms are available from RSGB HQ

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The RadCom Leader

End of a Year

AS YET ANOTHER YEAR draws to a close the HQ staff can look back with satisfaction on what has been achieved in 1992.

A great deal of hard work has been undertaken to reorganise the administration at HQ, both in membership services and sales. We are now seeing positive results from this reorganisation.

Refurbishment at Lambda House has commenced and progresses apace. The Society has organised a very successful strategy conference and, in certain areas, plans laid at Warwick are already being actioned achieving good results. Our relationships with outside agencies and sister societies remain strong and the year end sees the Society financially on a firm footing.

On a more personal note I would like to thank the Council and officers of the Society, the members and last but not least my staff for the support they have given me during my first six months in the General Manager's Chair.

As 1993 dawns, the Society's 80th year, I look to the future with optimism. A platform is being laid from which we can go from strength to strength.

In closing may I take this opportunity to wish you all a happy and peaceful Christmas and a prosperous New Year.

Peter Kirby
General Manager

A CHRISTMAS MESSAGE FROM THE PRESIDENT

"CHRISTMAS COMES but once a year, but it when it comes it brings . . . ." – the end of my Presidential year. The time has flown, as no doubt each President of the Society finds and the end of my term has come very quickly.

During the year I have visited many locations, spoken to many members, replied to a mountain of mail and spent, so it seems, weeks in meetings. I know that when I hand over the Presidential chain of office to Peter Chadwick, G3RZP, he faces the same busy year and heavy workload and I wish him every success during his year in the 'hot seat'.

I have, as has every President to whom I have spoken, received tremendous support from the volunteer officers, the membership and, not least, from the dedicated hardworking staff. I thank one and all for their support during the past year.

May you all have a very happy and peaceful Christmas and a prosperous new year.

Terry Barnes, GI3USS
President

NEWS & REPORTS

- THE TWO Canadian national societies CRRL and CARF are working towards a merger, recognising that a single unified organisation would be more effective than two in competition.
- STOLEN from a car in Walingford, Oxon, in October: Trio 2300 S/N 0090344. Microwave Modules 2m linear S/N 30LS2876312. Info to PC Hennessy at Wallingford Police 0235 512929.
- STOLEN from a car in W Hammey, Oxon, in September: FT-290 S/N 3300360. Info to G8PKN, QTHR, or Thames Valley Police on 0635 31000.
- STOLEN in the Edinburgh area: IC-R9000 S/N 01060. Info to PC Forsyth at Lothian and Borders Police 0506 31200.
- CONGRATULATIONS to RSGB Zone C Council Member Neil Lasher, G6HIU, who has a new baby daughter.

Vote Now

THE DEADLINE for the *receipt* of Council election ballot papers is 12 noon on 30 November. If you haven't yet voted, please do so *immediately*. Election details and a ballot form were sent to all members inside the *Annual Report* with last month's *RadCom*.

Yorkshire RLOs

The new RSGB Liaison Officer (RLO) for South Yorkshire is Alan Whitehead, G4JKW, 8 Limes Way, Gawber, Barnsley, South Yorkshire S75 2NS; telephone 0226 299031.

The new RLO for West Yorkshire is Derrick Allan, G0RZP, 283 Cliffe Lane, Gomersal, Cleckheaton, West Yorkshire BD19 4SB; telephone 0274 872244.

GM0MUV supports Fiennes and Stroud in their two thousand mile South Pole walk

The Men Who Went Out in the Cold – *Again!*

RSGB MEMBER Morag Howell, GM0MUV/VP8CME, has been given permission by the Radiocommunications Agency to use the callsign GB4MSS/VP8 from her expedition base camp in the Patriot Hills region of the British Antarctic Territory (2850ft asl and approximately 80°S, 8°W). As part of the Pentland South Pole Expedition, she is assisting Sir Ranulph Fiennes and Dr Mike Stroud in their attempt to walk unsupported (ie no vehicles or dogs) 2,200 miles across the Antarctic in just 100 days. Their only communication will be with Morag at base camp.

The expedition will conduct research into the limits of the human body's resistance to stress, extreme cold and starvation. There will be plenty of opportunity for this as the journey involves 400 miles of moving glaciers which fracture without warning, a 10,000ft climb pulling 400lb sledges, 120kph winds, white-outs, snow bridges which can collapse under a man's weight and summer (!) temperatures of -45°C.

Adventurers Sir Ranulph Fiennes (left) and Dr Mike Stroud prepare to set off to the South Pole. The route of their 2,200 mile journey is shown behind them.

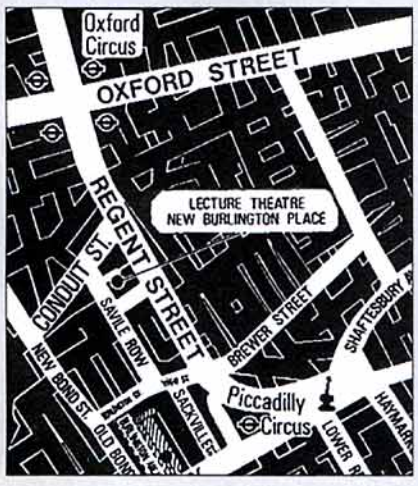
The intrepid pair set out in mid November and are due to reach the South Pole within two months before moving onwards to their destination at Scott Base.

Morag Howell, GM0MUV, is providing communication between the expedition and the outside world. The UK end is manned by her husband, RSGB member Laurence, GM4DMA.

In 1990 Ran and Mike attempted to walk to the North Pole unsupported and raised over £2M for the Multiple Sclerosis Society (MSS). They hope to raise a similar amount this time.

continued on page 8 ▶

Not a spiderman movie but a practice run on the Trade Tower at London's Plantation Wharf which is standing in for the crevasses, several hundred feet deep, which the two-man polar expedition will encounter.



The RSGB Annual Meeting 1992

THIS YEAR'S RSGB Annual Meeting takes place at the Royal Society of Chemistry Scientific Societies Lecture Theatre, the same venue as last year. The meeting starts at 2pm but the doors will be open from 12 noon for those wishing to partake of soup and sandwiches, buy RSGB books or simply chat with old friends.

Note that there are no car parking facilities nearby. The nearest tube stations are shown on the map.

A notice setting out full details of the Annual Meeting was published on page 6 of November's *RadCom*.

RSGB HF and IOTA Convention

Don Field, G3XTT, reports on this major event in the RSGB's calendar

AFTER TWO YEARS at Daventry, the RSGB HF Convention returned this year to the London area, in the beautiful surroundings of the ICL Beaumont Training Centre near Windsor. The change of venue was also accompanied by a change of format as this year's event included an IOTA (Islands on the Air) Convention which attracted about 100 overseas visitors from the US, Japan, Israel, Pakistan and most countries of Europe.

Roaring Success

THE SATURDAY DX Dinner was attended by over 200 visitors from 30 DXCC countries. After the dinner a plaque was given to the group which had endured the hardest journey to attend the Convention; this went to UA9OBA, UA9OPA and UZ9OA who had undertaken a gruelling journey by land and by air from Siberia in order to meet fellow IOTA enthusiasts. And to think that some complain if they have to drive for more than an hour or so to such events . . . .

The Convention proceedings began on Friday evening when Roger Balister, G3KMA, and his wife Jill kindly invited early arrivals to an evening buffet at their home near Woking. So many decided to come that Roger ended up having to hire a marquee for his garden!

The Saturday IOTA Convention proved to be a roaring success. The morning proceedings were given over to presentations about the workings of the IOTA programme by its Director, G3KMA, and members of the IOTA Committee, followed by a lively discussion of a range of issues from what exactly constitutes an island to the matter of appointing overseas checkpoints for IOTA applications.

Expeditions

THE TEMPO changed in the afternoon when Larry, K5MK, talked on how to organise a successful island DXpedition, and was followed by a series of slide shows by some of those who had been at the sharp end of the pile-ups. G3KMA also used the occasion to announce an RSGB-sponsored IOTA contest, the first of which will be held over the weekend of 24/25 July 1993.

The evening dinner was followed by presentations, particularly to those who had done most to ensure the continued growth and success of the IOTA awards programme (by far the RSGB's most successful awards, with a new certificate issued every day of the year and the number of applicants growing at 20% or more per annum!).

Bob Locher, W9KNI, also gave a most amusing talk, taking a light-hearted swipe at DXers and DXing, The evening ended with a presentation by Terry Dubson, W6MKB, of the 1992 VP8SSI South Sandwich Islands DXpedition, which left all the audience in total admiration of a job well done in the most difficult of conditions.

Spoilt for choice

THE SUNDAY programme appears to have led to a common complaint - that there simply were not enough hours in the day to enjoy all that was on offer! Three simultaneous lecture streams were run, centred on construction, operating and other HF topics. It is not possible here to give more than a flavour.

The day started with a choice between Ross Clare, GW3NWS, on how to build your own linear, a presentation by Strumech on the use and abuse of towers, and a talk by John Linford, G3WGV, and Don Field, G3XTT, of the Reading and District ARC on how to win Field Day, which they have done for the past two years [see November *RadCom*, p65 - *Ed*].

Not only did GW3NWS give some valuable hints and tips during his lecture about the ins-and-outs of building a linear amplifier, but he then ran a 'surgery' in one of the upstairs rooms. This proved highly successful and is a formula which the organisers will expand in the future.

Other technical lectures included *RadCom* reviewer Peter Hart, G3SJX, on developments in HF transceivers, Peter Chadwick, G3RZP, on the myths and reality surrounding SWR, and Mike Grierson, G3TSO, on home-brewing HF transceivers. All are well-known to readers of this magazine and their lectures were very well received.

DX inside out

IAN BUFFHAM, G3TMA, presented a summary of the HF DXing articles which have appeared in *RadCom* - members of the RSGB HF Committee will be available to take this same presentation around to clubs.

Robin Page-Jones, G3JWI, spoke on EMC, always relevant, and once again there was a presentation on, and demonstration of, the DX PacketCluster, a topic which is proving of increasing interest to both HF and VHF DXers alike. On the operating side, the contest forum dealt with matters such as log accuracy and checking, while the slide presentations ranged from the Malaysian islands (Hans, DF5UG)

Visitors from 30 DXCC countries were welcomed by President Terry Barnes.

An enthusiastic audience heard Ross Clare, GW3NWS, talk about HF linear amplifiers during Saturday's lecture session.

IOTA Award Programme Director Roger Balister, G3KMA, presented plaques to several overseas visitors.

Irina, UZ9OA, received the DX Travellers Prize for making the journey from Siberia to attend the Convention.

Drew Givens, GM3YOR, and his XYL Moira, plainly enjoyed Saturday's DX Dinner.

Bob Locher, W9KNI, amused diners with a light-hearted swipe at DXers and DXing.

Hans, DJ6TJ, brought fraternal greetings from IARU Region 1.

Premier IOTA Award recipients included (top) Jean-Michel, F6AJA, (middle) Bernhard, DL2GAC, and (bottom) Larry, K5MK.

through the Pacific (Andy, G4ZVJ), to Clipperton Island (Vincent, G0LMX) and back to Sri Lanka (Doug, G0LUH).

For the first time the HF Convention had a commercial sponsor in the form of Martin Lynch, who kindly arranged for free tea and coffee to be available throughout the day. Thanks also to those who provided raffle prizes: Canberra Communications, Datong, G3PMR - Shacklog Software, the G4MBC group, Lowe Electronics, Siskin Electronics, SMC, W9KNI - Bencher Paddle, Practical Wireless, F6EXV, G3PJT, G4DYO, G3KMA and the RSGB. The proceeds, as ever, went to the RSGB DXpedition Fund which exists to help DXpeditions with their expenses, such as QSL cards.

Refreshments were generously provided by sponsors Martin Lynch.

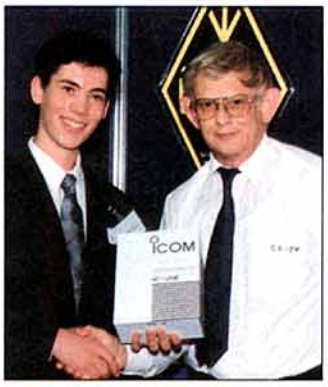
Presentations

THE MAIN PRIZE of a Bencher paddle key was won by DF5UG, but not before the RSGB President had drawn his own ticket and then hastily put it on one side! As if all the above wasn't enough, the Young Amateur of the Year presentations took place during the day (see Nov *RadCom*, p7) and there were displays by RSGB committees and software demonstrations. An HF station, GB1OTA, organised by the Chiltern DX Club, made almost 1000 QSOs during the weekend.

It is hard to recall all the famous callsigns to be seen during the Convention but some come easily to mind. RA3AUU, SM0AGD, K5MK, DL2GAC, DK7PE, JI6KVR, F6EXV, ON5NT, DF5UG and DK6NP were just some of the overseas visitors to have been involved in DXpedition operations. It was also good to see the IARU HF Managers for Italy and Germany, Mario, I2MQP, and Hans, DJ6TJ.

Particular thanks are due to Bob Whelan, G3PJT, Roger Balister, G3KMA, and other HF Committee members for their hard work in organising this most successful event, and to Don Beattie, G3OZF for arranging the use of the excellent venue. Make sure you don't miss next year's RSGB HF Convention!

The UK PacketCluster Group stand attracted a great deal of interest.



Paul Nicholson of ICOM (UK) presented the Young Amateur of the Year runner-up, Neil, G7NGM, with an IC-2iE transceiver and other goodies.

Emergency Communications Officer

JOHN IRVING, G4XJT, has been appointed RSGB Emergency Communications Officer with immediate effect. He can, in the first instance, be contacted via the Chairman of the Membership Liaison Committee, Clive Trotman, GW4YKL, QTHR.

Novice Exam

THE NEXT City and Guilds of London Institute Novice Radio Amateur's examination (subject 773) will take place on Monday 14 December, not the 7th as was previously stated.

Correction

IN THE repeater franchise feature (*RadCom*, October), the GB3DS Repeater group was incorrectly listed as not having paid. Apologies to them.

Mencap Appeal

THANKS TO your efforts, a large sum has been raised for Mencap. Details of prize winners and amounts will be published in next month's *RadCom*.

A Code-Free HF Licence

ONE OF THE topics currently being discussed by the RSGB's HF Committee is the question of access to the HF amateur bands (below 30MHz), without the necessity for a Morse Code qualification. Such a licence would be referred to as a 'code free licence'.

Licensed radio amateurs in the UK will be aware that amateur radio is controlled internationally by the regulations set by the International Telecommunications Union which is an agency of the United Nations. Current ITU regulations require that radio amateurs operating at frequencies below 30MHz demonstrate their proficiency at sending and receiving Morse Code, though the speed and nature of any test is not specified. The HF Committee wishes to consult as widely as possible and seeks input on the question of a code free licence, from any UK amateur or SWL, whether they are for or against the idea of a code free HF licence. Because of the anticipated level of input, letters will not be replied to individually, but will be acknowledged. Views, opinions and comments should be sent to: The RSGB HF Committee, c/o RSGB HQ, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE, to arrive not later than 8 March 1993. Letters should be clearly marked, 'Code Free Licence' on the bottom left hand corner of the envelope.

1993 Presidential Installation

THE SOCIETY'S 1993 President Mr P Chadwick, G3RZP, will be installed at an evening reception and dinner on Saturday 9 January (8.00 for 8.30pm). The venue is the Bonnington Hotel, Russell Square, 92 Southampton Row, London WC1.

Tickets for this prestigious event are £20 per head. Members wishing to attend should apply to Justine Hodges at RSGB HQ by Friday 11 December. Please mention any special dietary requirements when applying.

Council Members Retiring

RETIRING FROM RSGB Council at the end of December are John Case, GW4HWR, and George Jessop, G6JP. They are thanked for their services to the Society.

John Case has had a long involvement with the Society, culminating in being elected President in 1991. John's special interest has been introducing young people to amateur radio. He was very involved in Project YEAR which led to his going to Buckingham Palace to present the first few Novices to the RSGB patron HRH Prince Philip, the Duke of Edinburgh, last year. John continues to serve the Society as Chairman of the Training and Education Committee.

George Jessop joined the Society in 1929 and was first elected to Council in 1968. He served for seventeen years on the Technical and Publications Committee. He was elected President in 1974 and a year later joined the staff as General Manager and Secretary until 1977. In recognition of his incalculable contribution to the work of the Society he was made a Vice President in 1991.

How British Telecom, the Scouts and amateur radio combined to provide an unforgettable experience.

A Shack With a View

THE 35TH JAMBOREE on the Air (JOTA) took place over the weekend 17/18 October. This year's theme was "Let's Talk".

The scouts joined up with the World Federation of Great Towers to put on stations at towers round the world, including Blackpool Tower (GB2TWB), the Empire State Building, Centrepoint in Sydney, Donauturm in Vienna, CN Tower in Toronto, the Tour Olympic in Montreal, the Eiffel Tower in Paris, the Euromast in Rotterdam and Moscow's Ostaniko Tower.

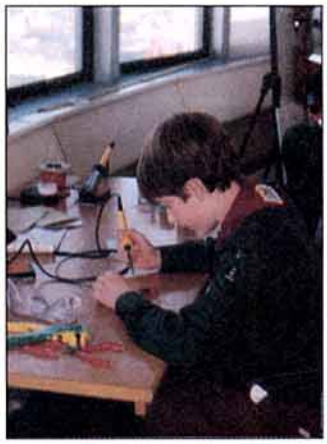
Thanks to the generosity of British Telecom, JOTA station GB2BT operated from the top of the BT Tower in London. The display occupied all of floors 33 and 34 (where the restaurant used to be) and was ably organised by the Scouts National Amateur Radio Adviser, Paul Bateman, G1ZOV. Many parties of scouts from all over London had an opportunity to see amateur radio in action, combined with a breathtaking view.

Stations on air included two for HF, one running VHF/UHF FM, a packet radio demonstration and a duplex 23cm ATV link to Warlingham in Surrey. Lowe Electronics and RF Engineering are thanked for the supply of antennas. Interestingly the HF stations did not fare well, an experience reported by some of the other tower stations. Does anyone know how to get out well on HF so close to a 160m high earth rod?

PHOTOGRAPH JOHN FOGG

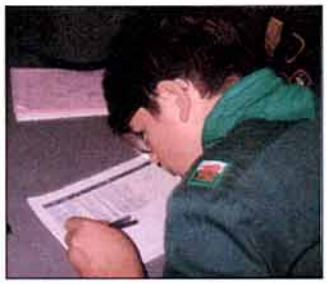
Part of the 'room at the top' generously provided by BT. The five stations at GB2BT proved almost as great an attraction as the stunning all-round view.

One HF station was manned for most of the weekend by James, 2E1AWP.



Visitors were given the chance to build their first electronic project.

Hannah, 2E1ABE (left) and Suzanne, 2E1AAI, putting out a CQ on 2m FM.



The final chore, writing up the formal log and filling in all those QSL cards.

Rowena, 2E0ADA, at the packet radio station watched by Paul, G1ZOV.

The most popular demonstration was the Home Counties ATV Group's full duplex 1.3GHz TV link to Warlingham. All the equipment was home-brew.

Another JOTA station. The 1st Kirk Michael (IOM) Scouts, at GB2MSR.

Out in the Cold - Again!

continued from page 5

Morag will be trying to contact as many amateurs as possible when time permits during her three-month stay and anyone receiving a QSL card is asked to make a donation to the MSS. She will be on all HF bands, SSB only, until around 10 February 1993. QSLs should be sent to the UK GB-series Bureau.

The main expedition sponsor is Pentland Group PLC and amongst many others are the RA, the RSGB and South Midlands Communications Ltd.

The Multiple Sclerosis Society can be contacted via David Harrison, Harrison Bergman Ltd, 57-59 Gloucester Place, London W1H 3PE.

HQ open at Christmas

FOR THE first time in many years RSGB HQ will be open between Christmas and New Year. Take the opportunity to come and see us, buy your books at the counter prices in the book shop, and meet some of the staff. Opening times will be 9.15-5.15pm on 29, 30 and 31 December.

● 1992's SECOND EI Activity Day is on Sunday 27 December. All 26 EI counties will be active and an award is available for working 20 of them this year. Apply to: IRTS Diamond Jubilee Awards Manager, Dave Moore, EI4BZ, 12 Castle Ave, Carrigtwohill, Co Cork.

● VOLUNTEERS are needed by Enterprises By The Blind to read parts of *RadCom* onto cassette tape. Contact Mr Gerrard, G3LAZ, on 0582 27588.

● G1EQU FROM HULL won a colour TV in the North Wakefield RC Rally draw in September.

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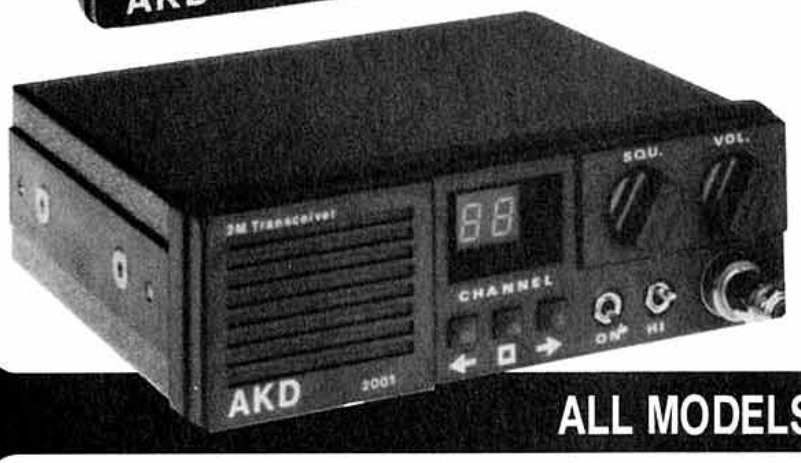
70.250 to 70.4875 MHz in 12.5 KHz steps. 20 channels cover FM Calling and Packet. RF output 25 and 5 watts. RX sensitivity better than .25uV.



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144-146 MHz 25KHz channel spacing. PTT repeater tone burst. RF output 25 and 5 watts. RX sensitivity better than .4uV.

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Access

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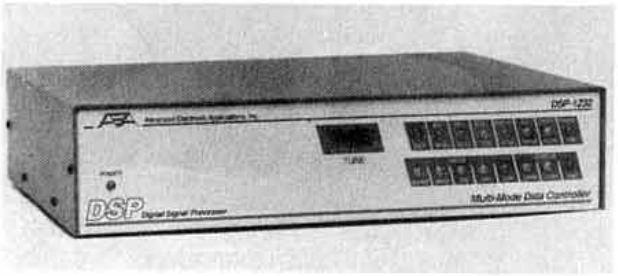
DSP-1232 DSP Data Controller



The DSP-1232 multi-mode data controller is the most powerful available to amateurs. Includes all known amateur digital signalling modes from HF Amtor to packet satellite operation, all in one future-proof unit. New modems and modes can be added with a ROM change. The Digital Signal Processing modem built by the company with the experience of over 60,000 multi-mode data controllers sold world wide.

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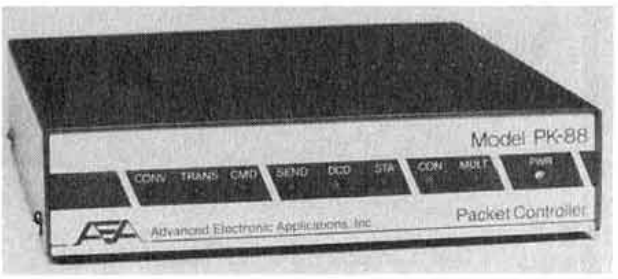
PK-232 MBX Multi Mode Controller

The world's favourite multi-mode data controller. More PK-232s are in use than any other multi-mode data controller. All the most used HF and VHF data modes in this well proven unit with an outstanding reputation.

PK-232 MBX: £339.95
PC-PAKRATT II software: £49.95

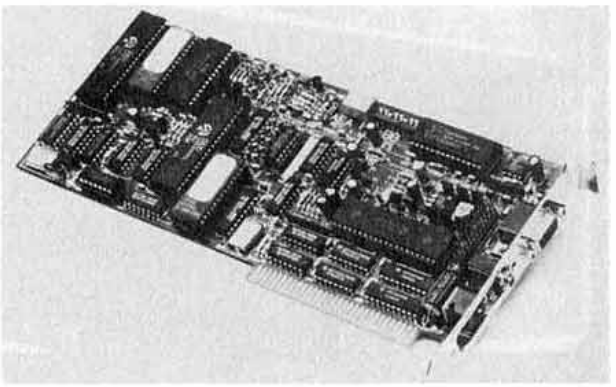
PK-88 Packet TNC



Robustly packaged with all the most needed features, this PK-232 compatible unit gives outstanding packet radio performance on both HF and VHF.

PK-88: £149.95
PC-PAKRATT 88 software: £32.95

PCB-88 Packet TNC for the IBM-PC



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Prices are correct at time of going to press, but may vary according to exchange rate.

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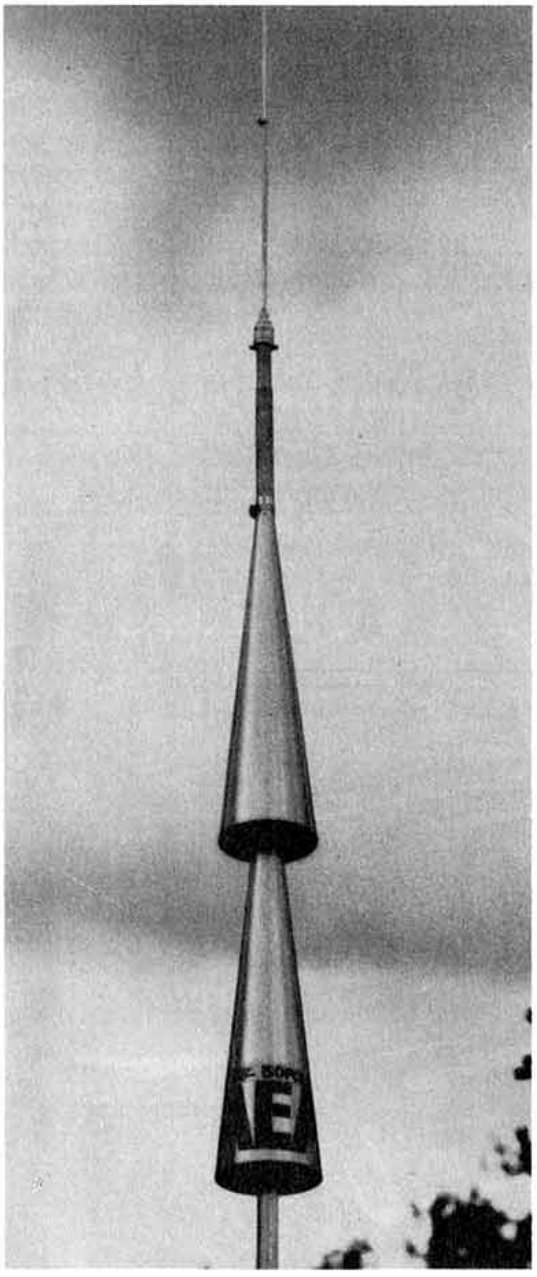

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The unique decoupling cones give virtually zero degrees radiation angle all round the horizon, bringing in repeaters you never heard before. Computer noise picked up on the feeder is decoupled, making this the perfect packet radio antenna.

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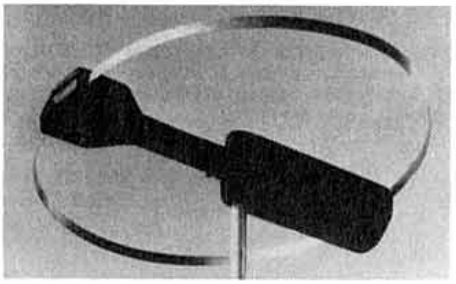
Quite simply the best Morse keyer there is. 8,000 characters in 20 memories. Contest serial number generation. Many training modes including real time contest and QSO simulation. Computer interface. Too many features to list here.

MM-3: £189.95

IsoLoop 10-30 HF Loop Antenna



The perfect answer to HF transmission where there is no room for an antenna. Only 43 inches in diameter, the IsoLoop performs as well as a dipole and covers 10 to 30 MHz with 150 watts power handling capability. Very low noise on receive. Complete with remote antenna tuner. A true breakthrough.

IsoLoop 10-30: £299.95

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We stock a range of home digital weather stations, manufactured by Davis Instruments in California.
Perception II displays indoor temperature, humidity and barometric pressure.
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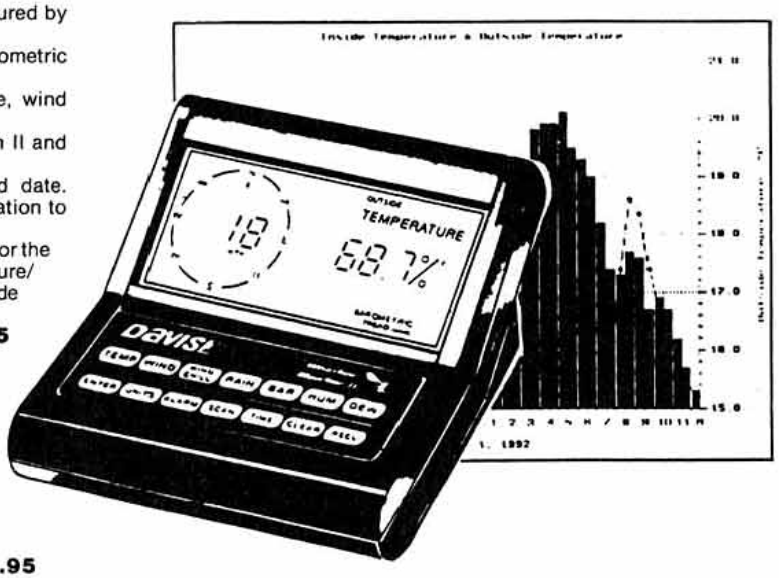
All models feature high and low indication with time and date. Programmable alarms and scan routines allow you customisation to meet your needs.
You can add an optional rain Collector to the Weather Wizard II or the Weather Monitor II to measure rainfall. Or add the Temperature/ Humidity sensor to the Weather Monitor II to measure outside humidity and dewpoint.

Perception II: £149.95
Weather Wizard II: £229.95
Weather Monitor II: £339.95



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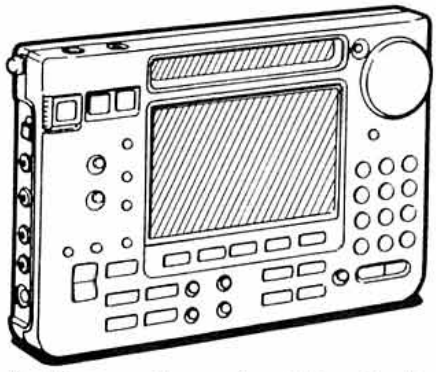

These are ideal for use with any of our HF weather broadcast decoding systems. The name of each station can be stored together with all relevant frequencies. Station selection is at the touch of a button. The ICF-SW 77 even selects the strongest frequency for that station automatically. 100 Hz tuning resolution for the 55, 100 Hz for the 77, which has a greater memory capacity.

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Complete systems, ready to plug in and go. Built to the highest professional standards.

All systems come complete with software, documentation, computer interface, cable, receiver, pre-amplifier and antenna. Very easy to use, giving superb high quality images. False colours and animation available. Supports VGA, SVGA displays on 286 processors and above. Includes features hitherto seen only on professional systems costing many times more. Colour brochure available on request.

Met-2a (Meteosat): £975.19
NOAA-2a: (NOAA option): £587.44

Note: All of the above HF radio related products require the use of a good quality general coverage SSB receiver or transceiver.

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HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham
B17 8QB

IT'S THE END of another year and I would like to begin by wishing all readers and contributors the best of health and happiness (and DX!) for the holiday season.

Please note that G3GIQ, who prepares the nine band tables, intends to change the way in which they are presented in 1993. He will list callsigns in order of their scores on different bands each time. Please let Henry know if you do *not* approve . . . .

DX NEWS

A NEWS RELEASE from ARRL says that documentation has now been received from 5R8GW and that DXCC credit will be given for contacts with him since 12 December 1991. Goran Eriksson now has a Kenyan licence and is 5Z4XW. He keeps skeds with Sweden and with Z22JE at 1800 on Sundays near 14.330MHz. 3X0HLU is new in **Guinea** and the operator's name is Daniel. Hartmut, 9X5HG, in **Rwanda** is often near 21.010MHz in the morning and on 7MHz CW late at night. C9TDM is reported to be active at weekends near 21.315MHz between 1500 and 1600. 5R8AB, in **Madagascar**, is on most days between 1500 and 1900 near 21.260MHz. FR5DX, on **Reunion Is**, now has WARC band antennas and has been on after 1700 near 18.125 or 24.940MHz.

If you are a top band buff you may already know that there is an unofficial activity period by Ws every Wednesday night/Thursday morning. In addition to CW stations there are a number using SSB between 1.843 and 1.840MHz.

Bob Harris, G4APV, made nearly 1,000 QSOs from Dhaka during his recent activity as S21ZD. It seems that licences are now being issued to visitors and if you are interested I suggest that you contact Bob. VK2DXI should currently be in **Singapore** as 9V1XE, and will move to Saudi Arabia at the end of the year.

According to *Lynx DX Bulletin* the ITU has issued the prefix block S5A-S5Z to Slovenia. *DX'press* says that the operation from **Malyj Vysotskij Is** in late October would probably be the last to use a 4J prefix. There will be many prefix changes in the former countries which made up the USSR in the near future and 4J may be allocated to Azerbaijan. The same source says that from 1 January 1993 UB will become EM-EO or UR-UZ, UM = EX, UG = EK, UL = UN-UQ, UI = UK-UM, UF = 4L, UO = ER, UJ = EY, UD = 4J, UN = UL, UH = EZ, and UC = EU-EW.

A special bulletin from ARRL dated 13 October stated that the DXAC had voted in favour of adding to the DXCC list **Croatia** (9A) - wef 26.6.91, **Slovenia** (S5) - wef 26.6.91, **Bosnia-Hercegovina** (YU4) - wef 15.10.91, and **Macedonia** - wef 8.9.91. YU1, YU6, YU7, and YU8 will continue to be the old Yugoslavia. These recommendations now have to go to the ARRL Awards Committee for acceptance. JX3EX and JX7DFA are new operators on **Jan Mayen** and have good antennas and linears. They will be there until April 1993.

XQ0X was expected to resume his operations from San Ambrosio Is, **Easter Is**, and

A much sought after QSL card from Ray Gerrard.

BAND REPORTS

Thanks to all who contributed this time. They included G2HKU, G3s GVV, KKJ, G4s DBN, DJC, GW4KGR, G4s MUW, NXG/M, 4XRV, G0KDS, and the UK Packet DX Cluster courtesy of G4PDQ. Stations on CW are shown in italics:-

1.8MHz	
0000	*V29SW*
0100	*VP2EC, 3DA/G3SXW, 3DA/G4FAM*
0300	*FG5BG*
0400	*PY0FF, W0IFH*
1900	*UZ9MWU*
2000	*OH1AF/OJ0, SV8ZS, UL7AAE*
2100	*JA2XW, UA0QGM*
2200	*UI8LA, VQ9QM, 4K2MAL, 4L1FDR, 4X4DK*
10MHz	
0600	*D44BS, FK8GJ, KP4TQ*
1400	*VK9NL/W*
1700	*KL7XD, RY0U*
1800	*SU1HV, TA2AO, V85XF, VQ9DM, ZA1s F,J, 3DA/G3SXW, 3DA/G3TXF, 3DA/G4FAM, 9K2MU*
2200	*TA2AH, 9N1DX*
2300	*FY5FX, TA4/KU0J, VK6HD, 4S7NE, 7P8SR*
14MHz	
0600	*FK8GJ*, NL7J, T32SS, VK9NL/W, ZK1TW
0700	FK8CR, FW1FM, KH3AE, T32RA, P29AI, VK9NL, *VK9WW*
0800	A35s MW, VG, DU9RC, H44JC, VE6BUA, ZK1HJ, ZK2s XF, XG, 5W1SL
1000	T32GG, T32RS
1500	*BV4CT*, HS1HSJ, JU830C, KL7XD, VK9WW, 4K3/UA1ZFQ
1600	VQ9WM, XV7TH, XX9AS, 9M8s FC, FH
1700	S21A, XU3UN, ZD9AB
1800	FR5AI/G, HS0ZBB, VP8CFM, VU3MBB
1900	ET3YL, ZL8RS
2100	A71BV, C9RJJ, HF0POL, VP8CKC, ZS9A
18MHz	
0800	NL7ZH, *T32GG*
0900	*JT1/JI2MED, RY0U*, ZL4DS
1100	*P4/K4PI*, ZL2APW
1400	PJ8AO, 9N1DX
1500	OH1AF/OJ0, TZ6VV, *V85s KX, XF, 3DA/G3SXW, 9M8JH*
1700	CY0NSM, FR5ZU/E, K1RH/FP, KL7XD, ZA1E, ZB2FX
2100	OX3KM
21MHz	
0800	BYs 4RSA, 5RC, H44/JA1DEN, KL7CUS, T32RA
1000	KH0AC, T20AA, V63MC, V73UY, 3X0HNU
1100	ET3s BC, YL, T30s A, MD
1300	BY8AA, FR5AG, V73IO, V85PB, XX9AS
1400	S21ZD, VK9CY
1500	FP/SP5SS, HS0AT, S21ZD, *5N0ZKJ*,7Q7JL, 9M2YY, 9M8SH
1600	VP8CFM, VQ9WM, 5R8AB
1700	VP8CKC (S Orkney), 5K3V
1800	S21A, VP8VN, ZD9BV, 8R1JV, 9M2ZA
1900	VK4AND, VP8CKB
24MHz	
1300	FR5DX, *V85XF, 3DA/G3TXF, 9N1DX*
1700	A22BW, *FP/VE1KM*
1800	FR5ZU/E, *HC2RG*, RY0U
28MHz	
0900	BV2BT, *TR8XX*, V51HL, VK4, VK6, XU3UN
1000	ET3BC, FR5ZU/E, H44/JA1DEM, HS0ZBB, NH6XM, SU1AL/2, VQ9YA, 5H3AS
1400	FR5ZN, J28GG, V51BG, *V85XF*, 3X0HNU, 9J2GA, 9X5AB
1500	C9TDM, ET3YL, S21A, TG9AGR, ZD7VC
1600	*C9AJJ*, FH5DL, HF0POL, HK0TCN, J69BB, TU2PA, VR6BX, *XQ0YAF*
1700	VP8VN, *3DA/G3SXW*, 3X0HLU, 4T500DX

QTH CORNER

A35XG	(see 5W1SL).
E28DX	Viroj J. HS1HSJ, PO Box 89, Bangkok, 10220 Thailand.
GD4UOL	S Muster, Flat 4, 60 Genesta Rd, Westcliffe on Sea, Essex, SS0 8DB.
LX1DM	*Only via G0MMI*, 5 Grove Way, Waddesdon, Aylesbury, Bucks, HP18 0LF.
P29VZF	via G3OZF, Mayerin, Church Way, Stone, Aylesbury, Bucks, HP17 8RG.
S92SS	C Lewis, C Postal 522, Sao Thome DRSTP, via Portugal.
ZK2XG	(see 5W1SL).
3X0HLU	Box 4927, Conakry, Guinea.
4J1FM	OH2LVG, Frank Reid Smith, Vanhaistenie 5 E 73, SF-00420, Helsinki, Finland.
4J1FW	(see above).
5W1SL	via P29AA, Official Station, Spectrum Mg'mt Dept, Box 1783, Port Moresby, NDC, PNG.

should be there for a few more months.

I heard from Mike, V85KX, in **Brunei** that he intends to leave 1.8MHz working to Bill, V85AA, this season as he has 400W into an "80ft up" sloping dipole. Mike himself is on 3.5MHz (usually 3.503 or 3.508.5MHz) every day at his sunrise time (plus or minus 30 mins) which will be as follows: 2 December at 2215, 9th at 2218, 16th at 2221, 8 January at 2232, 15th at 2234, 22nd at 2236, and 29th at 2237 and then back to 2206 by May 20. UK signals are very good at times but few seem to be *listening*!

YI1BGD

CLIFF, G0MMI, has written to say that he is receiving cards for YI1BGD but is *not* the station's QSL manager. YI1BGD now has a central address which is PO Box 55072, Baghdad, and cards sent to G0MMI will be forwarded. All cards for contacts made with G1WAG at YI1BGD have been answered via the bureau or direct as appropriate. Cliff is acting as manager for YI1RJ, Raed, for contacts since 1 April 1992 but Raed is currently in Jordan as JY6ZZ and Cliff emphasises that he is not able to QSL these contacts.

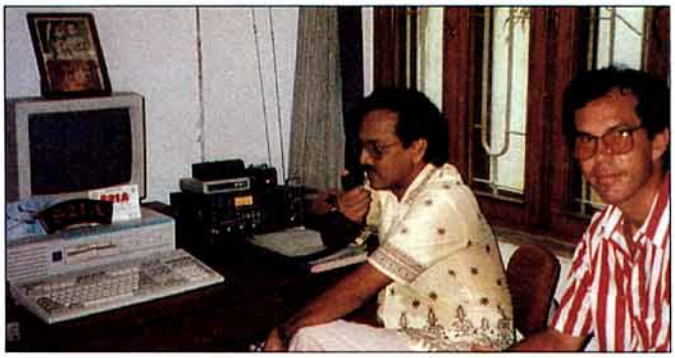
EXPEDITIONS

THERE WILL be a visit to **Kho Samui Is** (in the Malay Peninsular N E Group for IOTA purposes) from 0800 10 December to 2400 on 12 December. This will be led by Chamlong, HS1AAM, and he will be accompanied by HS1CDX, HS1HSJ, HS1EHY, HS0/G3NOM, and HS0/JJ1BDF. Activity will cover CW, SSB, FM, RTTY, AMTOR, and packet. Operating frequencies will be 14.030, 14.195, 21.030, 21.200, 28.030, and 28.480MHz. The callsign will be E28DX (E2 being a new prefix for Thailand) and QSLs should be sent to the address in *QTH Corner* with SAE and - if possible - a small donation.

The group which visited **Desecheo Is** early in 1992 is hoping to make a return visit between 27 December and 4 January.

1992 WARC BANDS TABLE

	10MHz	18MHz	24MHz	Total
G3WGV	**136**	**162**	119	417
G3KKJ	93	158	112	363
G4OBK	84	132	**129**	345
G2VJ	79	109	111	299
G3ING	62	89	42	193
G2AFV	69	72	42	183
G3IAR	51	85	22	158
G4MUW	-	63	38	101
G4NXG/M	-	67	28	95
G4XRV	92	-	-	92
GM0KMJ	-	62	62	
GW4RGT	13	21	16	50



Saif, S21A (left) with Bob Harris (G4APV/S21ZD) in Saif's shack.

CONTESTS

INDEPENDENT FINLAND 75 YEARS ANNIVERSARY

0000 to 2400 6 December

3.5 to 28MHz, CW and SSB simultaneously. Finnish stations will congregate near 3.525, 3.775, 7.025, 7.075, 14.025, 14.225, 21.025, 21.325, 28.025, and 28.525MHz. Single operator single and multi-band, multi-operator single transmitter, QRP (multi-band less than 5W output), and listener sections. Exchange RS/T plus number from 001. Finnish stations will give three numbers indicating their OHC. QSOs count one point and may be made on both modes once per band. OHC numbers are multipliers and count once only. Ten special -FIN suffix stations will be on - QSOs with these count as five *multipliers*. Logs must be sent before 31 December 1992 to SRAL, att'n Jukka Kovanen, OH3GZ, PO Box 44, SF-00441 Helsinki, Finland. I can provide copies of rules (SASE please).

AGCW-DL-QRP WINTER CONTEST

1500 2 January to 1500 3 January

Minimum nine hours rest time. Single-operator on 3.5 - 28MHz CW only. I can provide copies of the rules (SASE please). In the 1992 event G4AWT came seventh in the VLP class, G3TXZ 11th, and G3NNK 20th. In the QRP section G4BUE came first, G3DNF ninth, G3FNM 23rd, G4ZME 48th, G4GLC 66th, GM4HQF 74th, and G4FDC 76th.

CANADA WINTER CONTEST

0000 to 2400 27 December

1.8 to 50MHz. Ten entry classes. Everyone works everyone else. I can supply copies of rules (SASE please).

TOPS ACTIVITY CONTEST

1800 5 Dec to 1800 6 Dec

CW only. 3.500 - 3.560MHz *with 3.500 - 3.512MHz reserved for DX contacts.* QSOs with own country count one point, with own continent two points, with others and with /MM stations six, and with TOPS members add a two point bonus. Call CQ TAC and exchange RST and serial number from 001. TOPS members will give their membership number. Each different prefix worked counts as a multiplier. Single and multi-operator and QRP sections (up to 5W output single operator). Mail logs before 31 January 1993 to Helmut Klein, OE1TKW, Nauseagasse 24/26. A-1160 Vienna, Austria. (Copies of rules available - SASE please).

ARRL 160 METRE DX CONTEST

2200 5 Dec to 1600 6 Dec

Copies of full rules available - SASE please.

ARRL 10 METRE CONTEST

0000 12 Dec to 2400 13 Dec

No more than 36h operation allowed. CW, SSB, and mixed and single-operator QRP (less than 5W output), low power (150W), and high power sections. Send RS/T and serial number - USA and Canada will give state/province. Two points for SSB QSOs, four for CW, and eight if with USA Novice or Technician class station. Multipliers are US states Canadian provinces and DXCC countries - except W and VE. Logs must be submitted within 30 days of the contest and may be written on disk if desired. The address is ARRL 10 Metre Contest, 225 Main Street, Newington, CT 06111, USA. Copies of full rules available (SASE please).

Results of the **1991 CQ WW DX Contest (CW section)** have now appeared in *CQ Magazine*. Creditable performances all round - with special mention of **G3KDB** who came world third on 3.5MHz, **G3FXB** who was world sixth on 7MHz, and **GD4UOL** who was world sixth in the all-band section (low power). In European terms G3MXJ and G4BUO were 6th and 8th respectively in the all-band class, G3LNS 4th on 14MHz, G3FXB 3rd on 7MHz, G3KDB 2nd on 3.5MHz, and (low power) GD4UOL 2nd, and G3SWH 10th. GW8GT was 6th in the multi-operator single-transmitter class. Actual scores were as follows (* indicates low power class):- **All band: G3MXJ** - 2,837,366; **G4BUO** - 2,711,476; G3TXF - 2,021,400; ***GD4UOL** - 1,314,405; **GU4WRP** - 1,240,635; G3NKS - 1,075,076; ***G3SWH - 605,484**; *G3ESF - 454,986; **GW3JI** - 410,237; G5LP - 383,040; **GM3YOR** - 293,517; *G3JKY - 152,685; *G4ZME - 107,730; G0PPW - 106,876; G0FOS - 28,322; *GI0KOW - 21,141. **1.8MHz: G3XWZ** - 10,600; GW3GWX - 3,762. **3.5MHz: G3KDB** - 207,045; G3SJJ - 61,716; G4ARI - 40,795. **7MHz: G3FXB** - 337,659. **14MHz: G3LNS** - 540,452; ***G3XMZ** - 54,468; *G3URA - 15,925. **21MHz: G3RTE** - 330,187. **28MHz: G3UFY** - 277,656; G0AEV - 62,890; ***GM3CFS** - 36,192; *GI0NWG - 8,866.

AWARDS

BDARA SILVER JUBILEE AWARD

This is being issued to mark the Silver Jubilee celebrations of HM Sultan Dan Yang Di Pertuan of Brunei Darussalam. Stations outside *CQ* Zone 28 need confirmed contacts with six ordinary V85 and two club stations between 5 October 1992 and 31 December 1993. Listeners may apply and need to have heard 12 V85s and two club stations. Any bands/modes may be used. Send certified list of QSLs plus US $6.00 to the Silver Jubilee Award Manager, PO Box 179, Muara 4001, Negara Brunei Darussalam, before December 1994.

PANAMA INTERNATIONAL AWARD

For those who have confirmed contact with each Panamanian call area (HP1 - HP9) on any band or mode since 1 January 1978. Contacts with official club stations (using the LR suffix) may be substituted for up to three call areas. Send list certified by a national society awards manager plus US $3.00 or six IRCs to Liga Panamena de Radioaficionados Nacional, Apartado Postal 175, Panama 9A, Panama.

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VHF/UHF NEWS

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

THE TOPIC of declining activity, broached in last month's column, brought comments from several readers. Roger Daniel, G4RUW (BRK), has been operating on 2m for ten years. He suggests the high level of activity during the late 1970s and early 1980s was due to the influx of newcomers from the citizens band. Many soon lost interest or moved onto HF, leaving a central core of keen VHF users who are always there when the band is open.

Roger often hears operators saying they can't work DX because they only run 20-30W to a 5-ele beam, so they stand no chance against the QRO (high power) stations. He explodes that myth by citing his own achievements from a valley location near the Kennet and Avon canal. Using 10W to a 9-ele Yagi with masthead preamp, he has notched up 146 squares in 32 countries, from EI to UA3 and LA to IT9.

Mark Holloway, G4YRY (DOR), explains the decline in 2m activity by a drift away to 6m and to the microwave bands, with the rest just listening. He suggests that if Novice licensees had access to the band they could explore the propagation modes not available on higher bands.

Rik Royall, G8ESB (YSN), hears the same calls on 4m, 70cm and 23cm most of the time, but reckons that 2m seems to offer more choice. He wonders if it is TVI and/or high noise levels that have driven people off, or perhaps they are all watching cluster screens waiting for news of a 6m opening? He asks about activity periods on the various bands and wrote: "If you don't listen you can't work it."

Pete Austin, G7BXA (YSW), has noted a steep drop in 2m activity in the last two years. He is on every evening on the SSB calling frequency or the WAB (Worked All Britain) nets, but his CQ calls get few replies. Yet he has noticed that: "When there is the slightest lift, or an aurora, everyone is calling and some of them are quite rude towards other amateurs, especially those who are trying to work their first bit of DX."

About the TVI problem, he says: "Why don't they sort their stations out?" Why not; after all, isn't that part of the self-training aspect of the licence? To summarize a long letter, he suggests that contests and activity periods are the way to generate more activity.

EI ACTIVITY DAY

To round off its Diamond Jubilee year, the IRTS (Irish Radio Transmitters Society) is promoting an activity day on 27 December. Those seeking counties for the WEIC award might find a few wanted ones that day. In his 'On the Air' column in the October *IRTS Newsletter* EI4BZ mentioned getting QSLs from EIs. Several prominent DXers are not IRTS members so incoming cards are not forwarded to them.

PUBLICATIONS

ALTHOUGH NOT a publication in the usual context of this section, I was pleased to receive a copy of a newspaper report of Spanish amateur radio operation from Bob Fisher, G3PWJ (WMD). He acquired it while on holiday in Tenerife, EA8, and it was a very well written account of activity from Mount Teide on 12/13 September, to celebrate a religious festival. A group from Guimar, using a small 2m transceiver, contacted a radio amateur in Dhaka, which I presume is Dakar in Senegal, a QRB (distance) of about 1600km.

The October issue of *Six News*, the journal of the UK Six Metre Group, is a bumper 60-page one, full of very interesting articles and reports. One refers to low-loss coaxial cable made by Kansai Tsushin Densen which is marketed in Britain. Chris Gare, G3WOS, contributed a piece, 'Antennas Galore', listing all available products. He divides these into Economy, Serious and Seriously Rich categories, with price tags from £14.50 to £499. For details of UKSMG membership send an SASE to Mr PJ Turner, G4IIL, who is QTHR (address in the *RSGB Call Book*).

REPEATERS

DAVE CHATER-LEA, G4EPX, secretary of the Farnham VHF Group, sent a copy of its latest *Newsletter*. It deals with the status of UHF relay GB3FN on RB15 and microwave repeater GB3FM on RM2. Construction of 'FN Mk2 is under way and ". . . . donations of useful bits . . . ." would be welcome. Dave would like to ascertain how many people actually use 23cm repeaters, in particular GB3FM. Perhaps they would serve a better purpose as beacons? If so, swapping the TX and RX antennas would provide better coverage. Please contact G4EPX (QTHR) with your views.

GB3HV is a microwave TV repeater on RT3 operated by the Home Counties ATV Group. It has recently been rebuilt and the general specification sounds impressive. Presently installed at the QTH of G4CRJ in High Wycombe (BUX), a new location nearby is being considered. The technical officer is Mike Sanders, G8LES (QTHR), if you want further information.

BEACONS

TED COLLINS, G4UPS (DVN), reports that 6m beacon K1NFE on 50.061MHz is off the air, there being no plans to reactivate it. As he hasn't heard Sierra Leone beacon, 9L1SL, on 50.091MHz for over a year, he has deleted it from his list. OD5SK told Ted on 6 October that he had not received the OD5SIX beacon Tx and had no idea of its whereabouts.

At G3FPK, the Angus beacon GB3ANG on 2m, QRB 612km, is often at respectable strength yet CQ calls to GM prove fruitless. Roger Stapleton, GM0GKR (FFE), points out that the beacon is located on a tall mast on a hill - 370m ASL according to the RSGB list - whereas there are few GMs who have a very good take-off to the south. The exceptions are those in the Aberdeen area on the east coast and those in Dumfries and Galloway in the southwest of Scotland.

He reckons beacons can be a mixed blessing; a good thing for those at a distance for studying propagation, but a curse for locals who ". . . . wish they would blow up, or down, so they could get a quiet band to hear some DX." He suggests VHF beacons be operated for short periods only, like the HF ones.

METEOR SCATTER

THE GEMINIDS

Maximum activity in the Geminids shower should occur on 14 December, according to this year's *Meteor Shower Calendar* published by the IMO (International Meteor Organization). For those using computer prediction programs, the *visual* maximum should be at Solar Longitude (LS) 262.0°. The corresponding radiant Right Ascension (RA) and Declination (DEC) are 112 and +33°.

Note that the *radio* maximum could be some hours earlier, perhaps in the afternoon of the 13th, for reasons explained this time last year.

Best times are: NE/SW 2100-0200 and 0500-0930; E/W 0030-0400; NW/SE 1900-2300 and 0230-0730; N/S 1900-0100 and 0330-0900. The radiant point is below a mid-UK horizon between 1230 and 1630. The ZHR (Zenithal Hourly Rate) is about 110, so reflections are usually quite good at maximum.

THE URSIDS

The predicted visual peak of the Ursids stream is 10GMT on 22 December at LS 270.93° and radiant RA/DEC 217/+75°. Optimum times are NE/SW 0900-2400 and NW/SE 1700-0800 but the N/S and E/W directions are not very good. The radiant does not set as far as Britain is concerned.

The LS figures are based on the IAU (International Astronomical Union) epoch 2000.0. Some of the amateur software I've examined is written for the old 1950.0 epoch which may explain the discrepancies in predicting peak times between different programs.

MOONBOUNCE BOUNCE

JOHN REGNAULT, G4SWX (JO02PB), took part in the first leg of the ARRL EME contest on 17/18 October. A minor magstorm on the 15th, with the K-index reaching 5 at Boulder, Colorado, next day resulted in grim conditions at moonrise at 2100. On 144MHz he completed 38 QSOs, including seven new initials - stations worked for the first time - which were K5GW, WB4WTC, K6HXW, K0RRY, ON7EH, SK0UX and G0GMS.

G4YRY (IO90CR), completed with W5UN, KB8RQ, DL8DAT and SM5FRH in the contest and heard 11 others. At moonrise on the 18th he found: "The CW end below 144.020 was seething with signals . . . ." while the rest of the band was quiet. From Ireland, Tom Cocking, EI4DQ (IO51), is QRV with a 4-Yagi array. In September he completed with AF9Y, DL8DAT, SM7BAE, W7FN and WA6GMZ.

PROPAGATION

IN HIS September report, Ray

Cracknell, G2AHU (HWR), states that:

"The main feature was there was no clear-cut cyclic effect. It was the first month since the early part of Cycle 22 that the daily sunspot count didn't even reach the 90s. Conditions were primarily influenced by seasonal changes and results were well below expectations. This was due to low sunspot counts, a long succession of minor solar disturbances and some major ones. He comments: "Ironically the best day for DX on 50MHz was the 8th, the day with the lowest sunspot number." The 8th was the day before a major storm when the Kp planetary index reached 8.

During October, up to the 25th, the mean weekly sunspot counts were in the 130s except for the period 12-18 when it was 80. Mean solar flux values were 118, 124, 105, rising to 142 for the 19-25 period. The value of 161 on the 25th was the highest since last July, well in excess of what was expected. The Ap indices were 22.7, 12.8, 23 and 7.4 during the month.

50MHz

THIS TIME last year the 6m postbag was bulging with reports of openings to VK. In complete contrast, G4UPS recorded nothing in the period 24/9 to 3/10 this year.

NEWS

G4UPS reports that amateurs in the Republic of Slovenia were due to change their prefix from YU3/YT3 to the S51-S59 series from 24 October. Slovenia and Croatia are being considered for DXCC country status by the ARRL. OD5SK has received a 160W amplifier from JA1VOK which, with a new 5-ele Yagi, should improve Samir's signal from the Lebanon.

From Kazakhstan, UL7GCC will be using the call 4L2FA till the end of the year when the republic will get its own allocation. The expected activity from Swaziland in October by a group of Gs did not take place as the equipment didn't work.

ACTIVITY

Darrell Moody, G0HVQ (GLR), has moved QTH and re-equipped his station with a TS-690. On 4 October there was Es to EH7 from 1900 with an Es/TEP signal from PY5CC. On the 11th, he recorded an opening to 7Q and A2 from 1815 plus backscatter to YU3. Best Es DX next day were EH7AU (IM67), EH7AJ (IM87) and IS0AGY (JM49). EH3IH (JN11) was contacted at 1250 on the 15th and EH5CJ (IM89) at 1150 next day. EH9IB and ZB0T were copied at 1120 on the 18th.

Terry Chaplin, G1UGH (SFK), worked 9H5s EE and DV (JM75), EH2AGZ (IN91), EH7AJ and YU3UF (JN76) on 7 October, also YO7VJ in KN field. EH7BIH (IM87) was a new square next day. The 12th brought more 9Hs, I8TUS (JM89), IK8s in JN71, EH6ET (JM19) and EH3s in JN11. On the 13th IK8MKK (JN71), 15th EH5CJ (IM99), 9H1JN (JM75) and EH3IH, and EH7BIH again on the 18th.

G4UPS's report covered all the openings mentioned above. In addition he worked CT1BGE (IM58) at 1848 on 4 October, then heard PY5CC and, at 1935, ZP5JCY at RS59. PY5CC was copied at up to S9 on the 6th, 1917-2000, working Gs and EHs. At 1654 on the 9th 3X0HNU was briefly heard working a G. ZS6s WB and XJ were copied around 1700 on the 11th. Although there was Es to IT9 around noon on the 12th, and to EH, EH6 and YU later, 28MHz was absolutely dead.

70MHz

COLIN REDWOOD, G6MXL (DOR), should be running 50W from a Spectrum amplifier by now. He hopes to improve his antenna system. He missed the Trophy Contest on 20 September due to a throat infection. G8ESB reports Sunday morning activity. Alex Scott, GM0HNX (BDS), is QRV on the band with 100W and a 5-ele Yagi on a Tennamast. He operates 1800-2000GMT, depending upon activity.

144MHz

JUST TOO late for last month was G4YRY's report on the 16 September tropo to EA, OE, OK and SP. Between 1840 and 2120, Mark completed 40 contacts in 25 squares, three of which were new; best DX was probably SP3NNE (JO81). Shane Hogarth, G7EWL (NHM), worked EA2, F, HB9 and LX in this lift but failed to attract replies from SP.

Joe Ludlow, GW3ZTH (GNM), does all his serious operating portable at 1800ft ASL from The Werfa (IO81FP). He completed 69 QSOs with 11 countries in 31 squares in 150 min. from 1832 on 16 September. Best DX included EA2ARD (IN93), OK3CQF (JN88) and SPs in JO71, 80, 81 and 90. Joe's report was his first to *RadCom* for 17 years!

The tropo opening on 7/8 October was excellent, particularly for those in the east. G1UGH worked DL, OK and SP, which produced some new squares. Brian Underdown's, G7LIJ (KNT), best DX included SP3RBF (JO71), SP6GWB/P (JO80), SP2OFW (JO93) and SM7SPG (JO66). By contrast, Arlen Pardoe, GM0HUO (FFE), heard little of it, only working DL5XV (JO53) at 2140 on SSB.

G4SWX reckons that 8 October was the best opening to Poland since 1987 as it covered all the country; he thinks he worked every SP heard, a total of 67 between 1725 and 2244. He didn't think the PAs or DLs did so well, and that the SP signals didn't penetrate too far into G. (At G3FPK, SP5EFO (KO02) was barely audible when John gave him S9 plus 20dB).

Edward Allely, GW0PZT (GDD), found it a strange opening with localized ducting on the 7th to JO42, 43, 52 and 53. Next day was different - everything from JN59 to JO65. OK1AIY/P (JO70) at 1410km was his best tropo DX so far. On 18 October, his father, GW3KJW, worked IK4LFI (JN54) who was audible for one minute. This could have been a long Orionids meteor burst.

GW3ZTH's portable QTH is 14 miles from home and it takes Joe quite a while to pack up all the gear, drive to it and get everything working, including a home made 11-ele DL6WU Yagi. On 8 October he completed 49 QSOs in about four hours from 1754 and also found localized ducting with many QRP stations in JO50 coming in quite strongly. Best DX were SP5s NHF and EFO, SP3TYF (JO82) and SP6HEI (JO81).

Mervyn Rodgers, GM0GDL (TYS), missed an aurora on 9 October but caught one two days later. Using 150W to a 14-ele Yagi he made 12 QSOs between 1511 and 1732; an assortment of LA, SM and OZ stations plus OH3EX (KP10) and ES2XM (KO29). QTE (Beam heading) was 40°. GM0HUO heard this

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LOCATOR SQUARES TABLE
STARTING DATE: 1-1-1979

Callsign	50MHz	70MHz	144MHz	430MHz	1.3GHz	Total
G3IMV	386	-	483	125	52	1046
G4SWX	-	-	404	-	-	404
G0CUZ	-	-	374	78	-	452
G4DHF	-	-	342	-	-	342
G4RGK	167	-	319	182	58	726
G4RRA	-	-	299	80	-	379
G4YTL	-	38	279	37	-	354
GW8JLY	-	-	271	36	-	307
G4SSO	80	-	269	99	-	448
GW4VEQ	-	-	267	-	-	267
GJ4ICD	559	-	264	121	65	1009
GW4LXO	440	23	261	108	48	880
G4DEZ	141	-	251	62	56	510
G3FPK	-	-	246	-	-	246
G6HCV	355	-	241	-	-	596
G6HKM	407	-	236	117	57	817
GW4FRX	-	-	235	-	-	235
G0EVT	217	2	233	65	1	518
G4DOL	-	-	223	-	-	223
G0MGA	249	-	216	-	-	465
G0GMB	65	-	213	108	-	386
G4TIF	280	28	204	112	-	624
G8LHT	196	20	202	93	17	528
G0FYD	162	-	191	6	-	359
G0EHV	-	35	187	81	-	303
G1SWH	245	33	179	63	9	529
G0FIG	200	-	171	42	-	413
G4MUT	167	25	155	94	34	475
G7LIJ	-	-	147	-	-	147
GW6VZW	323	-	143	6	-	472
G8PYP	228	1	122	35	-	386
GM0GDL	-	-	122	-	-	122
G1UGH	193	-	120	-	-	313
GW0PZT	-	-	117	-	-	117
G6MXL	110	23	115	64	28	340
G1SMD	206	-	112	-	-	318
GU7DHI	329	-	106	5	-	440
G0NFH	133	26	101	51	18	329
G3FIJ	1	24	80	22	3	130
G7EWL	54	2	78	-	-	134
G0HVQ	268	-	71	-	-	339
G0HDZ	11	-	67	-	-	78
G7CLY	70	-	60	2	-	132
G7JAF	-	-	53	3	-	56
G0JHC	457	-	48	-	-	505
G6ODT	-	3	48	52	-	103
G4OBK	21	1	45	-	-	67
GW7EVG	-	-	28	-	-	28
G6AJE	-	-	25	-	7	32
GM1XOG	181	-	-	-	-	181

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Next deadline is 31 December. Band of the month 144MHz.

HF F-LAYER PROPAGATION PREDICTIONS FOR DECEMBER 1992

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

Time / / GMT	28MHz 000001111122 024680246802	24MHz 000001111122 024680246802	21MHz 000001111122 024680246802	18MHz 000001111122 024680246802	14MHz 000001111122 024680246802	10MHz 000001111122 024680246802	7MHz 000001111122 024680246802	3.5MHz 000001111122 024680246802
** EUROPE								
MOSCOW	....69982...	....89995...	....99998...	....999992..	...48878961.	653765568975	887533246888	++42....35++
MALTA	....68774...	....89986...	....999993..	....9889961.	11.387789951	773765568997	998632236899	+++3....3+++
GIBRALTAR	....17654...	....288761..	....699993..	....8999961.	98788951	453276557996	988753235899	++++2...25++
ICELAND	.....3773...	.....5896...	.....89991..	....199994..	....6888981.	342.86678973	888364446788	++++3..235++
** ASIA								
OSAKA	....4.....	....62.....	....84.....	....86.....	1..2763.11.1	2..253334635	....21.14673	.........45.
HONGKONG	....885....	....9971....	...18984....	...278861...	1...5666431.	2...23346761	1......14785	453
BANGKOK	....8+982...	...189994...	...268897...	...1488881..	1...15568511	3....3246877	2......14787	454
SINGAPORE	...188882...	...289994...	...368897...	...2488881..	1...16568611	3....3246876	1......14785	452
NEW DELHI	...18984....	...28996....	...468881...	...347884...	1..1145671111	631..1246677	72.....14788	4........455
TEHERAN	...1++982...	...388994...	...677897...	...7557882..	211522568732	8642..246887	873....14778	54.......455
COLOMBO	...1+++83...	...378995...	...3478981..	...2257893..	2....2568732	62....246887	51.....14778	2........455
BAHRAIN	...2+8872...	...488984...	...6668972..	...63478841.	311411468853	8731..136888	872....14778	54.......44+
CYPRUS	....++995...	...2999981..	...5989994..	...78789972.	431765678974	986532357998	88621.125888	++3.....25++
ADEN	...1+8885...	...3778971..	...55579951.	1..523589731	6412..268986	983....36898	872....13677	54.......444
** OCEANIA								
SUVA/S	.....244....	.....5662...	.....7885...	....18887...	....566783..	....533464..	...1311141..	.....
SUVA/L	....332..121	1...55411342	11..87643652	11..87666742	..137546762.	...3521354..	...12...21..	.....
WELLINGTON/S	.....564....	....27861...	....58883...	....78886...	....766782..	...1533463..	....21.141..	.....
WELLINGTON/L	.....	.....	11..21...111	11..53211322	..117533452.	...2521353..	....2...2...	.....
SYDNEY/S	....75771...	....87883...	...298896...	...388888...	...16667841.	....3334672.	....1..1451.	.........2..
SYDNEY/L	.....	....11.....	....3421.132	56421352	65554751	....3323562.	....1...23..	.....
PERTH	...177653...	...378875...	...3688881..	...2477893..	1...15568731	2246873	14761	.........43.
HONOLULU	.....	.....	.....2..	.....5..	.22.2.1.461.	.251522263..	..4531.131..	...3.....
** AFRICA								
SEYCHELLES	...145763...	...3568851..	...43478851.	1..212589731	63....268986	961....36899	73.....13678	5........445
MAURITIUS	...1578751..	...2578872..	...33469962.	21.212589852	73....268997	84.....36899	62.....13688	3........45+
NAIROBI	...1777862..	...27779841.	1..444589741	31.522379974	8612...58998	983....26899	872.....3687	54.......454
HARARE	....3456731.	...145678631	21.344479863	53.422258986	9712...27999	983.....4899	861.....2688	53.......35+
CAPETOWN	....3467752.	1...55678742	32.144458985	64.222137998	9813....5899	984.....2689	862.....378	53.........4+
LAGOS	....8+888531	1...98779752	42..85458986	75.173237998	99354...5899	89851...2799	7783.....488	455.......55
ASCENSION Is	48667631	67667752	32..86446885	651.83224898	995251..1699	99963....379	8784.....158	555.......2+
DAKAR	....4+88862.	69778851	21..87547985	541.86225898	886173..2799	98964....489	77862....168	4453.....3+
LAS PALMAS	....399984..	....6999972.	89889951	11..98888984	664186557898	999664334799	888741..1489	+++4.....25+
** S. AMERICA								
Sth SHETLAND	....2344432.	45566542	21..77665664	441.87544456	675165311135	455332.....2	12321.....	.....
FALKLAND Is	....1446762.	36567641	11..67654564	332.87422356	776.751...26	688452.....3	36652......1	.342.....
R DE JANEIRO	.....643452.	27545641	1...57544574	322.76322377	876.73...158	999551....36	87862......4	5453.....
BUENOS AIRES	....1333562.	35545641	67543453	222.87421256	776.751...26	799452.....4	57862......1	2453.....
LIMA	......++861.	......98763.	1855442	1.1.14732234	536.555...15	7894532....3	57863.....	2454.....
BOGOTA	......9+761.	......98773.	1864451	..1..2732244	435.1551..26	8884432....4	677631.....1	3444.....
** N. AMERICA								
BARBADOS	.....3++871.	.....597773.	7854662	1.1..7722475	536.164..158	8884431...27	87763......4	5444.......2
JAMAICA	......7+861.	......88772.	875551	..1..2752253	425.2452..26	8783532....5	777631.....2	4444.....
BERMUDA	......8++61.	.....298882.	5876751	..1..6754673	425.26521367	8783532...37	777631.....5	5444.......2
NEW YORK	......5++6..	......79971.	.....188884.	3876762	324.25553466	878353221136	776631....14	5444.....
MEXICO	.......8+5..	.......9861.	......19652.	284221	324.41461..3	57835323...2	377631.1....	.454.....
MONTREAL	......5995..	......79971.	.....189884.	3887761	334.25565565	878353332247	776631....14	5434.....
DENVER	.......173..	.......285..	.......5872.	.......7863.	234.3..65333	688352232.13	477631.1...1	.453.....
LOS ANGELES	........53..	........75..	........861.	.......1862.	233.32.46322	478253143..1	267631.11...	.353.....
VANCOUVER	.........1..	.........13..	.........46..	.........772.	233.22.27642	578253135333	257631.121.1	.243.....
FAIRBANKS	.....	.....	.........1..	.....11123..	242.34346721	577153346654	356531.13432	.233.....

The provisional mean sunspot number for October 1992 issued by the Sunspot Data Centre, Brussels was 88.3. The maximum daily sunspot number was 131 on 8 October and the minimum was 40 on 15 October. The predicted smoothed sunspot numbers for December, January and February, are respectively: (classical method) 86, 84, 82; (SIDC adjusted values) 104, 99, 94.

QSL

RSGB QSL Bureau,
PO Box 1773, Potters Bar,
Herts, EN6 3EP

● Now that 1993 is almost upon us I would like to thank all the QSL Sub-Managers for their efforts over the year and wish them a very happy and trouble free New Year. I would also like to thank the ladies in the QSL bureau for the unstinting work in sorting cards and interpreting routeing instructions.

● Mr V E Roberts, G3EGY and ex VS6GY, has written to tell me that he returned from Hong Kong in 1982 and thought he had lost his logs for the period he was out there. They have, however surfaced and he would like to say that if anyone requires a QSL card from him for a VS6 contact during that period would they get in touch with him QTHR. More proof of the 'never give up hope' theory!

● Ken Smith, G3RB, writes with what must be the ultimate story in the 'never give up hope' saga. Apparently in June last year he received a QSL card (direct) from Stan Mayhead G3II for a contact they had in March 1939! As Ken says '52 years is going to take some beating'.

● G2QY, G P Anderson, has sent me a most interesting QSL card which is reproduced here in the column. It is printed on a genuine five dollar bill issued from the Central Bank of China for a contact with XV1MCF in February 1947 by CW on 20m. Anybody know what a Central Bank of China's dollar is worth these days? Apparently the reason the operator used money at the time was because he thought it cheaper than printing on card. The name of the operator was Ole and asked for QSL's via a US Naval Box number in San Francisco.

The ultimate in 'green stamps': A five dollar QSL received by G2QY.

● Mr Anderson also has a couple of the famous RAEM cards - one for a contact on Christmas Day 1946 numbered 'QSL No 1194'.

● By the time members read this item the Central Bureau will have moved location within Headquarters and the girls will be sorting cards on a full time basis. Until recently, for a number of reasons, the sorters were employed part time but we thought it high time that the position was regularised. After all, it is the second most popular service provided to members by the Society. We hope that the changes will improve that service and it is worth mentioning that if you are going round the M25 and feel like killing an hour then you are most welcome to drop in at Headquarters and see what is being done QSL-wise on your behalf. If I happen to be down here at the time I will gladly show you around and try and answer any questions you may have on the system.

● The Bureau girls tell me that, for some inexplicable reason, they have had a couple of parcels of QSL cards returned from Czechoslovakia in recent weeks. No explanation was given and it may just be a one off situation but I will keep you posted on any developments.

● PO Box 88 Moscow seems to be functioning but the deluge of cards we used to receive from that location seems to have dried up somewhat. We still receive parcels of cards but now rather spasmodically. Has any member suffered as a result? If anyone is having difficulty please let me know and I will try and remedy it.

John Hall, G3KVA

HF NEWS

continued from page 15

CHILTERN DX CLUB

THIS IS almost certainly the UK's premier club catering for licensed amateurs and listeners interested in HF contesting and DXing. Membership exceeds 150 throughout the UK. As well as supporting and encouraging UK HF activity, CDXC also encourages DXpeditions to rare spots by funding selected expeditions, eg the recent Willis Is expedition. Membership is open to UK amateurs and SWLs. Anyone interested should contact Alan Jubb, G3PMR, 30 West St, Great Gransden, Sandy, Beds SG19 3AU. Annual subscription £10.00.

PROPAGATION

THIS MONTH Smithy reports as follows: "Since the middle of the year the 3-month mean sunspot number has levelled off at a value just over 70 as compared with 150 at the start of 1992: the corresponding solar flux mean values are 124 as compared with 225sfu. It is not therefore surprising that HF conditions, particularly on the higher bands, show a marked deterioration compared with the corresponding period a year ago. To make matters worse, there was a marked increase in geomagnetic activity in September with four major disturbances in the month and an average A index of around 20. "The average solar flux for the first half of October was 117sfu, the same as the monthly average for September (provisional monthly sunspot number 63), while the magnetic field was generally less disturbed. In spite of this the conditions on the HF bands, particularly 28MHz, were mostly well below the average to be expected with this level of solar activity. Fortunately there were a few good days and the Sunday of the RSGB 21/28MHz Contest was one of them. Hopefully the second half of the month will restore the statistical balance!"

THANKS

TO ALL who helped me to put the column together and to the writers of the following for items extracted: *RSGB DX News Sheet* (G4DYO), the *Lynx DX Bulletin* (EA2KL), *DX'press* (PA3DZN), and the *Long Island DX Bulletin* (W2IYX). Please let me have everything for the **February** column no later than **18 December**.

VHF NEWS

continued from page 17

event from 1509 working LA0GH (JO38) at 1550, QTE 20°. Arlen heard beacons OY6VHF (IP62), GB3LER (IP90) and SK4MPI (JP70). More weak auroral signals were heard around 1630 on the 12th and 13th from St Andrews.

430MHZ UP

SIMON KENNEDY, G0FCU (HFD), runs an FT790, BNOS 50W amplifier and a 22-ele Multibeam. His 400ft ASL site has a good take-off to the east and south, less good to the north and west. Beacon GB3SUT was S9 on 16 September yet the band seemed dead, but a CQ on 432.200MHz SSB brought a QSO with portable station OE5VRL/5 in JN78. Amazingly nobody else called the OE afterwards.

G6MXL copies new beacon GB3BSL on 432.934MHz most of the time in his Poole 'RF black hole' QTH. G8ESB asks if Tuesday night is still 70cm activity night. Rik worked 12 different stations in ten days in October up to the 21st, best DX being GM4AFF (IO87). On 23cm he contacted 13 different stations, with best DX G0API (IO80). He mentions the Monday activity period. G7EWL has built a transverter producing 0.5W and hopes to assemble a bigger station soon. GM0HNX has gear for 70cm and 23cm but Alex is not yet QRV.

DEADLINES

SPACE PERMITTING, I will try to include some notes about the Perseids stream and Comet Kegler next month. Meantime, a Very Happy Christmas to everyone. The **February** deadline is **31 December** and the **March** one, **28 January**. My fax number is 081-668 5582, telex 9312111074(CN), CompuServe ID: 70630,603 and BT Gold mailbox 76:MSX021.

Novice NEWS

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

SOME MONTHS AGO I passed on an offer from Brian, G0IFX. This was for any Novices who wished to use his station if they had no HF capabilities of their own.

Although the response so far has been limited, one retired gentleman who was about to embark on an RAE course expressed an interest. Conditions were rather unkind and there was a deafening silence on the HF bands, although one Russian contact was made on 15m. Brian also called a friend on 2m FM to demonstrate the possibilities for local contacts on VHF. Further visits are possible and arrangements have been made to keep in touch.

I wonder if other amateurs have had similar results and if any Novices or intending Novices have managed to 'adopt' an amateur and see/hear the enjoyment that comes from amateur radio. If you have found a successful way to demonstrate the hobby, please write in and tell us all about it.

SCHOOL ACTIVITY

MORE EXCELLENT news from Richmond School, confirming their continued 100% success for Novice students. Andrew, 2E1AOY, and Chris, 2E1BAP, have joined the Novice ranks and set the example for seven more students, who will take the exam next year.

Although there is more work to do, the school has a Clubroom and the equipment to set up a station - thanks to the generosity of the school Trustees. By the time you read this, GX0RYS will be active on HF, VHF and UHF - especially between 1300 and 1400 local time almost every day.

Membership of the school radio club stands at around thirty, so by my reckoning, there are a few more classes to arrange! Martyn, G3RLV, is the Instructor - and the sender of this information.

Phil, 2E1AOJ, and Chris, 2E1ANS, will be sitting the full RAE exam in December followed by a 12WPM Morse test - of course they are looking for success in both fields. I don't quite know where they find the time, as both are studying four A level subjects - besides being respectively Chairman and Secretary of the Club, and participating in a number of other activities.

If any other school would like to get in touch with Richmond, Martyn - and the boys - would be delighted to hear from you. If you want to arrange a sked in advance, the address is: Richmond School, Darlington Road, Richmond, N Yorks DL10 7BQ. Please let me know too, so that I can extend the list of 'radio-active' schools and keep everyone informed.

THE NOVICE CONCEPT

I HAVE BEEN encouraged by the opinions of many amateurs on the subject of the Novice licence. Obviously, everyone is entitled to their beliefs, and also to air them.

When the Novice scheme was first introduced, many amateurs saw it as an easy option - a watered-down version. I too, had some reservations, mainly because, at that time, I didn't know enough about it. Since then, my views have changed, as have many others.

A fellow amateur of long standing, saw sample questions from the Novice RAE for the first time recently. He expressed the opinion that the questions were of RAE standard in content if not in scope. Having been involved with RAE teaching in the past, he speaks from experience.

Many amateurs have said that the RAE course, being class room based, offers little scope for construction by students. No matter how good the demonstrations, they are no substitute for a hands-on approach. Students also need an opportunity to listen to amateur operating techniques, and perhaps practice using a microphone for themselves.

It was envisaged that the Novice licence was both for youngsters and older people as a first step towards full licensed amateur status. For some, it was sufficient in itself. Why not? Just as some amateurs have no interest in HF, and therefore choose not to take the Morse test, some Novices may be quite content to remain as they are.

Make Novices welcome and encourage them! They will learn more from *within* the hobby, and then perhaps feel ready for the next step. Never let it be said that amateurs are uncharitable. After all, we were all on that bottom rung once.

JOTA '92

AS I WRITE this, Jamboree on the Air has just ended. Due to other activities there was little chance to listen for long, but we did manage to visit GX3RSS at Bradley Woods camp, Rastrick, on the Saturday, where many contacts were made beyond these shores as well as with other UK JOTA stations.

A huge world map was on display, made of plywood with LEDs peeping through holes positioned in each country. As the original plan no longer exists, finding the connections to light the relevant LEDs caused much amusement.

Conditions were kind and there were many illuminated countries. Thirty-five in all, from 223 contacts. Scouts were kept busy saying their conversation piece and listening to the replies. Contacts included Australia, New Zealand and Zaire.

Two of the Scouts are Novices - Anthony, 2E1AUY and James, 2E1AHE. They were kept very busy - and loving it, besides proving invaluable to the official operators. Both are studying for the RAE and the JOTA weekend gave them both the extra proof that this is an enjoyable hobby and a great deal of experience.

Over a hundred Scouts, Cubs and Brownies were at the Camp - in a truly rural setting. Two courses were running connected with amateur radio, and both were very successful. From Saturday morning until midday Sunday, Selwyn, G4LNF, ran a Communicator Badge course. Seven Scouts embarked on the course with six passes at the end of it. A shorter course for Brownies was run by Norman, G3WAH. Nine young ladies took the course - and they all passed it.

Running the station was a joint venture between Halifax and District ARS and Brighouse Scout Fellowship ARC and a further ripple of excitement was caused when not one - but two Mayors arrived. The Mayor of Calderdale is licensed, Bill, G4KQJ. David Wright, the Mayor of Kirklees is not, but he showed a keen interest in what was going on.

I hope that other JOTA stations will send a report of their activities, so that I can pass them on. [See this month's *News and Reports* pages - *Ed*]

HAVE KEY - WILL CALL

I AM NOT quite sure just how many Class 'A' Novices there are at this precise moment, but the number is growing all the time. David, G0NEZ, writes to tell me that he has had 25 CW contacts with Novices. He pays tribute not only to the quality of the Morse sent by them, but to their general attitude, courtesy and operating techniques. Nor are they are all youngsters - the ages range from twelve to 77.

As Novice power output is limited, if you want to make friends, do remember that a Morse signal will reach the parts that SSB will not. Of course it's possible to work the world on low power - ask any GQRP Club member. You may have to work a little harder to be heard - but contacts could be from further afield. Sending and receiving in Morse rather than speech may seem harder, but the satisfaction you will feel at your achievement - and the new friends you will have made - will make it worth-while. Local contacts too will widen your circle of friends.

Do not abandon the key until you have at least given it a fair try.

A party of ten amateurs came from Oxford to the BT Tower in London to operate in JOTA. The group included six Novices (three class As) and (l to r) Terry, G0LUQ; Elizabeth, G0RJX; Anita, G7MPR and her son Martyn, 2E0ABA.

The fact that you cannot chatter away at thirty words a minute doesn't matter. Your callsign will explain that you are a relative newcomer to the hobby, and full licensees will be so pleased to hear you that they will make you feel welcome as they work at your speed. Do not be afraid to ask them to 'QRS' if they get carried away in their excitement at finding you.

Operating is a skill that needs practice, but will help you become more proficient and increase your speed. Remember, you had to learn to walk before learning to run.

If you are not yet ready for the test, but would like to practise reading some excellent slow Morse, listen for John, G3SJE (GB2CW) on top band. John spends three hours sending every evening on 1.976 MHz. This must be a thankless task, as you cannot tell him that you are there listening until you achieve that Class 'A' licence. Hopefully, when you do, you will let him know how you appreciated his help.

All amateurs will help you I am sure, but QRP Club members - and others - are listening especially for you between 3.565 and 3.585MHz. David tells me that he is on 80 metres *every* evening - and would love to hear you.

A GENEROUS GESTURE

VIKKI, EMMA, Stacey and Vicky, respectively 2E1ASM, AUF, AVL and AQD are Guides who became interested in amateur radio through Thinking Day on the Air and wanted to go further. Paul, G0LVV, allowed his arm to be twisted and a Novice class was started. Winter evenings saw the girls juggling their time between School and Novice homework, and four callsigns prove their success.

Unfortunately, Guides do not have unlimited funds, and Denby Dale ARC was concerned that interest would dwindle if regular use of equipment was denied them.

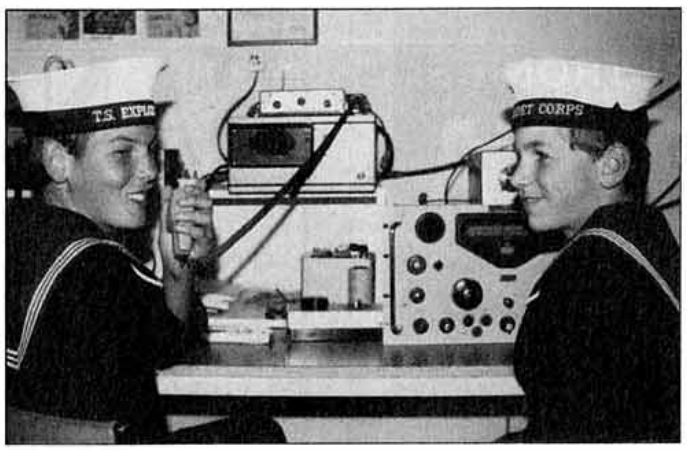
After discussion, Club members decided that they would lend four basic 70cm handheld transceivers to the girls until such time as the youngsters could provide their own, when they would be held in readiness for the next impoverished group. Phil, G4FSQ, prepared to modify four Pye Pocketphones to work on one fixed channel and the local repeater frequency.

Denby Dale club has approached a helpful local engineering company who are known to be interested in youngsters and their technical training. As a result not only was there a generous donation to cover the costs of the rigs, but also a contribution towards the cost of mounting GB2YIA 1992!

We attended the presentation at the Pie Hall at Denby Dale on 2 September, and it was a pleasant and memorable evening, well attended by members and their families. Tony, G0DDB, (Chairman) and Paul had a few words to say before the radios were presented by a representative of the local company, while the press flash bulbs were busy. The girls were asked to demonstrate the radios in a mock QSO from one end of the room to the other. Tony asked them to demonstrate on the key, as all four girls are working towards the 12WPM Morse test with tutor Jean, G0LPV - (Paul's XYL). Morse was checked and found to be perfect.

PHOTOGRAPH: ROCHDALE OBSERVER

Sir Cyril Smith presents successful Novices with their certificates.



Sea Cadets Sean and Anthony are now eagerly awaiting their Novice callsigns.

70CM REPEATER OPERATION

YOU HAVE your callsign and are ready to find a friend. So, what to do now? Perhaps, if you are a Class B Novice, you have listened on the local repeater and feel that you already know some of the operators you have heard.

Soon, you will know all the users of the repeater at given times, and can find your friends with no difficulty. Are you ready for the next stage? How many can you reach without using the repeater? How about trying a contact with them direct?

Using the repeater, explain what you are trying to do and invite your friends to experiment with you. Listen on the input to see if anything can be heard. Nothing is lost if you can't, - merely go back to the repeater contact.

Jack, G5UM, has a solution for you. He suggests that you can make a simple dipole very cheaply, fix it along the line of greatest activity and make many contacts on simplex frequencies. What's more, your effective signal will increase, so there is a possibility of sending your signal further. Result? Real QSOs - and the satisfaction of knowing that you have made this contact unaided.

A NEW CALLSIGN

JOHN JOINED a Novice class in spring last year, and took the Novice exam in September. He passed, and gained the callsign 2E1AHS just about the time he was ready to embark on the RAE course. In July '92, he became 2E0ACX, having achieved the 5WPM pass in Morse. A fortnight later, he learned that he had passed the RAE and sent for another callsign, becoming G7MEF. In August this year, he took and passed, the 12WPM test, and waited for his own special callsign - G0SPX - and was prepared to wait for it. By the time you read this, he will probably be using it. The waiting has been hard, but as he says, *this* one is for life.

John admits that without the Novice introduction, he would never have considered amateur radio as a hobby. He had no previous experience in any related subject. This is another instance of someone making a Novice entry and then taking further steps to become a full amateur.

PROFILES

AS REPORTED in October, it was hoped that Sir Cyril Smith would present the C and G certificates to successful Novices at Norden Community School. He did and the proof is shown.

The opposite photograph shows the eight successful candidates (Chris, G7BIG, says the Instructors were too shy to appear) with Sir Cyril. At the time of writing this, four Novice callsigns had been received: Sue, 2E1AZD; Chris, 2E1AZE; Peter, 2E1AZL and John, 2E1BCH. Peter is the twelve-year-old receiving his certificate. The new Novice course started the same night with five students, which grew to eight. Again, these are mainly mature students. Chris makes the point that *all* students are encouraged to progress to the full RAE (if old enough) and at least two of the pictured group are doing so.

Sean and Anthony (pictured opposite) are in the Sea Cadets, and each holds the rank of Able Seaman. Both have passed the Novice exam and should have their callsigns by the time you read this. Congratulations to both - and to their instructor, Mike, G4UXC.

The boys are cadet radio operators at *T S Explorer*, the Vale of Evesham unit. As *T S Explorer* holds the callsign G4WET, and operates on HF and VHF, they will soon gain amateur radio experience. Mike added that the course proved very popular - and there is now a waiting list! This means that he will be kept busy, and that soon, there will be more Novices in the unit.

SWL NEWS

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

AS WE head towards another festive season my thoughts are fixed on what the Lower Frequency bands (7 and 3.5MHz) will produce this coming winter. With the information obtained from the last two issues where I looked at LF DXing, I hope that the winter is a good one and that many of you reap some splendid rewards for some dedicated listening on both bands. For anyone trying these bands seriously for the first time please let me know what you find so that it can be reported in the next column.

G3AHO wrote with regard to a recent mention in the column of an SWL using a Saisho SW5000 receiver. As the magazine has never asked anyone to "test drive" it for us, Cyril wants to know what listeners think of its performance and whether it gives good value for money. He is not too active now, but wants to buy a receiver which covers the broadcast bands as well as the amateur bands just to keep in touch with what is going on. Views on performance, etc, can be sent to me and I will pass the information on to G3AHO.

Malcolm Harrington, BRS20249, wrote regarding his being awarded the '1991 Founders Trophy' for services to the RSGB. For the last 25 years or so Malcolm has, until recently, been a full member of the HF Contests Committee. He did a fine job in publicising all the Society's contests and must have checked many thousands of contest logs in his own time. I have had the pleasure of being on a committee with Malcolm and I was always impressed by his hard work and efforts on our behalf. Although he confesses to being surprised at being awarded the Trophy, it is indeed a great honour and one which he should enjoy.

50MHZ FIRST

IAN, G4OUT, provided the news that the Society has issued the first 50MHz 100 Countries Award to a listener. It has gone to a Dutch SWL - Jan, NL213. He well and truly beat the three 50MHz stalwarts from these shores with 114 countries confirmed. Jan sent me a list of the QSL cards he has received - in some cases it seems like 28MHz on a good day. He has cards from VP2EHF, KM1E/C6A, TI2NA, CO2KK, FY5DG, J73AE, KG6DX, VS6EL, YC0UVO, W3JO/6Y5, HL5BBK, 7P8EN, FM5WD, ZP5ZR, 9X5NH, 5H1YK, 9Y4VU, 9Q5EE, 9J2HN and 1A0KM. Jan must be congratulated most sincerely because none of these countries has been heard by SWLs in Britain.

He says there are five SWLs on 50MHz in PA. Not only has Jan proved himself a good SWL on that band, he has 68 countries confirmed on 144MHz, 49 on 432 and 35 on 23cm! The photograph this month shows the NL213 shack.

UBA SWL 1993 COMPETITION

JAN, ON6JG, sent the rules for the annual competition organised by our friends from Belgium - the UBA. The rules are simple enough, but to save valuable space here, anyone who wants the full rules can send me an SASE. Basically, SWLs are invited to log what they can on each of the six main amateur bands. Each country heard on each band scores both a point for having heard it and a multiplier. All modes can be used and the event runs for the whole year.

USING RST

I HAVE seen a number of contest logs in my time, and I still do. One that I saw recently caught my eye for the wrong reasons and I decided it might be time to remind listeners of how RST is used. There is confusion in some minds about the 'SINPO' reporting system and 'RST'. The former is *not* used in amateur radio, but is used for reporting to broadcast stations. The latter is used for reporting to amateur stations. The 'R' stands for readability, 'S' for strength and 'T' - used *only* when reporting a Morse signal - for tonal quality. So, a station on voice or RTTY receives an 'RS' report and a station using CW receives an 'RST' report. Readability is measured from 1 to 5 as follows:

1 = unreadable
2 = difficulty in reading, only some words readable
3 = signal readable with some difficulty
4 = signal suffering only slight readability problems
5 = no difficulty in reading

Problems with readability can be caused by a number of things - a receiver problem, a transmitter problem, propagation or the fact that the operator speaks too quickly or by bad diction. It must be said that R3 reports are about the lowest you will ever hear on the amateur bands. Many 3 x 3 reports are exchanged in the DX portion of 3.5MHz for example, but they are less commonplace elsewhere in the spectrum.

The strength of the signal is measured from 1 to 9. For a listener to give a 5 x 0 report may only indicate that he is paying too much attention to the 'S' meter. Many listeners now tend to give audio reports. For example, the signal is barely moving the 'S' meter, but the station is perfectly R5 although a bit weak. In many cases the SWL will say, for example, that the station is a 5 x 3. It simply does not make sense for any serious SWL to give a 5 x 0 report - *ever*. For those who are not sure how the 1-9 scale works, the following may be useful:

1 = very faint
2 = very weak
3 = weak
4 = fair
5 = moderate
6 = good
7 = very good
8 = strong
9 = very strong

Listeners will also hear amateurs giving '59+20dB' reports. This simply means that the received signal is 20 decibels over the S9 reading. Finally, whilst on this subject many stations are heard freely giving away 5 x 9 reports and then ask for all the details to be repeated. In such circumstances, a 5 x 9 report should *not* be given. As long as listeners are honest and accurate in their reports, everything should be fine. Before moving on, I hope that when a SWL becomes a licensed amateur, he refrains from the habit of giving a 5 x 9 report just as a matter of course. Indeed, the worst example of this are those who have QSL cards with 5 x 9 already printed!

On CW, the 'T' refers to the quality of a properly tuned CW signal. It is true that most reports given are '9', but a rough sounding note would merit something less than a '9'. A 'K' at the end indicates that there are key clicks and a 'C' indicates a chirp.

The shack of Jan Steenbergen, NL213, showing his FR50B and Century 21 receivers, plus a receiver for the 144MHz band.

HF NEWS

HAROLD, G2CDT (exBRS3039), had written asking if any SWL would like to correspond with one of the SWLs at the LZ1KVZ club station. He lives in Sopot where there are four amateurs. Anyone wishing to write should send their letters to Daniel, c/o Vladimir Zaimov Technical School Radio Club, PO Box 8, Sopot 4330, Bulgaria.

David, BRS25429, recently achieved one of his main ambitions of hearing 300 countries on 7MHz (and he has 297 confirmed). It is worth making the point that this does include some 'deleted' countries, but it is a wonderful achievement. How long did this feat take? 30 years dedicated listening!

September saw some SWLs, including myself, taking more interest on 18 and 24MHz due to the challenge. Some interesting DX was found, especially during the mornings on 18 and mid-afternoon on 24. On the 'main' HF bands, conditions were very mixed. Best DX pulled from your letters included CY0NSM on 7MHz: T32GG, XY0Q and 4S7VLG (remember I am the SWL QSL Manager) on 14MHz; D2EL, H44/JA1OEM, KH0AC and V85EM on 21MHz; and HS1CDX, TL8DF, 3X0HNU and 9X5AB on 28MHz.

FINALE

SEASONS GREETINGS to all my readers, with special thanks to those who regularly support the column. News and views for the **February 1993** issue should reach me by **15 December**.

RADCOM CONSTRUCTION FEATURE

HF All-band Antenna for Mobile or Home

The first of a two part article by John Robinson, G3MPO

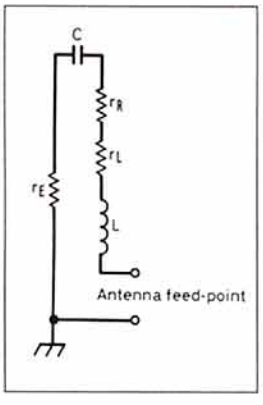


Fig 1: Simplified equivalent circuit of the antenna.

TECHNICAL UPDATE

THE POPULAR RF Sniffer construction article in the October issue should have specified a 200µA FSD meter, as shown in the diagram. Also, the author of last month's 'Inexpensive but Effective Wobbulator' was Peter J Lawton, G7IXH (not G7IXK). Apologies to both.

WHEN I RETURNED to amateur radio after a break of thirty years, I decided to look for a less intrusive antenna than before, when setting up my new station. Purchase of a second-hand TS-430S presented me with the option of mobile operation from a car. This would entail no more than designing and manufacturing a suitable aerial and matching unit, and attaching it to the car. An inexpensive and interesting project.

This article attempts to set down what I found out about the hows, whys, and wherefores of mobile operation, and concludes with a practical DIY design for an all-band eight foot whip made from easily obtainable materials. Hopefully, it will encourage others to extend their activities into this highly effective and satisfying mode of operation.

PRACTICAL REQUIREMENTS

These are easily listed (although less easily met):

a) Minimal impact on the car - no big holes or unsightly mountings.
b) As good a performance as is practicable.
c) Easily demounted.
e) Time to change bands of not more than two minutes.
f) Low cost - not more than £50.
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h) All parts to fit neatly and quickly into the boot.
i) Minimal impact on XYL's use of the car. Crucial!
j) Simple operation - minimum of knob twiddling, no ATU.
k) At least 150 watts power handling capability.

DESIGN CONSIDERATIONS

PRACTICALLY ALL mobile antennas are 'short' vertical monopoles fed against ground. Such antennas concentrate their power at low angles of elevation, with the radiation pattern shifting slightly upwards as the length of the antenna in relation to the wavelength decreases - in many ways, an ideal specification for general all-round performance. Except perhaps on 10 metres, a full quarter wave on a car is never possible, and the 'missing length' has to be made good with either a series inductance or a capacitance to ground near the top, for each band. For aerodynamic reasons, coil loading is far more practicable for mobile use - at sixty miles an hour an eight foot whip with a saucer-sized capacitive spider mounted on the end is a frightening sight to see - so the inductive method of loading was adopted with little further thought.

The distribution of current along the antenna in-board of the loading coil is the same as that along the inner end of one limb of a dipole, ie it declines along the antenna according to a cosine law. This means that at LF, where the antenna is small compared to a quarter wavelength, it is virtually constant along the length. Outboard of the coil, current distribution is like that at the end of a dipole, and falls off until it reaches zero at the end. The current in the coil is practically constant and equal to the current in the lower part of the antenna, but its passage through the coil creates a large voltage near the end of the whip. At 100 watts, typical values of drive voltage and bottom element current are about 70V and 1.5A RMS respectively, the voltage induced by the coil and fed to the top end rising to several thousand volts at the lower frequencies. (Don't touch the top section or coil with the power on!)

Thus, when fed with 100W, the bottom of the antenna behaves like the inner end of one limb of a dipole fed with 200W - 100W each side - whereas the top section resembles the end of a dipole fed with much higher power - on 3.5MHz for example, the input drive to a half-wave dipole showing these levels of current at the end would be about 60kW!

ANTENNA EFFICIENCY

IN LES MOXON's comprehensive book, *HF Antennas for All Locations* [available from RSGB sales - see 'Bookcase' pages - *Ed*], the simplified equivalent antenna circuit is shown to be completed by current flowing to the car body via the antenna capacitance. This occurs either directly or via the 'car-body to earth' capacity, and thence back to the transmitter. In so doing it encounters resistance in the earth path which unfortunately dissipates some of the radiated power in the form of heat. In my own case, a figure of 20Ω appears appropriate. A simplified equivalent circuit is shown in **Fig 1**, current flowing via the coil inductance (L), whip capacitance (C), radiation resistance (r_R), coil resistance (r_L) and earth resistance (r_E).

Low radiation resistance is not in itself a bad thing - a transformer can match it to 50Ω - but earth resistance losses are significant.

Since the RF power is shared between earth, coil and radiation resistances, obvi-

ously only power delivered into the radiation resistance is useful for communication purposes. Nothing much can be done about earth resistance but it will clearly pay to keep radiation resistance as high as possible and coil resistance as low as possible.

For practical reasons, the choice open to the mobile operator is usually one of a roof-mounted, base-loaded whip about four feet long, or a centre-loaded, bumper-mounted eight foot whip, the theoretical ratio of radiation resistance in the two cases being about one to five.

Therefore, I selected a centre-loaded 8ft version of the antenna with its higher radiation resistance and consequent higher performance, in preference to the simpler base-loaded 4ft whip.

From the beginning, the antenna system was designed to operate without an ATU and this in turn meant that the system must resonate in its own right at each frequency. A maximum VSWR of 1.5 was the objective - to match the turn-off characteristics of the TS-430S. To a first approximation, each loading coil resonates with the capacitance of the antenna top section and the required inductance therefore increases inversely as the square of the operating frequency. The resultant operating Q increases as the frequency decreases, to the point that at 7MHz, the 1.5 VSWR bandwidth is only about 25kHz, and at lower frequencies even less. The antenna is therefore tuned by making the top section of the antenna telescopic. A total movement of about 8in allows tuning across all bands except 160, where only about three quarters of the band is covered. To cover the whole band, a second longer/shorter whip can be used. On all bands above 40m, the Q is sufficiently low to make tuning within the band unnecessary.

Positioning of the coil is a subject of some debate. Radiation resistance considerations point towards high mounting, but this increases the inductance necessary which in turn increases coil losses. It must also be possible to reach the telescopic section of the whip to adjust it, and I therefore settled on a more or less central position so that the combined height of mounting point, lower mast, coil and telescopic section just about equalled my reach.

With an antenna such as this, the impedance presented to the transmitter ($r_R+r_L+r_E$) should always be less than the transceiver output impedance of 50Ω, so that a step-down matching unit is required. Of the available choices - base coil, ferrite auto-transformer, and capactive shunt - the latter was the simplest and cheapest to implement, and was therefore selected.

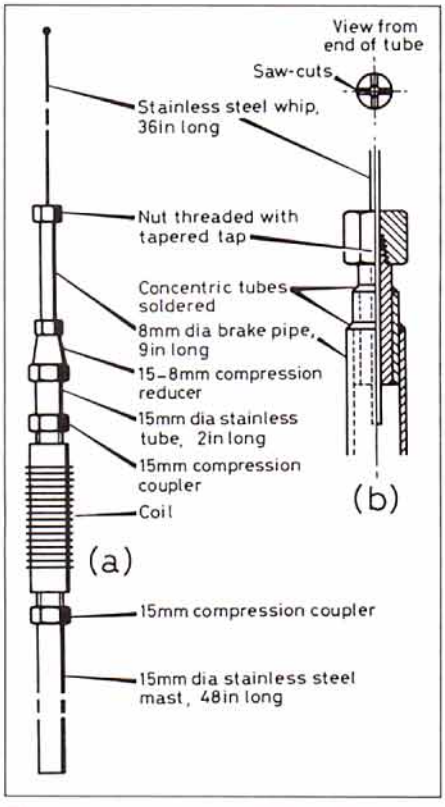

Fig 2: An 8mm diameter brake pipe and stainless steel whip comprise the upper section.

ANTICIPATED PERFORMANCE

THE PERFORMANCE OF the antenna will depend essentially on two things:

a) The gain of the antenna in the important direction - ie towards the horizon for DX and at higher angles for intermediate distances.

b) The efficiency with which power is radiated/received - ie the ratio of the radiation resistance to the total antenna circuit resistance.

At the higher frequencies, the first of these approximates to that of a free space dipole mounted on end, with the polar diagram becoming slightly more rounded at the lowest frequencies as higher angle radiation increases and power at the horizon falls by about half an S-point. With full 360° coverage, this represents a good compromise for general purpose communications and is better than many home-based dipoles can achieve in practice. The theoretical efficiency - power radiated as a proportion of total power generated - is less favourable, falling short of the conventional dipole by about half an S-point at 10 metres and by as much as three to four S-points at 160 metres.

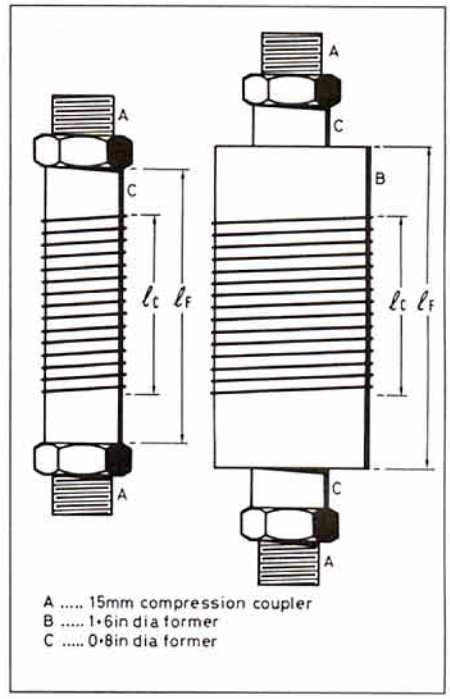

Fig 3: Coil former construction and dimensions will depend on the frequency in use.

This means that overall, in relation to a home station dipole radiating the same power, we can expect signals to be comparable at the higher frequencies, but falling off by as much as four S-points at the lowest frequencies. Fortunately, signal levels between home-based stations of S9+20 are common on 80 and 160 metres and four S-points down still leaves us with a respectable S7 to 8 report.

ENGINEERING

AS MY WORKSHOP FACILITIES were little more than a 'Workmate' and electric drill, the mechanical design presented some problems. Fortunately, the local plumber's stockists provided a suitable source of ready-made brass, stainless steel and plastic bits and pieces. 15mm plumber's brass compression couplers were selected as both coil terminations and the means of fixing them into the antenna. The bottom section of this is made from a length of 15mm stainless steel central heating tubing.

Selection of a coil former material presented potential pitfalls as PVC can be comparatively lossy. Fortunately, a range of white polypropylene waste pipe was found to be commonly available, and this has subsequently proved a good choice. The thread of the brass 15mm compression couplers can be screwed (with some difficulty) into the end of the 0.75in (19mm) version of this tubing to make a very strong joint. The ends of the tube can be pre-heated in hot water if necessary. Even better, a 0.5in (12.5mm) BSP taper tap can be used to cut a starting thread in the tubing. A second coupler screwed into the other end gives an excellent coil former with ready-made 15mm connections at each end

which fit and clamp directly onto the 15mm lower mast.

The coil structure had to be strong to support the considerable wind drag of the antenna top section. In several thousand miles of motoring it has proved completely secure. Varying lengths of former are used for the higher frequency coils, and where a greater diameter is needed for the lower frequencies, the same 0.75in (19mm) former is used as a spine. This runs up the middle of a larger diameter tube to which it is attached by packing the space between them at each end with postage stamp size pieces of car-repair glass mat soaked in resin. It should then be waterproofed with a silicone rubber sealant.

Above the coil former, a length of stainless steel whip was required (obtainable from most amateur radio suppliers), a short length of small diameter tube into which the whip can slide, and a means of connecting this tube to the top 15mm coil coupler. The most difficult to achieve was the telescopic section, but the local car accessories shop had a range of copper brake tubing in concentric sizes from 8mm OD down. A 9in (230mm) length of 8mm diameter pipe, with one end plugged by short lengths of the next two sizes down and soldered into position, gave a nice sliding fit to the 2.5mm diameter whip. Some sort of quick release lock was now required to hold the whip, once set, in position, and this called for a degree of ingenuity and precision. The solution was to cut a thread on the last half inch of the end piece of tubing with a thread-cutting die, and make cross cuts down its length with a mini-hacksaw.

A matching taper tap and a short length of brass rod allowed me to make a nut with a tapered thread which would close the tube down onto the end whip as it was screwed on, thus locking it. Some patience and a degree of luck were required before a satisfactory nut was obtained, but once made, the arrangement worked well. Subsequently, the brake-pipe components were replaced with stainless steel which required a visit to a specialist steel supplier and the assistance of a local handyman. The whip structure was completed by connecting the telescopic section onto the coil using a 15mm-to-8mm (microbore) brass reducer and a 2in (51mm) length of 15mm tubing, as shown in **Figs 2 and 3**.

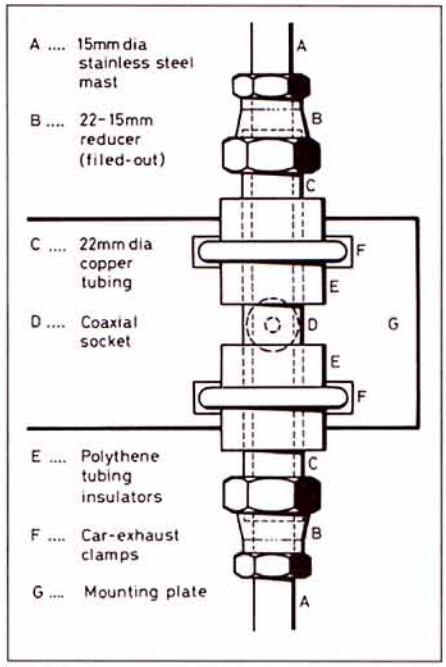

Fig 4: Electrical connection and mounting details for mobile or fixed-station operation.

The base mount fitting between the antenna and the car needs above all to be strong, for this is where the main mechanical load appears. The solution selected depends upon the car in question, but it is unlikely that the antenna can be mounted through the bodywork like a car aerial. If you have a tow bar with a bolt-on hitch, the simplest arrangement is to sandwich a steel plate between the hitch and its fixing, and fix the mount onto this adjacent to the hitch. Failing this, most cars have a rear towing loop of metal to which an outrigger can be bolted.

Many commercial systems mount the whip on a spring, but this was rejected since it seemed likely that a spring strong enough to prevent the antenna thrashing about at speed was also likely to be too strong to prevent impact damage. Also I had no ready source of suitable springs, and it was therefore decided to fix the antenna rigidly to the car.

. . . to be concluded

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Pat Hawker's Technical Topics

SURVIVING HELL AND HIGH WATER

IF THE WORST HAPPENS and electronic equipment is subjected to such catastrophes as domestic or vehicle fires, floods, lightning strikes, battery acid spills, electrical shorts etc what are the chances of it ever working again?

An article 'Surviving hell and high water' by Marvin Kurland (Trenton State College) in *IEEE Spectrum*, May 1992, pp44-47 claims that electronic equipment can often be rehabilitated after a fire or flood at a cost of only 15% or so of replacing it "but it helps to design it so as to minimize damage in the first place". Apparently there is a UK company - Imbach UK Ltd of Aldridge, West Midlands, that specialises in coping with large electronic installations as experts in damage management and reclamation.

It is pointed out that the most common type of damage is the sooty film that smoke leaves on equipment, even in rooms not touched by fire. The next most common is damage from water from building sprinkler systems, fire hoses, or even leaking radiator pipes in the ceiling overhead. Corrosion proceeds most rapidly right after exposure to fire, smoke, or water. The longer the exposure lasts, and in the case of fire, the higher the temperature reached inside the equipment, the less likely the hardware is to survive.

The first step in stopping corrosion is immediately disconnecting the damaged equipment from the power supply. This rules out further damage from electric shorts. It also erases any voltage potentials within the circuitry that would otherwise plate contaminants onto circuit boards and backplanes. Next, the ambient humidity must be reduced to below 50%. Although smoke does little damage while a fire is raging, the particulate residue left after the smoke has dissipated contains chlorides (from burning PVC insulation and cabling and from some fire extinguisher compounds in high temperatures) and sulphides from burning paper. All are corrosive by-products of combustion that eat away at metal contact surfaces in the presence of oxygen and moisture - reducing humidity slows corrosion. Ideally equipment should be moved to a clean, air-conditioned, and humidity-controlled environment.

The *Spectrum* article shows how damage-management companies go about the task of reclaiming high-cost electronic data processing installations but there are a few ideas that might prove suitable when tackling radio equipment - although in bad cases this would seem to be a job for a professional expert. To quote the article by Marvin Kurland:

"Once the necessary test samples are taken - a procedure taking up to a couple of hours - the damage management team will probably spray connectors, backplanes, and circuit boards with a water-displacing protective oil. The oil leaves a thin but easily removable coating to help prevent oxygen and moisture from contributing further to corrosion. Contrary to popular belief, water in itself does not permanently ruin electronic equipment, which can be splashed or sprayed with it, or even submerged in it without irreparable harm. Water alone is quite innocuous - indeed, deionized water (which has about the same low surface tension as alcohol and essentially no conductivity) is used in cleaning much damaged equipment. The trouble is due to corrosive impurities from pipes or soot that mix with the water - hence the use of a water-displacing oil to limit the occurrence and extent of corrosion.

"As soon as possible, cabinet doors should be opened, side panels and covers removed, and chassis drawers pulled out to drain the water off, something a user can do. Never, ever, should water-damaged equipment be placed in cardboard packing boxes or any other material that will trap moisture inside the chassis.

"A damage management team will probably set up fans to move room-temperature air through the equipment to dry it out, taking care to keep the damp air flow away from other equipment. Technicians may also direct compressed, deionized air at low pressure (about 0.17 Megapascal) to blow out trapped moisture or direct heated air from handheld driers onto connectors, backplanes, and circuit boards.

"Chassis and large pieces of equipment are disassembled and may be spray-cleaned by deionized water at low pressure. Circuit boards could also be washed by hand and gently scrubbed with a clean, soft brush in a continuous left-to-right, top-to-bottom motion to avoid any recontamination. If the equipment has been exposed only to chlorides, it may be washed with deionized water and mild detergent and rinsed with deionized water. If it has also been exposed to sulphides, it may also be washed with a solution of alkaline and deionized water. In any case, the rinse is followed with a low-pressure spray of alcohol to drive out the water. The units are finally baked dry at 100°C in special ovens, so as to remove all trace of moisture."

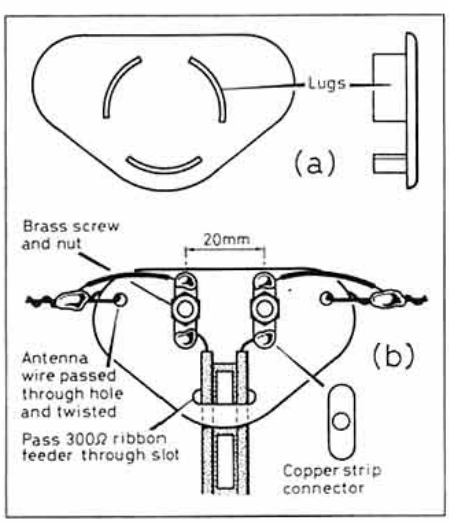


Fig 1: Simple dipole centre made by GI4JTF from kitchen cupboard blanking plates.

The article includes advice on how equipment could be designed to facilitate reclamation and lists a number of publications giving further advice. It notes that one of the first books published on the feasibility of using water to clean smoke-damaged electronics without hurting their reliability was *Effects of Corrosive Smoke on Electronics* by S T Olesen, published in January 1984 by the Danish Public Research Institute.

TIPS AND TOPICS

BRIAN JOHNSON, G3LOX, reminds us that an old car-ignition sparking plug, fitted into an 18mm diameter copper tube forming an earth stake, provides an effective static discharge system for antennas - a tip he discovered some years ago when using balloon supported antennas. He also points out that a spare car wheel can provide an excellent temporary base for a vertical antenna such as a 14AVQ which conveniently fits into the centre hole.

Dr E H Squance, GI4JTF, while looking for a dipole centre for a G5RV antenna he was building, noticed some blanking plates inside some old kitchen cupboards (Hygena): **Fig 1(a)**. He cut the lugs off and super-glued the two plates back to back. They were then drilled and finished as in **Fig 1(b)**.

Julian Jablin, W9IWI, in the 'Hinks & Kinks' column of *QST* (July 1992) writes: "An article on repairing meters that cautioned against losing tiny screws and springs reminded me of an old watchmaker's trick. The working area on the bench must be scrupulously clean, of course. Attached to the front of the bench, just in front of the working area and extending over the floor, is a wooden frame about 18 inches wide and 12 inches deep, with a loose rectangle of thin cotton material tacked to its underside. This can be temporary, and held in place by C clamps. An old picture frame, with a smooth kitchen towel tacked loosely where the glass would be, works fine. When a little screw or spring drops out of the meter (or whatever small device you're working on), it rolls off the bench (Murphy's Law in action), but instead of hitting the floor and disappearing it is caught in the cotton gadget and is easy to retrieve". A simpler version of basically the same idea is also provided by Jim Harrison in *Sprat* No 71: "For table top construction a wooden board with a piece of beading pinned round is most useful, so that components do not roll onto the floor!"

USING SCRAPS OF COAXIAL CABLES

SOME TIME AGO, I RECALL including in *TT* an item on using the cylindrical insulation of scraps of coaxial cable to form stand-off insulators, coil formers and the like. This idea turns up again - but in more detailed form - in a 1991 issue of the *Mid-Sussex Newsletter* (taken in fact from a reprint in *Airtime*, June 1991, Newsletter of the Southdown Amateur Radio Society). This provides a 'Topical Techniques' feature but the original author is not credited. The text is as follows:

We all have many odd short lengths of coax lying around the shack, but these usually end up in the rubbish bin the next time we wipe down the bench. Old UR67 and similar 'half-

inch' cable is, however, a most valuable raw material, for lengths of even less than an inch can be put to good use for stand-off insulators or coil formers.

The first task is to remove the outer sheath, braiding and centre conductor. This can be done by any of the usual techniques. Then, for stand-offs, cut the inner insulation into lengths of half to three-quarters of an inch. For coil formers, cut to about 1.5 to 2in (38 to 51mm).

There are two methods of making the stand-off: **Fig 2**. The simplest is to attach a couple of solder tags to one end using a short self-tapping screw and then using another similar screw to fasten the stand-off to the chassis or PCB. Provided that the gap between the tips of the two self-tapping screws is more than a quarter of an inch, these stand-offs should cope with up to 5000 volts.

An alternative method is to drill a 1/16th inch hole through one end of the insulation and force through a tight hairpin of copper wire (the discarded inner conductor is ideal). Where it comes through, open up the hairpin into a small loop and pull back until it is tight against the insulation. Cut one of the 'legs' of the hairpin on the other side to around 3/16th inch and bend back round the insulator to secure and form the longer leg into a loop of similar size to the first. The wire can be made more secure by applying just sufficient heat to melt the insulation around the wire. Again attach to the chassis or PCB with a short self-tapping screw. Making a coil former uses exactly the same procedure except that two loops are fitted, spaced sufficiently far apart to permit the required coil to be wound between them. **Fig 3** shows how the formers are made, together with a graph plotting frequency against turns for formers made from the inner insulation of half-inch coax, with capacitances of from 15 - 140pF, using 20SWG enamelled wire.

Rather longer lengths of discarded coaxial cable (that has not been ruined by moisture) can also be used to form fixed high-voltage, high-Q capacitors of any required low value provided that the cable's capacitance per inch is known or can be determined.

Another application of stripped cable insulation that has been suggested in the past is to form spreaders for balanced open-wire line using short self-tapping screws to hold short lengths of binding wire.

G8VXB'S SURFACE MOUNT TIPS

THE PROBLEM OF DEALING with surface-mount chips has been described by P J Roberts, G1VUV in *Television* (September 1992): "The need to remove and replace surface-mounted components, especially ICs is becoming more common. Those little flat square chips with millions of legs are a particular problem. Getting them off the board is hard enough, let alone putting them on." Some notes by Dave Young, G8VXB, on handling surface-mount components also appeared in *Cats Whispers* - the newsletter of the Coulsdon Amateur Transmitting Society - September 1992.

G8VXB notes that an increasing amount of equipment is using surface mount technology: although a number of suppliers sell specialised equipment for surface mount working, these all involve a large outlay. The main differences between surface mount and standard components are: (a) No component pins or PCB holes. (b) Approximately half the size. (c) PCB tracks and pads are smaller.

For anyone contemplating the repair of surface mount equipment, he considers that a number of tools are required which may be absent from most toolboxes. He lists these as follows, based on Farnell catalogue numbers, although similar tools from other distributors may be substituted:

- Wire cutter (Farnell 108-713). These need to have small jaws, but strong enough to cut an IC pin.
- Long nose pliers (Farnell 276SEB). The tips of the pliers are required to be able to grip a surface mount IC, but long enough to keep any heat away from the hand.
- Soldering iron (Farnell C250). For the small pads and tracks a low power, miniature iron is ideal. The regulated irons are better, but a good deal more expensive.
- Iron tip (Farnell 10, 1106). This needs to be as small as possible for soldering and a 1mm bit for use with solder wick.
- Tweezers (Farnell VEN7A). These are ideal for the smaller surface mount devices. Do not buy the cheaper tweezers, as they are not suitable for surface mount use.
- Solder wick (Farnell AA). Use the smallest size of this product.
- Solder (Farnell SMAR26). Silver-loaded solder should be used on surface mount components, to stop the connections from deteriorating.
- PCB cleaner (Farnell PCC01L). There are a number of suitable cleaners.
- Anti-static area (Farnell 175-818). Static precautions should be taken where necessary, especially if the circuit contains unprotected FETs. This product is not suitable for mains operation.
- Heat gun (Farnell 107-261). This is used for the removal of the larger ICs. For smaller ICs a gas soldering iron, used as a heat gun, may be used.
- Anglepoise lamp (Farnell 401). A number of such lamps are suitable.
- Magnifying glass (Farnell 201-870). A plastic-lens version is usually sufficient.
- Component holder. This can be made from a small piece of plastic rod with some double-sided tape on the end.

If the above list has not already discouraged any attempt to repair or build SMC boards. G8VXB adds that "Before any work is carried out, ensure that: (1) The PCB is firmly held on the work surface (insulating tape works reasonably well). (2) There is enough illumination to see the soldering area clearly.

While soldering, due to the small track size, a minimal amount of heat is required in order not to damage the PCB or the components.

(a) Keep any soldering to less than three seconds per pad.

(b) Use a 1mm iron tip when using the soldering wick.

On the question of removing surface mount devices, G8VXB divides this into procedures for (A) Two and three terminal devices; (B,C)

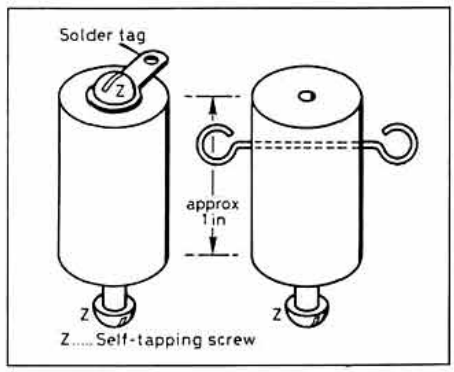


Fig 2: Construction of stand-off insulator from short lengths of scrap coaxial cable.

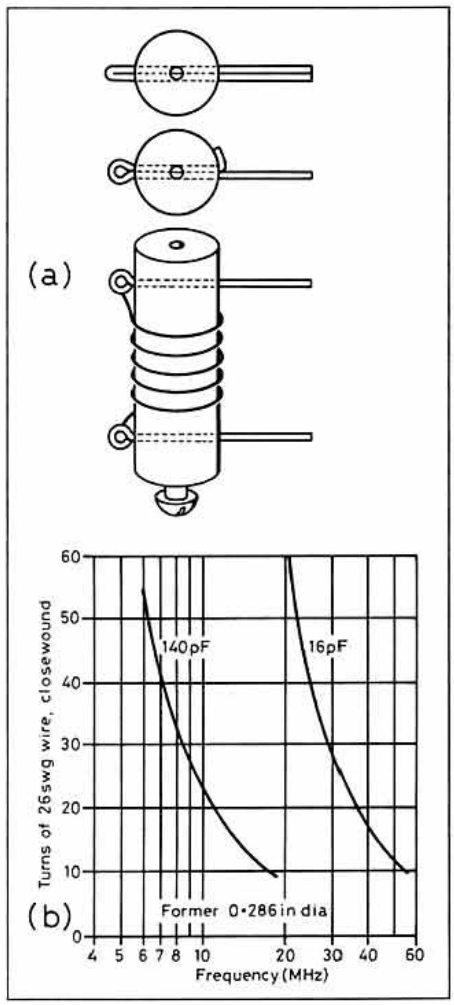


Fig 3: (a) Construction of coil formers from half-inch coax. (b) Plot of frequency against turns for formers made from the inner insulation of half-inch coax with capacitances between 15 and 140pF.

Two methods for dealing with multi-pin devices:

(A) 1. Remove solder from terminals using solder wick. 2, Heat device with iron while holding in tweezers (or heat one terminal, then quickly the other, while holding in tweezers). 3, Rotate in the plane of the PCB when solder has melted. 4, Remove surplus solder with solder wick. 5, Remove any glue deposits.

(B) Multi-pin devices, first method: 1, Cut IC pins using cutters. 2, remove IC and pins using tweezers. 3, Remove surplus solder with solder wick. 4, Remove any glue deposits.

(C) Multi-pin devices, second method: 1, Heat IC pins using heat gun. 2, Remove using long-nose pliers, rotating in the plane of the PCB. 3, Remove surplus solder using solder wick. 4, Remove any glue.

G8VXB notes that Method B requires a certain amount of experience and recommends initial practice on some surplus PCBs.

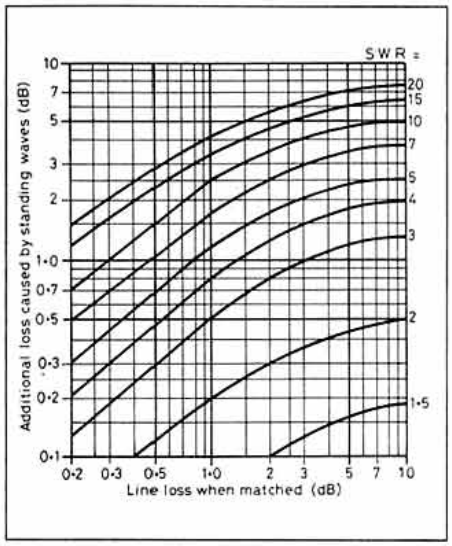


Fig 4: Graph showing by how much (or at HF usually how little) additional feeder loss occurs with a moderate VSWR on the line compared with the same line having an accurately matched 1:1 SWR.

Method B however is the recommended approach since with Method A the tracks may be damaged when cutting the IC pins.

His technique when installing surface mount devices is as follows: 1, Pre-tin one pad (if a dual-in-line component choose a corner pad). 2, Hold device in tweezers, and line up on PCB. 3, Press lightly on component with holder. 4, Heat pad until solder flows around pin. 5, Solder the opposite pin. 6, Solder the pins on alternative sides. 7, Clean with PCB cleaner and inspect. 8, Redo connections if necessary and clean. NB A minimal amount of solder is required.

PERSISTENT SWR MYTHS

DESPITE THE EXCELLENT explanations given a decade or so ago by Walter Maxwell, W2DU, in a series of articles in *QST* and later in his book *Reflections - Transmission Lines and Antennas* published by ARRL, many of the myths that have long surrounded SWR and the use of SWR meters continue to persist. For example, the idea that in the presence of a mismatch between the antenna element and its feeder, reflected power represents lost power dissipated in the transmitter. There is no doubt that an SWR meter is a useful accessory, and virtually essential in the case of a transmitter with a solid-state power amplifier where protection circuits will begin to reduce the output power when the SWR reaches or exceeds about 1.7:1. However it should always be remembered that it is often misleading to attempt to evaluate antenna performance on the basis of 'the lower the SWR the better'.

In the past, based on the writings of W2DU, *TT* has emphasised such points as:

(1) Reflected power does not represent lost power except for the (usually modest) increase in line attenuation over the matched line attenuation (**Fig 4**). In a lossless feeder line no power would be lost because of reflection no matter how high the SWR. At HF with low-loss cable, reflected power loss is usually insignificant; at VHF it may become significant; at UHF it may become extremely important.

(2) Reflected power does not flow back into a transmitter and cause excessive dissipation and other damage. The damage often blamed on a high SWR is usually caused by improper output-coupling adjustments and not by the SWR.

(3) Attempts to reduce SWR below 2:1 on any coax line on HF generally represent wasted effort from the viewpoint of increasing the radiation from the antenna - although may be needed to prevent output reduction of solidstate amplifiers arising from the action of the protection circuits.

(4) A low SWR is not evidence that an antenna system is a good one or that it is working efficiently. On the contrary a lower than normal SWR over a significant bandwidth is reason to suspect that a dipole antenna or a vertical antenna is being affected by resistance losses that may arise from poor connections, poor earthing systems, lossy cable or other causes.

(5) The radiator of an antenna system need not be of self-resonant length to achieve maximum resonant current flow, nor need the feed line be of any particular length. A substantial mismatch at the junction between feeder line and radiator does not prevent the radiator from absorbing all the real power that is available at the junction. Where suitable matching (ATU etc) cancels out the reactance presented by a non-resonant radiator and a random length of feeder, mismatched at the antenna junction, then the system is matched and all the real power may be radiated effectively.

(6) The SWR on the feed line is not affected by any adjustment of an ATU (or the length of the cable see below). A low SWR achieved by this means is usually an indication of a mismatch between the transmitter and the input to the ATU.

(7) With an effective ATU and a good open-wire feeder a 132ft centre-fed dipole does not (contrary to general belief) radiate significantly more power on 3.5MHz than an 80ft dipole fed with the same transmitter power. A dipole self-resonant on 3750kHz does not radiate significantly more power on 3750kHz than on 3500kHz with any normal length of feeder, although the SWR may rise to about 5:1 and the coax cable will then, in effect, be working as a tuned feeder.

(8) High SWR in a coaxial feeder resulting from a severe mismatch at the antenna junction does not in itself produce common mode currents on the line or cause the line to radiate.

(9) The SWR in a feeder cannot be adjusted or controlled in any practical manner by varying the line length.

(10) Of the various types of dipoles (thin wire, folded, fan, sleeve, trap or coaxial) none will radiate more field than another, providing that each has insignificant ohmic losses and is fed the same amount of power.

It is however worth noting that where a mismatch exists between a feeder and the input impedance of a receiver, then reflected incoming signals will be re-radiated from the antenna element and lost. Optimum SNR of received signals thus does depend on good matching between feeder and receiver.

It seems worth publishing again an ingenious diagram stemming from a French amateur illustrating the effects of a mismatch between feeder and antenna element: **Fig 5.**

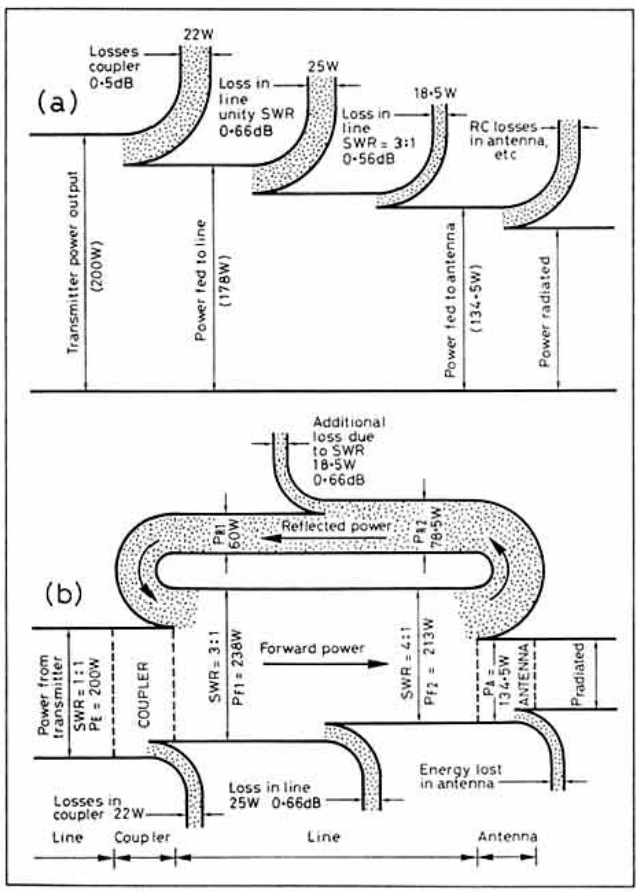


Fig 5: An ingenious diagram originated some years ago by a French amateur that illustrates the effects of a mismatch between antenna and transmission line. Although with even moderate SWR a significant amount of power may be reflected, most of this subsequently returns back up the feeder. Note that forward power, as measured in the feeder can be appreciably more than the true output power of the transmitter.

This shows incidentally that forward power in a feeder, as measured in the feeder may actually be significantly more than the real output power of the transmitter!

My excuse for attempting, once again, to destroy some of the common myths about SWR is that misleading information continues to be published in some periodicals and books. A letter 'SWR and the feed line' from Phil Winter, KM4OD in *QST*, September 1992, pp88-89, expresses concern that an article in *QST*, April 1992 on a five-band, two-element quad - although generally extremely useful, seemed to imply that adding three feet of coax to a quarter-wave feed line 'cured' a 4:1 SWR on 7MHz. KM4OD shows that on 7MHz three feet of coax would have a negligible effect on impedance and no effect on SWR.

He writes: "I strongly suspect that the real culprit was not the quarter-wave feed line or the reactive load, but current flowing on the outside of the coax shield. This could lead to a 4:1 SWR indication on the shack SWR. Maxwell states 'Since there is no practical way to determine the impedance of arm 3 (outside of the coax shield), the true antenna impedance and SWR cannot be calculated from the measured data'. Adding three feet of coax could have altered the impedance on the outside of the shield so that a lower SWR reading was indicated . . . . If we are to get the most out of our stations, we must make sure we understand what's going on in that black stuff that runs out the wall and up the tower. Firstly, SWR does not change as the feed-line length is altered, discounting attenuation effects. If we do measure an SWR change as the feed-line length is changed, then current must be flowing on the outside of the coax shield, rendering any SWR measurement inaccurate. Secondly, line loss aside, no single length of coax is any better or worse than another. Make your feed line long enough to reach your antenna, turn on your rig and make contacts."

Perhaps a more typical example of the misleading nature of antenna measurements brought about by RF current on the outer shield was reported in the Technical Correspondence column of *QST* a few years ago by Scott M Hower, K7KQ, as follows:

"Antenna construction and experimentation can sometimes be very confusing, with measurement yielding results that change and do not seem to make sense. Most amateurs use an SWR indicator or perhaps a noise bridge, both of which generally provide useful data for HF antenna measurements. There is one situation, however, that will result in meaningless readings from either device, that being when the outer shield of the coaxial transmission line becomes part of the antenna system. My antenna is a 14MHz vertical ground plane, consisting of a quarter-wave vertical radiator mounted at the peak of the roof. Four radials, each a quarter-wavelength long, run out from the base of the antenna along the roof. A short length of coax connects the antenna to the radio equipment on the top floor, immediately beneath the ground plane system.

"Two major problems I encountered were constantly changing SWR-meter (or noise-bridge) readings and lots of RF in the shack, creating a hot chassis, microphone and so on. Several attempts to detune the transmission line by using different line lengths had no effect on the problem of RF in the shack. Changing the transmission-line length did, however, have an effect on the SWR readings. The clincher occurred when I observed that the SWR readings changed when the headphones were plugged into the rig!

Finally, I realized that the outer shield of the transmission line was contributing to the composite load, made up of the shield and the antenna itself. Further, all of my radio equipment - SWR meter, linear amplifier, coaxial cable jumpers, even the headphones and microphones - would add to the total length when connected.

"One might think that a good earth connection would solve the problems, but a good earth is hard to obtain from the third floor of a house. Turning to *The ARRL Antenna Book*, the solution became obvious. A portion of the coaxial transmission line was wound into an RF choke, 5 turns, approximately 6in in diameter - right at the base of the antenna. The addition of the choke cured both problems completely."

It may be useful to add that the problem of a 'hot' chassis in an upstairs shack can be successfully overcome by the connection of a quarter-wave length of wire to the 'earth' point of the ATU - a dodge that has been mentioned several times in *TT*. Similarly the choke current-balun could be of the ferrite-ring type, using the constructional details shown in the September *TT*.

WHEN MULTIPLE BYPASS CAPACITORS MAY BE NEEDED

THE OCTOBER *TT* NOTED an IEEE paper by Clayton Paul that showed that it is unnecessary to use two capacitors when bypassing lines to prevent EMC problems. However, G0GSF suggested that this line of thinking could be applied also to bypassing solid-state power amplifiers. Bob Price, GW3ECH, feels that, for this application, G0GSF may have overlooked a valid reason for using multiple capacitors. He writes:

"Anyone who has tuned a VHF power amplifier into a load whilst watching the output on a spectrum analyser will have seen that under certain tuning conditions, parasitic (low frequency) oscillations can occur which then look like sidebands spaced either side of the amplified frequency. The principal reason for this is the very high gain of VHF transistors at relatively low frequencies. Small values of impedance in common paths to two stages or in supplies which also feed bias stabilising circuits (to just one stage) can lead to the right conditions for (parasitic) oscillation, ie a loop gain exceeding one and 360° phase shift around the loop.

"One small value but low inductance capacitor is used to decouple the stage at the amplified frequency. The second (and often third) capacitor(s) then decouple the stage at lower frequencies at which parasitic oscillations are likely to occur. It is not unusual to find a relatively high value polyester capacitor and an electrolytic capacitor used, not to improve the frequency response of the decoupling at signal frequencies but to minimise the risk of oscillation at one or more low frequencies."

EARTHS AND MARCONI ANTENNAS

IT IS NOTICEABLE THAT every time the topic of earths and earthing as part of a vertical monopole or Marconi-type antenna crops up in *TT*, it produces correspondence from those who hold diverse views. It sometimes seems that the subject can be as controversial as that of the antenna itself! John Heys, G3BDQ, for example, crosses swords with Dennis Unwin, G0FMT, in connection with his in-built earthing system for his quarter-wave Marconi antenna (*TT*, October). While personally I am not persuaded to start digging or laying an earth mat by G3BDQ's suggestions (surely with a resonant quarter-wave Marconi or monopole vertical the feed impedance is assumed by convention to be directly related to the radiation resistance and the more RF current that you can push into the antenna for a given transmitter power then the more efficient the antenna), it seems only fair to reproduce G3BDQ's remarks:

"I must cross swords with G0FMT. He is wrong in assuming that efficiency is directly related to feed impedance on a quarter-wave wire. You can juggle about with feed impedance in many ways (usually by lengthening or shortening the wire) but this will have little effect upon the efficiency of the system. The only way to increase the efficiency is to raise the radiation resistance of the antenna and/or reduce the earth resistance.

"This latter factor is the thing we can do ourselves. Running wires around the house, along the floor or putting in earth rods is almost a waste of time and effort. Salt water all around the antenna for a considerable distance, a copper sheet of enormous dimensions represent the ultimate . . . . earth rods are 'no-go' and buried wires unless very long and very numerous are not very good either. I find that an effective compromise is a comprehensive 'earth mat' of galvanised 'chicken wire'. this must cover a considerable area all around the antenna. As my 'mat' was increased the efficiency of my antenna was raised dramatically. I certainly did not try to equate efficiency with feed impedance.

"An earthing system must have a very low resistance return for the earth current back to the antenna base. The late Dr George Brown (*Proc IRE*, February 1935) states: 'In the operation of the usual transmitting antenna, the conduction current in the antenna diminishes as we proceed upward along the antenna. This is explained by displacement currents which are assumed to flow in the antenna, through space to the conducting plane below. This conducting plane completes the circuit by forming the return path to the base of the antenna. If this plane is not a perfect conductor, some power must be expended in returning the current to the base of the antenna'."

While one would not quarrel with the general tenor of the later comments, it does seem to me that they at odds with the now widely held view that, for example, a monopole antenna with a few radials elevated a few feet above ground and forming a counterpoise has been shown to be as effective as the usual form of broadcast antenna earth with 120 buried radials. Les Moxon, G6XN (*HF antennas for all locations*) shows clearly (page

THAT FULL-WAVE RECTIFIER

BOB PEARSON, G4FHU, was interested in the October *TT* item on a full-wave envelope detector first described in *Electronic Design* (May 14, 1992) but was puzzled by the claim of the original author that it offers the virtually zero rectification threshold of a synchronous detector.

G4FHU writes: "In fact this is not true! It does indeed work well as a full-wave rectifier when the input signal is sufficient to turn one transistor off but that needs rather more than 100mV peak-to-peak.

"If the transistors are well matched (as they need to be for good full-wave rectification) they draw an almost *constant* current via the collector and emitter loads while they are both conducting because increase in one transistor is balanced by a corresponding decrease in the other.

"In case I was in error in my conclusion, I connected the matched pair of transistors in a CA3045 integrated circuit array and added a balancing circuit to adjust the input to give equal adjacent peaks at the collector when operating as a full-wave detector. I then plotted changes in collector direct voltage against input signal level and this showed the anticipated 120mV peak-to-peak input offset in the rectifier characteristic: **Fig 6**.

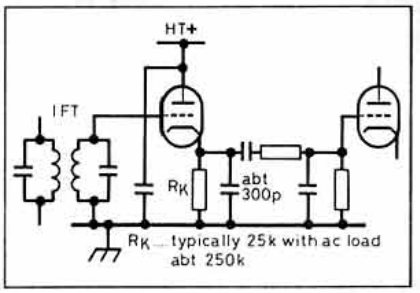


Fig 7: Basic circuit of infinite-impedance AM detector.

"The CRO showed that below that level, the waveform deteriorates progressively. Paradoxically, a mismatch then helps to improve the low level rectification by 'half-waving', but the penalty is then the loss of precise full-wave operation everywhere else.

"I make the point only to save disappointment if the circuit is used for low-level signals. It is still of course well worth consideration for other applications."

On the subject of low-distortion envelope detectors, I would draw attention to the 'infinite-impedance detector' (**Fig 7**) which was developed by RCA in the mid-1930s and which I recall formed an extremely effective detector for broadcast receivers, with far less distortion of heavily modulated signals than with the conventional diode envelope detector. I am not sure whether this form of detector with its very high input impedance can be readily implemented with a bipolar transistor, but it certainly can with an FET as, for example, in the GI3XZM HF 'straight' receiver (*TT*, October 1987, etc), although I have no idea whether this would show the same low distortion over a wide dynamic range as when implemented with a valve.

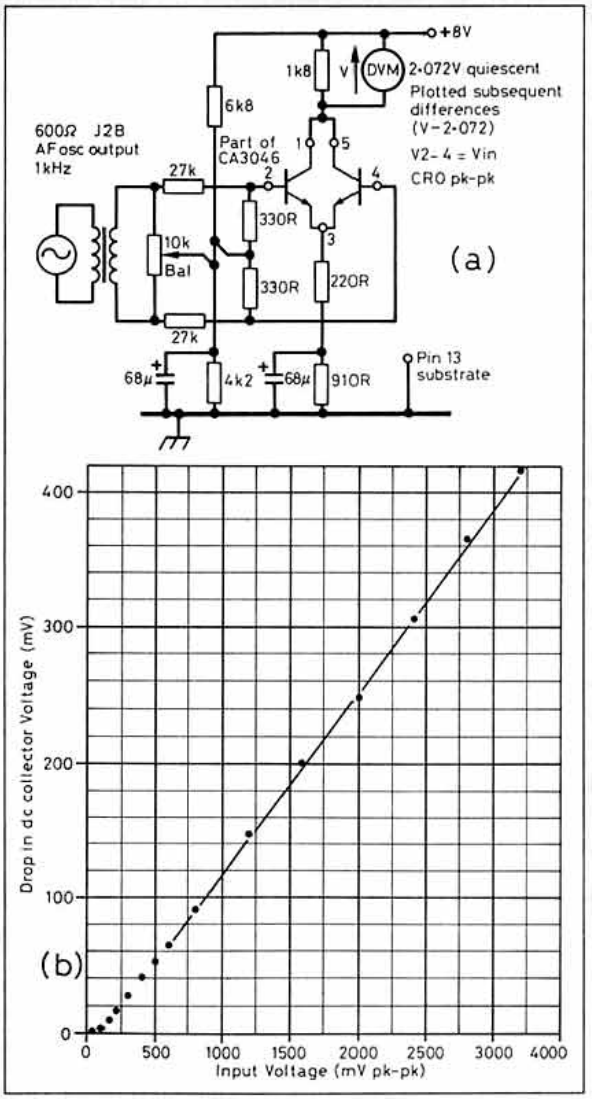


Fig 6: Full-wave envelope detector as tested by G4FHU showing that such an arrangement works well on signals of more than about 100mV peak-to-peak but does not meet the original designer's claim that "it offers the virtually zero rectification threshold of a synchronous detector". Below about 100mV the waveform deteriorates progressively, although a mismatch may help to improve low level rectification by "half-waving".

4) that "high efficiency can be achieved with very short radials or counterpoises . . . ." The important thing is to make sure that the currents flowing to and from the feed line are maximised. In the old days, before we worried about SWR and power meters, an RF ammeter in the antenna wire or the earth wire formed a valuable guide to antenna radiation. If altering the earthing or counterpoise system increases the current then one could safely assume that the radiation efficiency had been increased. While a large earth mat made from chicken wire *does* form an effective earth it is not the only approach that yields high radiation efficiency. One method may well be the in-built system used by G0FMT that could save a lot of back-breaking digging.

HERE AND THERE

A LONG 'MINI-REVIEW' PAPER 'Auroral and Polar-Cap Ionospheric Effects on Radio Propagation' by Dr Robert Hunsucker (University of Alaska) in *IEEE Trans Ant & Prop*, July 1992, pp818-828, provides a detailed description of how disturbances in the auroral and polar-cap ionosphere can have profound effects on radio signals transversing the high-latitude ionosphere (auroral oval) including for example HF paths between the UK and much of North America. the paper reviews salient past results and presents developments in this field for the period 1970—91 during which considerable efforts have been made to model and predict the parameters of the auroral and polar-cap ionosphere and to develop HF propagation programs which include these important effects.

Wilf Boothman, G3SWP, in connection with the notes on recharging dry batteries, draws attention to an article in the May 1992 issue of *Electrical Review* which tells how pupils at Westray School in the Orkneys found that a battery charger design intended for recharging nicad cells could be modified for dry batteries. Some 250 chargers were sold with the profits used to buy computers for the school, but then the British Battery Manufacturers' Association warned the local trading standards authority of the possible dangers of recharging dry cells and the lower efficiency compared to using nicads. The BBMA secretary denies that BBMA's objection to dry cell chargers is motivated by possible losses of sales.

Gerry Openshaw, G2BTO, reminds us that he described 'An easily constructed audio oscillator' using a GPO carbon microphone and headphone earpiece for Morse practice - similar to the arrangement shown in the October *TT* as long ago as April 1947 (*RSGB Bulletin*, p166). This type of simple oscillator was also used by S Pauwe as a sidetone oscillator in his modernized Mk VII transmitter-receiver (*TT*, June 1987).

BENCHLIGHT WARNING

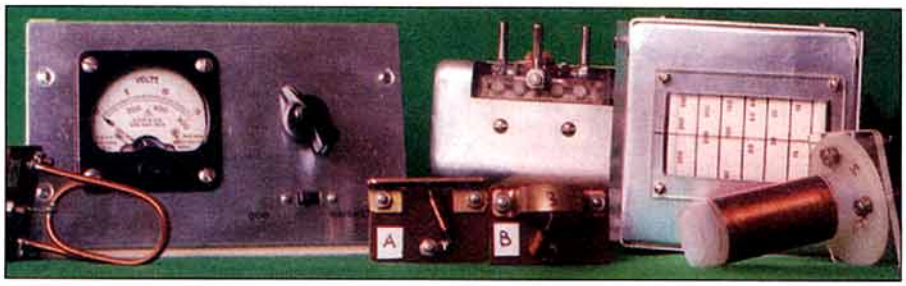
LAWRENCE BROWN, G7LQO, considers the GW8DOA Movable Bench Spotlight (*TT*, November) potentially dangerous. He writes: "If a plastic or copper tube is used, the cable *must* be grommeted at the entry and exit points. If the tube is copper, then it *must* be earthed. Otherwise it could be extremely dangerous." ***G3VA***

RADCOM TECHNICAL FEATURE

A Wide Range Gate-Dip Oscillator

by Jack Hardcastle, G3JIR

A GDO IS PERHAPS the most versatile RF test instrument radio amateurs can construct for themselves. It provides a means of adjusting tuned circuits to resonate at a required frequency and, equally importantly, it functions as an absorption wavemeter. This allows transmitters to be monitored for spurious frequencies such as harmonics. In this case the project arose from a desire to renovate the shack GDO, built in 1948, which was still operating but long overdue for retirement. Since the general physical layout had proved very convenient to use it was decided to retain this, whilst trying to improve the sensitivity and extend the frequency range.



CIRCUIT DEVELOPMENT

THE DESIGN CRITERIA for this new instrument were simplicity and low cost. This was achieved by selecting a circuit using the minimum of components. A series-fed oscillator is used, removing the need for the RF choke and coupling capacitors of a shunt-fed circuit, at the expense of requiring a 3-pin, rather than a 2-pin, plug and socket for the coils. The coil's centre-tap is arranged to be at DC as well as at AC earth potential because this simplifies the diode detector circuit. This can now be connected directly to the FET drain end of the tuned circuit in the half-wave rectifier arrangement shown in **Fig 1**.

C1 is a 2-gang variable capacitor used in a split-stator configuration. Because of this it must be mounted so the rotor is isolated from earth. Although in principal a single-gang capacitor could be used here, this was found to restrict the VHF performance and it was difficult to achieve oscillation above 50MHz.

The tuning capacitor used in the first prototype was 75pF per section and the coils were designed to suit this. A second prototype was made using a 2-gang, 115pF per section capacitor to achieve a greater frequency swing on each band. This was found to be the maximum capacitance which could be usefully employed; higher values merely cause oscillation to cease at the low-frequency end of the VHF bands. This was not unexpected as the tuned circuit impedance is too low to sustain oscillation at these frequencies.

An E304 FET was used which had been purchased cheaply at a rally and was found to be excellent. Many similar types may be substituted, and even the ubiquitous 2N3819 will operate up to the lower VHF region.

All capacitors are disc ceramic types. For best VHF performance the smallest obtainable should be used and connected so the leads are as short as possible. The indicator meter M1 used was 500µA full scale with R3 chosen to give a deflection of approximately 300µA on the HF ranges. On VHF ranges this falls to around 100µA. For a higher sensitivity meter R3 will need to be increased for a similar deflection - eg 47kΩ for a 100µA meter.

Power consumption is very low for battery operation. Typically (on range A) 4mA when oscillating and 5mA when oscillation ceases. On range J this was about 0.5mA lower in each case. If using a mains power supply, remember that a negative supply is required with the positive power rail earthed.

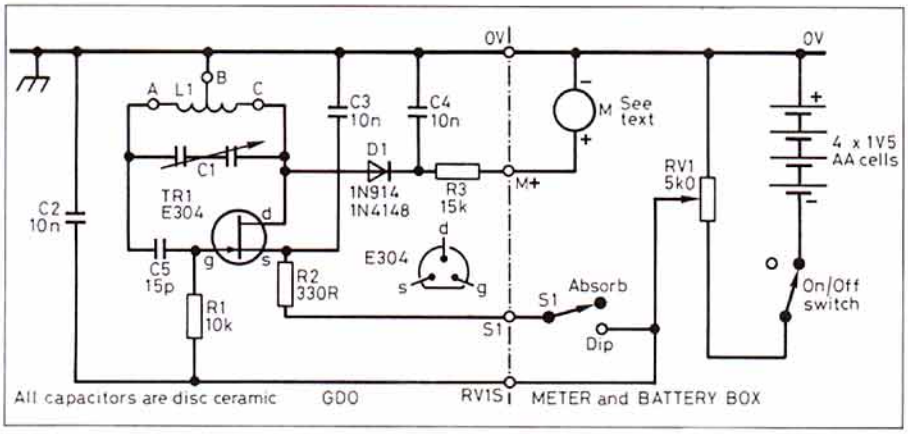


Fig 1: Power consumption of the GDO is very low giving satisfactory battery operation.

CONSTRUCTION

THE POSITION OF the main components is shown in the photograph. Constructors will need to make appropriate changes to accomodate their own variable capacitor as well as their choice of plug-in coil design.

The designs for plug-in coils are illustrated in **Fig 2 and 3**. Two 4mm plugs have been soldered to the tuning capacitor stator while a third is attached to the insulating base plate by a 6BA screw. These are matched by sockets screwed to the base of the coil. The sockets have been made from 25mm long hexagonal brass pillars which are readily available. As supplied they have an axial hole tapped 4BA throughout and this is enlarged by drilling out with a 4mm drill. Approx 6mm of thread is left at one end which is used to anchor it to the base of the coil.

The layout shown in **Fig 4** has sockets consisting of short pieces of edge connector socket mounted on a piece of 'Veroboard'. Double sided edge connectors were used and each piece includes three or four pairs of contacts in order to provide sufficient pressure to hold the coil assembly firmly, whatever the orientation. All the contacts are wired together to make a reliable, low-resistance connection with the coil plugs. The coil plug may simply consist of pieces of printed circuit board material but salvaged gold-plated PCB edge connections are even better.

The coils are wound on pieces of plastic pipe or discarded polythene solder reels which have had one end cheek removed while the other is used as a mounting flange. To mount the plastic pipe a short wooden plug is inserted into the end enabling it to be attached to the base with a woodscrew. The coil diameter was selected to produce a short, fat coil rather than a long, thin one. This produces a large external field to ensure good coupling with circuits under test. Winding details and dimensions are given in Fig 2.

The oscillator circuit is so simple that a special PCB has not been prepared, instead it is constructed on 'Veroboard'. Two boards of different sizes have been constructed - the dimensions really depend on the type of coil assembly to be used. A smaller board can be fitted directly to the tuning capacitor without any mechanical support other than the short, rigid connecting leads, whereas a larger board requires mounting brackets to support the coil and to withstand mechanical stress.

The drum dial shown in **Fig 5** is made from a baked bean tin! This has had its top completely removed and the bottom is carefully drilled to allow a spindle fixing bush to be fitted. The bush is made by soldering a brass disc to a standard spindle coupler. Holes to match the drum are drilled oversize in the disc which allows the assembly to be aligned so the drum is accurately centred. Modern tin cans are surprisingly accurate cylinders and smooth rotation can readily be achieved.

A drum dial was chosen to accomodate the many ranges needed. Before assembling the dial it is sprayed with several coats of matt white paint. When it has been fitted to the spindle, parallel lines are marked on it using a draughtsman's black fibre-tipped pen. This is simple if the pen is held stationary while the drum is rotated. A temporary cursor is fitted over the scale to act as a guide for the pencil used to mark the frequency calibrations on the drum. Pencil was used instead of drawing ink as it produced a neater line.

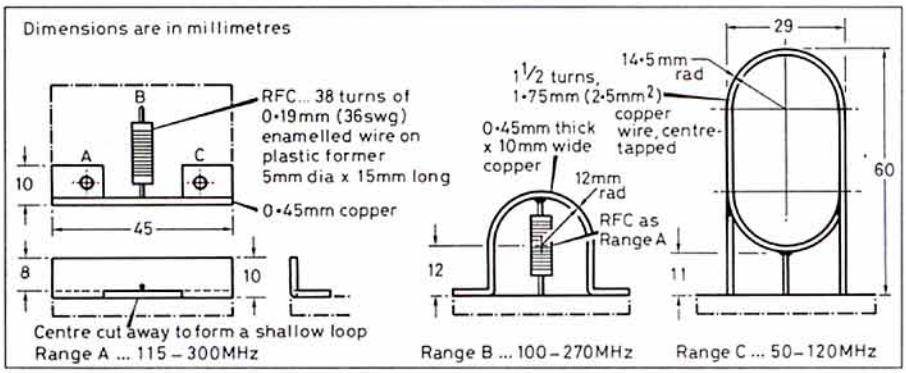


Fig 2: Construction details of inductors for the three VHF ranges, from 50 to 300MHz.

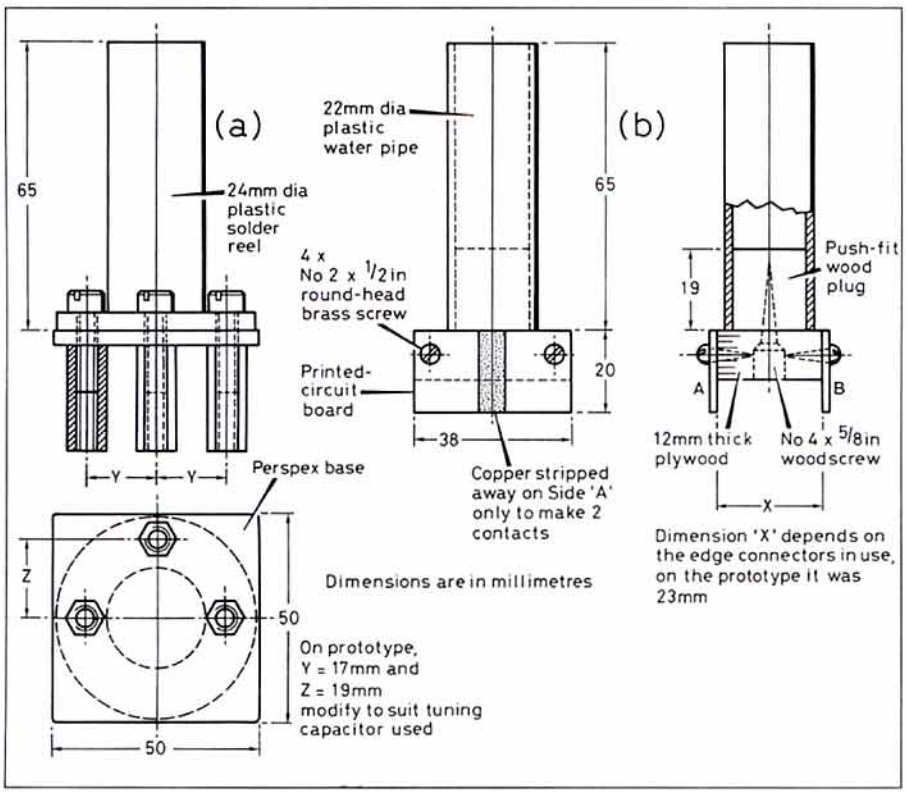
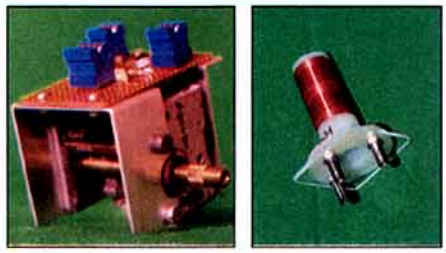


Fig 3: Coil assembly for either (a) 4mm plugs or (b) edge connectors. See Table 1.

Range	MHz	No Turns	Wire	Winding details	Former	Notes
D	29-65	2¾+2¾	18SWG enam	Spaced diam. of wire	⅞in diam	22mm plastic
E	17-36	5¼+5¼	18SWG enam	Close spaced	⅞in diam	water pipe
F	9-19	9¼+9¼	25SWG enam	Close spaced	⅞in diam	water pipe
G	5-10	20+20	28SWG enam	Close spaced	⅞in diam	water pipe
H	2.6-5	48+48	28SWG enam	Close spaced	15/16in diam	Polythene
J	1.4-2.7	92+92	35SWG enam	Close spaced	15/16in diam	solder spool

Table 1: Coil winding details.



Capacitor and PCB detail (left) and a coil for the HF range (right).

Calibration involved coupling the coil to a short piece of wire acting as an antenna for a digital frequency meter. However if a DFM is not available, calibration may be carried out using a receiver. Set the receiver to the required frequency and tune the GDO for maximum S-meter reading, or if CW-mode is available, tune for zero-beat. In any case take care that you are not tuned to a harmonic. Frequency meters can read multiples of the input frequency if they are overloaded, or if the oscillator level is too high. So keep the level down and coupling to a minimum.

Finally rub-down transfers should be used to mark the principal frequencies on each range. Only a few should be carefully chosen to avoid clutter and give a neat appearance.

MECHANICAL DETAILS

THE BOX CONTAINING the drum dial has been designed without any complicated bends, so no specialised metal bending equipment is necessary. 16SWG aluminium was used for the sides and end plate to provide strength and rigidity but even a 3in (76mm) width of this material is quite hard to bend, unless it is first grooved on the inside.

Much thinner material is used for the top and bottom panels but even this is worth lightly scoring to enable bends to be made in exactly the right places. The top cover will be easier to bend if the dial opening is not cut out until bending is completed. Then it can be removed using a tension file mounted in a hacksaw frame or, if this is not available, thin aluminium may be easily cut using a fretsaw.

The top and bottom panels are really too thin to allow the use of self-tapping screws, but the solution was to glue 6BA nuts to the panel using 'Araldite'. The nuts were held in place with a screw while the adhesive was applied and allowed to harden. Provided no adhesive has been allowed to get onto the thread the screw may then be withdrawn leaving the nut firmly fixed to the panel.

Fig 5 shows the outline of a cover (J) over the tuning capacitor assembly. This was made by cutting a corner out of an aluminium screening can so it would fit over the top and protect it from physical damage. It is electrically isolated since screening was not required in this application; indeed it could with advantage be replaced by a plastic cover if available.

Alternatively, there is no reason why the two boxes should not be made from wood and hardboard. Whilst not often used in electronic assemblies these days, they should not be overlooked where appropriate.

To allow the oscillator unit to accomodate a large dial, yet still remain reasonably compact, the meter and batteries were assembled in a separate module. This again could be made from wood or hardboard.

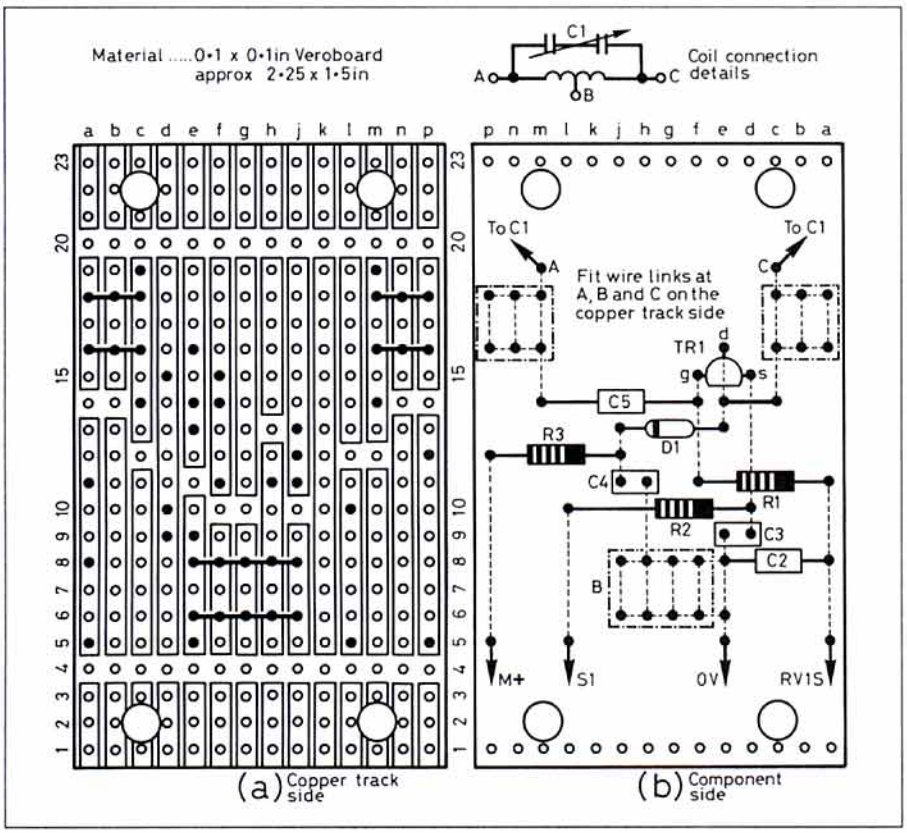


Fig 4: The components may be conveniently mounted on a small piece of Veroboard.

OPERATION

OPERATION IS VERY straightforward but it must be remembered that maximum sensitivity of the dip indication is obtained when the circuit is only just oscillating. This is achieved by adjusting the supply voltage for the minimum level consistent with reliable oscillation over the band in use. Once a dip has been discovered the coupling between GDO and test tuned circuit should be reduced to a minimum. Failure to do so results in the tuned circuit pulling the frequency of the GDO, with misleading consequences.

Operating technique was further investigated using a wideband spectrum analyser. It was discovered that a number of harmonics were generated when the supply voltage was increased above the minimum required for oscillation. In particular, the second and third harmonics rapidly increased in amplitude. Because the diode detector responds as well to harmonics as the fundamental they effectively mask any variation in the fundamental, even when large dips are indicated by the spectrum analyser. This is the reason for an apparent lack of sensitivity when the GDO is operated at high levels.

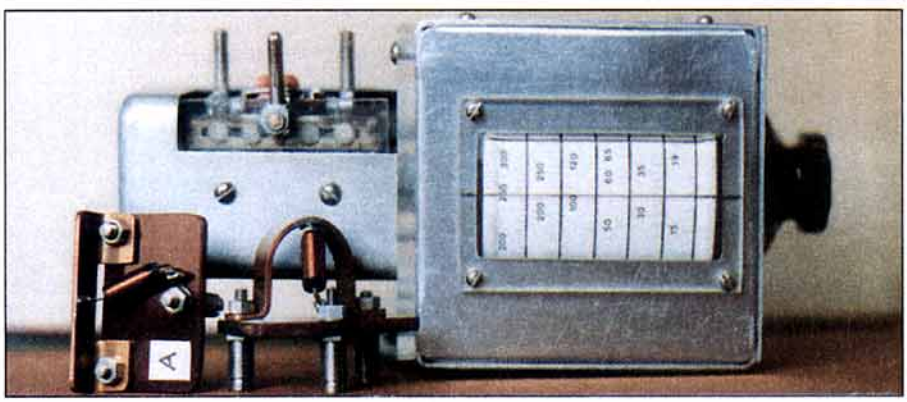
Even with a very low supply voltage, harmonics are still generated and can be observed to vary in amplitude as the GDO is tuned over its frequency range. Corresponding minor variations in meter deflection take place but they are very small and will not be confused with a real 'dip'.

ABSORPTION WAVEMETER

TO ALLOW OPERATION as an absorption wavemeter the FET must be switched to a non-oscillating state and the only satisfactory way is to break the source circuit using switch S1. If the circuit is prevented from oscillating by switching off the power, the FET becomes a low impedance; damping the tuned circuit and ruining its selectivity.

CONCLUSIONS

THE AIM OF DESIGNING a compact oscillator with a minimum of components has resulted in a very low-cost design. By building the circuit directly onto the tuning capacitor it can be made to operate before any metalwork needs to be done, which helps to maintain the interest. An hour's work should be sufficient time to have it working, which will appeal to beginners and old-timers alike.



COMPONENTS LIST

Semiconductors:

TR1	E304 FET
D1	1N914 or 1N4148

Resistors: All 0.25W 5%

R1	10k
R2	330R
R3	15k
RV1	5k0 linear

Capacitor:

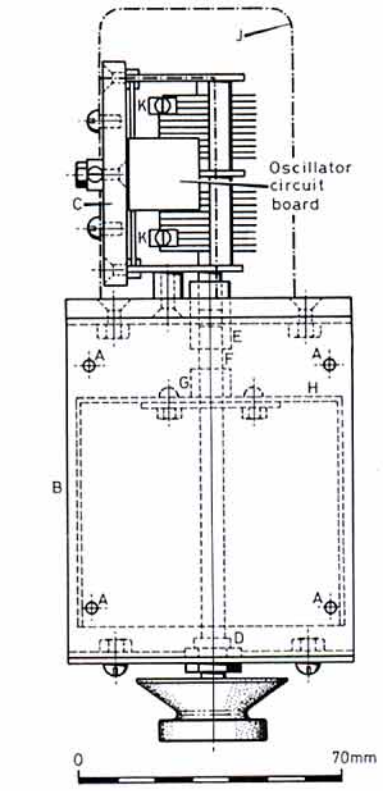
C1	75 + 75pF or similar (see text)	
C2,3,4	10n	disk ceramic
C5	15p	disk ceramic

Coils: See Table 1

Meter: 500µA full scale (see text)

Switches: S1,S2 SPST

Battery connector (4 x AA cells)
Veroboard 0.1in pitch 2.25 x 1.5in
Variable capacitors are available, price £2.55 (inc p&p), from J Birkett (tel: 0522 520767). They are 125+125pf and may need a 470pF fixed in series with each section.



A 8 Holes 6BA clearance
B Material: 16SWG pure aluminium
C Material: Insulator. Paxolin or Perspex. 2 Pieces.
D 0.25in (6.3mm) spindle bush salvaged from scrap potentiometer
E 0.25in (6.3mm) spindle coupler
F 0.25in Paxolin rod
G Half of spindle coupler soldered to 38mm diam. brass disk
H 220g baked bean tin
J Aluminium IF screening can with corner removed
K 4mm plug soldered to fixed plates of capacitor

Fig 5: Mechanical details of the GDO.

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The Peter Hart Review

HF-150

Lowe HF Receiver

IN A MARKET largely dominated by the Japanese suppliers, Lowe Electronics have successfully developed and sold a range of HF communications receivers. In November 1989, I reviewed the HF-225 receiver in this magazine. Since then two new models have appeared, the HF-235 for professional and commercial use and, more recently, the HF-150 budget priced receiver.

When it comes to buying an HF receiver, the SWL has two broad options; to buy a communications receiver or to buy a consumer short wave receiver. The mass-produced consumer short wave receivers offer good value for money but are really intended for broadcast listening on short whip antennas. For SSB use on the amateur bands and with larger antennas, they have major shortcomings. On the other hand, the communications receiver will cope well with all modes and requirements but at a relatively high cost and usually not as a self contained portable package.

The HF-150 is a true HF communications receiver, small enough to be classified as portable, robustly constructed and at a most attractive price.

PRINCIPAL FEATURES

THE HF-150 HAS CONTINUOUS frequency coverage between 30kHz and 30MHz. Eight modes of operation are provided - USB, LSB, AM with wide filters, AM with narrow filters and four synchronous AM modes. Two different IF bandwidths are provided, nominally 2.5kHz and 7kHz. These are not selectable by the user from the front panel but automatically set according to the selected mode.

HF broadcasting frequently suffers badly from the effects of selective fading. This results in the amplitude of the sidebands varying with respect to each other and to that of the carrier. In particular, if the carrier amplitude is reduced with respect to the sidebands, most conventional AM demodulators will generate severe distortion. The synchronous AM demodulator uses a product detector together with a narrow locking range phase locked loop to regenerate the carrier at constant amplitude. This gives a far superior performance under selective fading conditions. The HF-150 provides four different synchronous AM modes, two using DSB with the wider IF filter and two using SSB with the narrow IF filter. The mode to use depends on prevailing conditions - normal DSB for general AM use, hi-fi DSB where signals are strong, and SSB (lower or upper) under crowded band conditions.

Tuning is accomplished with the weighted spin-wheel knob which tunes in steps of 8Hz on SSB and synchronous AM or 60Hz on normal AM. This gives tuning rates of 1.6kHz per revolution on SSB or 12kHz per revolution on normal AM. Slower tuning rates are engaged for synchronous AM. If the tuning knob is rotated quickly, x6 or x8 speed-up is selected to increase the tuning rate. For larger changes in frequency, the spin-wheel may be used to increase or decrease the frequency in steps of 100kHz across the tuning range of the receiver. There is no separate band switch.

The receiver is also equipped with sixty memories which hold frequency and mode. There are three memory functions - preview, recall and store, controlled by the three function buttons on the front of the receiver. Memories are selected with the spin-wheel knob and the frequency contents are previewed leaving the received frequency unaffected.

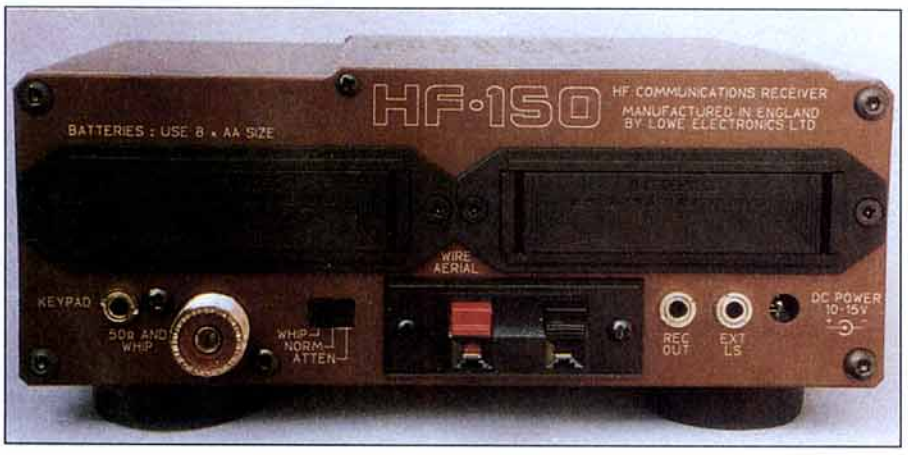
An optional keypad is available which plugs into a jack on the rear panel. This useful addition allows the frequency to be entered directly to the nearest kilohertz and also allows direct selection of the memories.

The receiver has been designed to function with a variety of different antennas. Two antenna sockets on the rear panel allow for the connection of wire antennas of nominal 600Ω impedance or an SO239 50Ω coaxial connection. An RF preamplifier is also selectable for short wire or whip antennas, and for strong signal conditions a 20dB input attenuator may be switched in circuit. An antenna slide switch on the rear panel selects between these various combinations.

A 7.5cm diameter speaker is fitted into the top of the case with provision for external speaker, phones and recorder output. This output, independent of the volume control, is at a suitable level for driving tape recorders, RTTY decoders etc.

A five-digit liquid crystal display is fitted. This indicates the frequency to 1kHz resolution or alternatively the memory number. At power-on, the display indicates 'HF-150' and with low battery voltage 'LoPr'. A number of other messages may be displayed such as 'STo' for store and the different modes during mode selection. A flag shows when memory mode has been selected.

The receiver operates from a nominal 12V supply and is supplied with a suitable small mains PSU. Alternatively, the receiver may be powered from internal batteries, either



The rear panel of the HF-150 is uncluttered whilst providing a number of useful facilities.

alkaline/manganese primary cells or nickel/cadmium rechargeable cells. Battery holders are fitted to accommodate eight AA sized batteries. When switched off, NiCd batteries may be recharged from an external supply and will take about 16 hours to fully recharge if completely discharged.

A 32-page A5 manual is provided with the receiver. This covers clearly how to operate the receiver and to obtain best results under various conditions. A full circuit diagram is included together with a circuit description and a particularly detailed equipment and performance specification. Useful advice is given on suitable antennas.

DESCRIPTION

THE RECEIVER IS VERY ROBUSTLY housed in an extruded aluminium case. The overall size is 185mm (W) by 80mm (H) by 175mm (D) and weighs approximately 1.3kg without batteries. The bulk of the circuitry is constructed on one PCB, with a second PCB behind the front panel containing the microcontroller, display and driver. The front panel has a very simple layout. Apart from the volume control and rotary tuning knob, the only other controls are three multifunction push buttons which select memory, mode and tuning rate functions. When selecting mode, two of the buttons scroll forwards or backwards through the eight possible mode combinations.

The receiver is double conversion with a first IF of 45MHz and a second IF of 455kHz. Signals from the antenna pass through a 30MHz low pass filter and into a high dynamic range active double balanced first mixer. There is no RF amplifier unless the whip preamplifier is selected and there are no signal frequency bandpass filters. The second mixer is a similar active double balanced mixer. The 45MHz IF crystal filter has a bandwidth of 15kHz with two switchable ceramic filters in the 455kHz IF for the main channel selectivity.

The local oscillator drive for the first mixer is provided by a simple single loop frequency synthesiser tuning in 1kHz steps. Smaller step sizes, down to 8Hz, are provided by shifting the frequency of the oscillator drive to the second mixer over a range of 1kHz using a D/A converter and varicap diode.

A single chip 8-bit microcontroller is used with internal ROM and RAM. The active frequency and mode settings and memory contents are stored in non-volatile EEPROM memory which does not require the use of a back-up battery. The receiver will power-up to the last used frequency and mode. The control system and software has been developed to allow the microcontroller to be put into an idle state as much as possible to minimise the pick-up of spurious noise from the control system.

MEASUREMENTS

ALL MEASUREMENTS WERE MADE with the receiver powered from the PSU provided with the receiver. Results are given in the accompanying table with additional comments as follows.

SPURIOUS REJECTION

Rejection of all IFs, sub IFs and IF images was better than 78dB, a perfectly adequate figure. There were very few other spurious responses.

AGC

The AGC attack time was a little long and had an extended tail, taking several hundred milliseconds to finally settle.

DISTORTION

One of the advantages of synchronous AM is lower distortion. This is only achieved when the tuning is accurately set.

STRONG SIGNAL PERFORMANCE

Considering the low cost and simplicity of this receiver, the third order intermodulation and reciprocal mixing performance are remarkably good. However, there is no front-end selectivity, which makes the receiver vulnerable to out-of-band second order intermodulation problems. For example, strong broadcast stations on the 25m and 31m broadcast bands intermodulating to give a signal on 21MHz (eg 11.7MHz + 9.5MHz = 21.2MHz). This parameter was not measured unfortunately.

SELECTIVITY

The selectivity measurement is only approximate. **Fig 1** shows the combined results of selectivity, reciprocal mixing and intermodulation.

POWER REQUIREMENTS

Using an external power supply, the current consumption varied from 130mA with low audio output up to 250mA with high audio. The receiver functioned down to about 8.5V, below which the synthesiser lost lock, although the voltage regulators lose regulation below 9.5V. The low power indication came on below 8.8V.

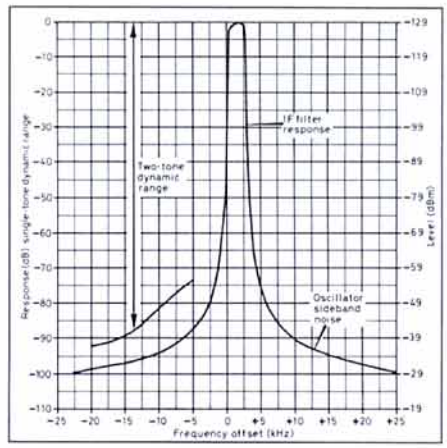


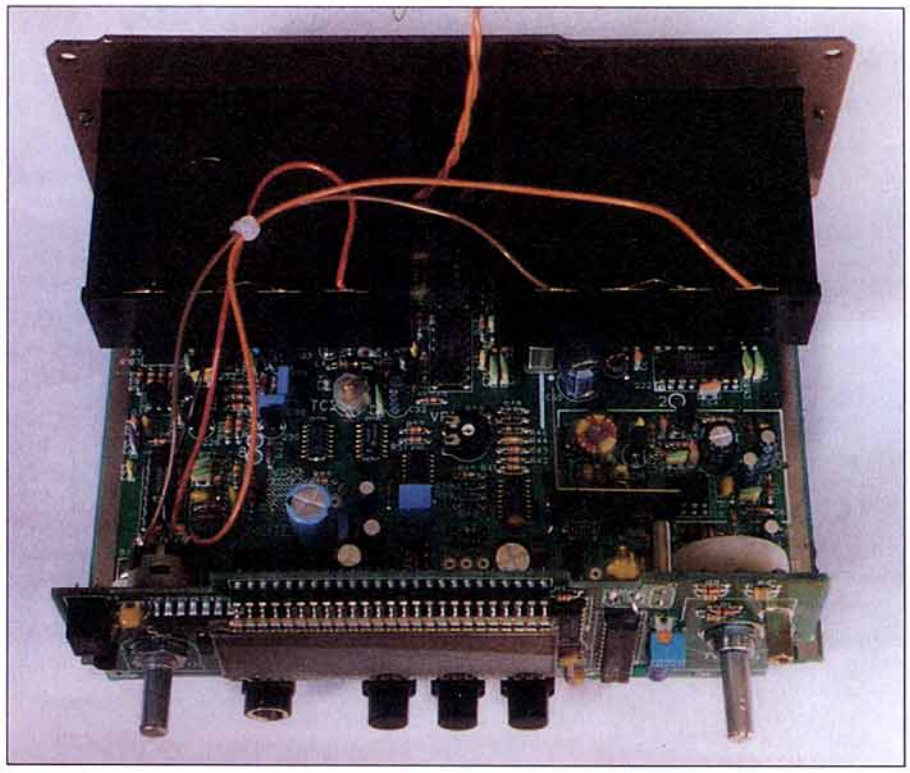
Fig 1: HF-150 effective selectivity curve on USB.

ON AIR PERFORMANCE

The receiver functioned very well under all conditions. The audio quality was particularly good on SSB and wider bandwidth AM and synchronous AM modes. The sensitivity was ample on the higher bands and the receiver coped well with crowded LF band signals. In this situation, it was usually desirable to switch in the input attenuator. There were no instances of second order intermodulation experienced, which is the danger with wideband front-ends, but tests were not exhaustive by any means. The receiver gave a good performance on the LF and VLF bands which is usually a sign of a good synthesiser.

Synchronous AM functioned well on selective fading signals and really helped on readability. With four different modes there is plenty of scope to achieve optimum results.

Tuning with 8Hz steps gave a very smooth result but seemed interminably slow on tuning speed. Although the speed-up feature functioned on AM, speed-up did not seem to operate on SSB. This may have been a fault



The receiver is built on two PCBs, a main board and one for the front panel.

LOWE HF-150 MEASURED PERFORMANCE

FREQUENCY	SENSITIVITY SSB 10dBs+n:n NORMAL	WHIP	IMAGE REJECTION
1.8 MHz	0.25µV (-119dBm)	0.14µV (-124dBm)	81dB
3.5 MHz	0.25µV (-119dBm)	0.13µV (-125dBm)	84dB
7 MHz	0.25µV (-119dBm)	0.13µV (-125dBm)	93dB
10 MHz	0.25µV (-119dBm)	0.13µV (-125dBm)	88dB
14 MHz	0.25µV (-119dBm)	0.13µV (-125dBm)	84dB
18 MHz	0.28µV (-118dBm)	0.14µV (-124dBm)	84dB
21 MHz	0.28µV (-118dBm)	0.13µV (-125dBm)	85dB
24 MHz	0.32µV (-117dBm)	0.13µV (-125dBm)	83dB
28 MHz	0.32µV (-117dBm)	0.13µV (-125dBm)	83dB

FILTER	BANDWIDTH -6dB	-60dB
NARROW	2600Hz	4600Hz
WIDE	6600Hz	10500Hz

FREQUENCY OFFSET	RECIPROCAL MIXING FOR 3dB NOISE
3 kHz	79dB
5 kHz	83dB
10 kHz	92dB
15 kHz	95dB
20 kHz	98dB
30 kHz	102dB
50 kHz	106dB
100 kHz	110dB
200 kHz	113dB

AM sensitivity (28MHz, 30% mod): 1.6µV NOR, 0.5µV WHIP

AGC threshold: 0.5µV approx

80dB above AGC threshold for +4dB audio output

AGC attack time: 7ms (see text)

AGC decay time: 2s

Max audio before clipping: 1.2W into 8Ω, 2.0W into 4Ω

Distortion at max audio: 1%

Distortion on AM at 70% mod depth: 3%

Distortion on AMS at 70% mod depth: 1-2%

Inband intermodulation products: -30 to -40dB

	INTERMODULATION (50kHz Tone Spacing) NORMAL		WHIP	
Frequency	3rd order intercept	2 tone dynamic range	3rd order intercept	2 tone dynamic range
1.8 MHz	+8dBm	92dB	-3dBm	88dB
3.5 MHz	+9dBm	92dB	-3dBm	88dB
7 MHz	+10dBm	93dB	-3dBm	88dB
14 MHz	+10dBm	93dB	-3dBm	88dB
21 MHz	+11dBm	93dB	-6dBm	86dB
28 MHz	+12dBm	93dB	-8dBm	85dB

TONE SPACING (7MHz BAND)	3rd ORDER INTERCEPT	2 TONE DYNAMIC RANGE
5 kHz	-19dBm	73dB
10 kHz	-7dBm	81dB
15 kHz	+5dBm	89dB
20 kHz	+8dBm	92dB
30 kHz	+9dBm	92dB
50kHz	+10dBm	93dB

NOTE: All signal input voltages given as PD across antenna terminal. Unless stated otherwise, all measurements were made on SSB with NOR antenna setting.

with the review sample. The keypad entry of frequency was extremely useful and I would regard this as an indispensable option. Clicks were audible every 1kHz when tuning the synthesiser but they were not particularly objectionable. This must be kept in perspective considering the price of the radio.

As I found with the HF-225, it is important to avoid placing the receiver close to mains powered equipment including its own AC PSU. A burble can be introduced onto received signals by AC mains fields coupling into the receiver VCO.

CONCLUSIONS

THE HF-150 CAN BE RECOMMENDED to the SWL searching for a true communications receiver at the lowest cost. Although it has a minimal set of features when compared with receivers costing twice as much, it is fully competitive in terms of performance. My only concern is the wideband front-end which may be prone to overload from out-of-band signals although no problems were experienced during the course of the review.

The receiver is manufactured in the UK and currently sells for £359 inc VAT. The KPAD-1 keypad is an extra £39.95 and other accessories include XLS-1 external speaker at £59.95 and AK-150 portable operation accessory kit at £39.95.

ACKNOWLEDGEMENTS

I WOULD LIKE TO THANK Lowe Electronics of Matlock, Derbyshire for the loan of the receiver.

Peter Hart, G3SJX

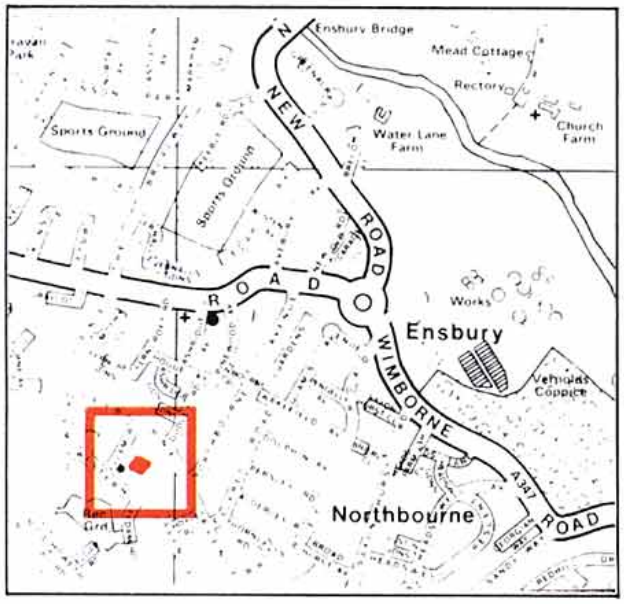
SINCE THE REVIEW was completed, Lowe Electronics have added two new optional accessories, the MB-150 mobile mounting bracket which caters for top or bottom mounting, at £29.95, and the IF-150 interface which plugs directly into the keypad socket and provides an RS-232 interface for remote control by computer. This is supplied with a ready to run software package and costs £39.95. The IF-150 is also suitable for the HF-225 receiver.

LOWE in BOURNEMOUTH

Colin Riggs has been with the company for eight years, ever since our branch in sunny Bournemouth opened. Licensed since 1967 as G3XAS, Colin has a wealth of experience in HF operating, much of it mobile, and is one of our resident Gurus on the subject.

With a growing interest in airband monitoring bringing in a different breed of customer, Colin is rapidly getting to grips with the wide range of scanners and accessories we now stock.

He has built up an excellent reputation with local amateurs over the years and is very keen to help newcomers to the hobby. Bournemouth is another of our sites destined for a change of QTH and will be relocated in the near future.



TS950SDX

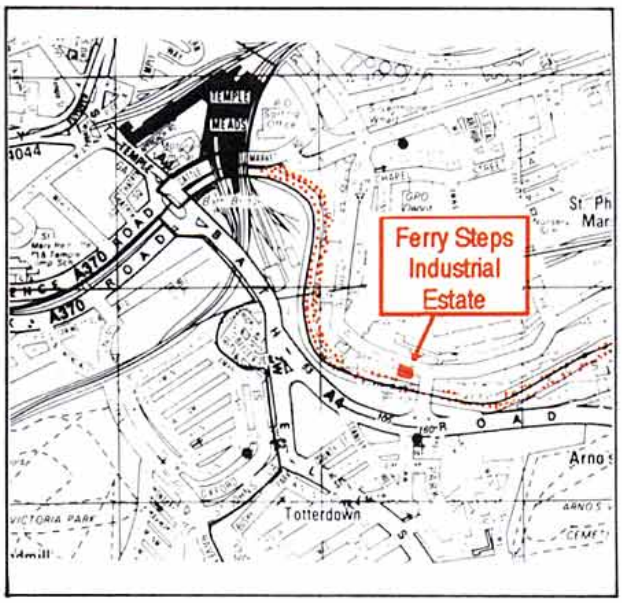
27 Gillam Road, Northbourne, Bournemouth BH10 6BW
Tel: 0202 577760

LOWE in BRISTOL

Our Bristol outpost is manned by Tony Hall G4CYE, who developed an interest in amateur radio whilst studying to become a ship's radio officer back in 1972. He particularly enjoys operating on top band where his main interests are in mobile operation and designing aerials.

Tony spent 16 years at sea, the last three of which he was First Radio Officer on the Canberra. He enjoyed meeting the passengers on board, which has stood him in good stead in dealing with his own customers.

Tony is looking forward to the opening of our new showroom in Bristol where he will have more room to display a much wider choice of equipment. The new location will be even better for local customers and will give easier access to Tony's valued customers from Wales and the South West.



TS850S

Unit 6, Ferry Steps Ind Est., Albert Road, Bristol BS2 0XW.
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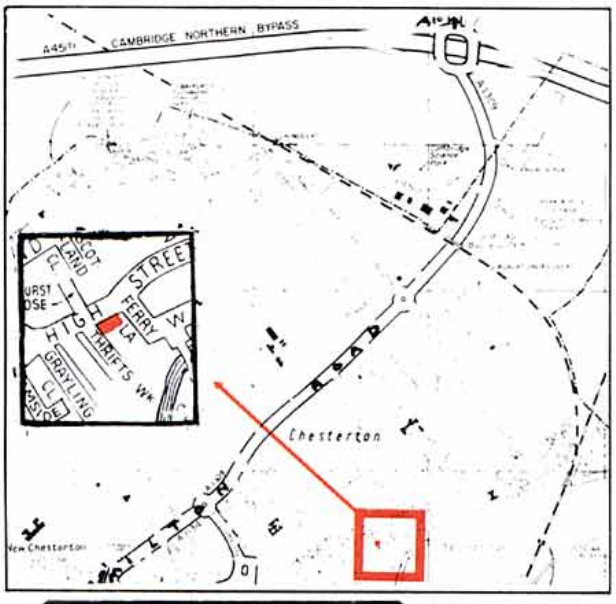
LOWE in CAMBRIDGE

Tony Collet, our man in Cambridge, was first licenced as G8GXE in the early 70's (and still has the flared trousers). Despite obtaining the Man's licence (now G4NBS) he hasn't lost his love of VHF and enjoys DXing on all bands from 70Mhz to 23cms. In the past, Tony was a member of the VHF Contest Committee and has been Treasurer of the Cambridgeshire Repeater Group for many years.

He joined Lowes in 1981 where he ran the Kings Cross shop and in 1984 we pulled him out of his home (perversely just round the corner from our Heathrow shop) and replanted him in Cambridge where his knowledge and experience have proved invaluable to local customers. With the plethora of air bases in the surrounding area, Tony has built up quite a following with airband enthusiasts and has always been keen to visit clubs.

One good piece of news we have for Tony's customers is that we will shortly be relocating his branch to give you more room to try out our ever expanding range of equipment and accessories.



TR851E

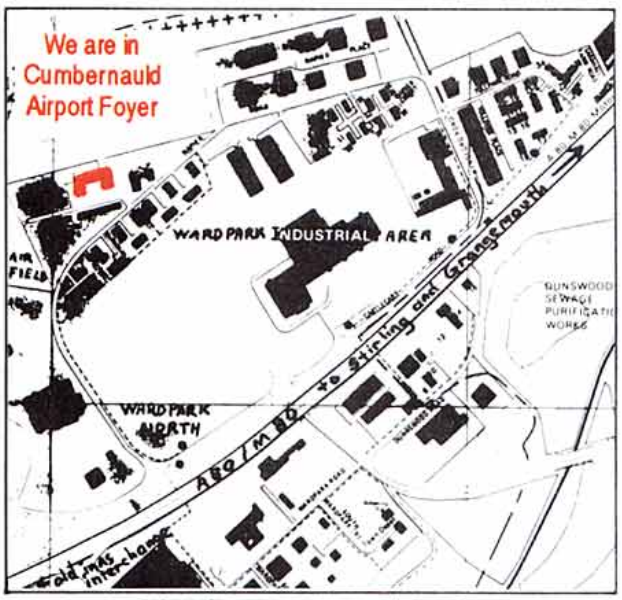
162 High St, Chesterton, Cambridge CB4 1NL.
Tel: 0223 311230

LOWE in CUMBERNAULD

Sim Weir, our tame Scot, was licensed in May,1963 as GM3SAN, spending his first five years exclusively on CW using home brew gear. He then spent some time building and operating SSB equipment which was then in its infancy. Since then he has operated everywhere between top band and 23cms, mainly with home brew gear.

Despite being brought up in the valve age, Sim has always been keen to try new technology and operating modes and was one of the first to exploit the early OSCARs. He has also operated ATV and was heavily involved in the development of the repeater network in Scotland. He's currently rebuilding a UHF repeater. In more recent years, Sim's interest has grown in digital modes and is a keen Amtor and RTTY operator. A committee member of MacPAC, he also operates the Glasgow packet mailbox, GM7SAN with multi user ports on 4m, 2m, 70cms, and 23cms.

As we sit here writing this, we are wondering how Sim manages to fit in work ! Still, since we moved him to more spacious premises at Cumbernauld Airport he's been much happier and so has his growing army of customers. Sim thanks you all for your support over the years.



TS711E

Cumbernauld Airport, Cumbernauld G68 0HH
Tel: 0236 721004

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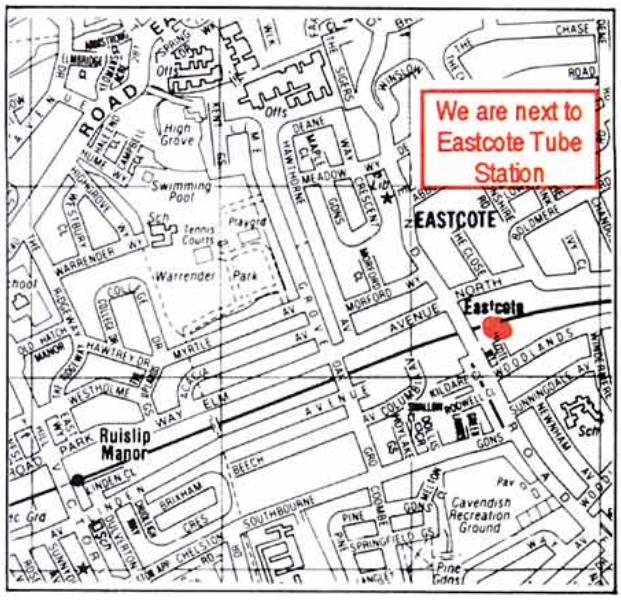
LOWE in EASTCOTE

Fred Butchart, G4RJS, perhaps better known as Raspberry Jam Sandwich has looked after our Eastcote branch for almost three years now. Being located right next door to Eastcote Station (Piccadilly and Metropolitan Lines) it is ideal for those in and around London using public transport.

Fred has been licensed for over ten years and enjoys operating all bands and modes but has a particular leaning for RTTY and 2m DXing. He's been using a home brew terminal unit for some time now for RTTY but is gradually becoming used to the Kantronics KAM.

Fred has one of those useful things in amateur radio, a wife with a callsign. Lynne, G0RJS, can often be found helping in the shop at weekends. Fred always has a smile for his customers and makes a demon cup of tea. Next time you're having one, ask about the secret supply of biscuits he keeps in the stockroom !



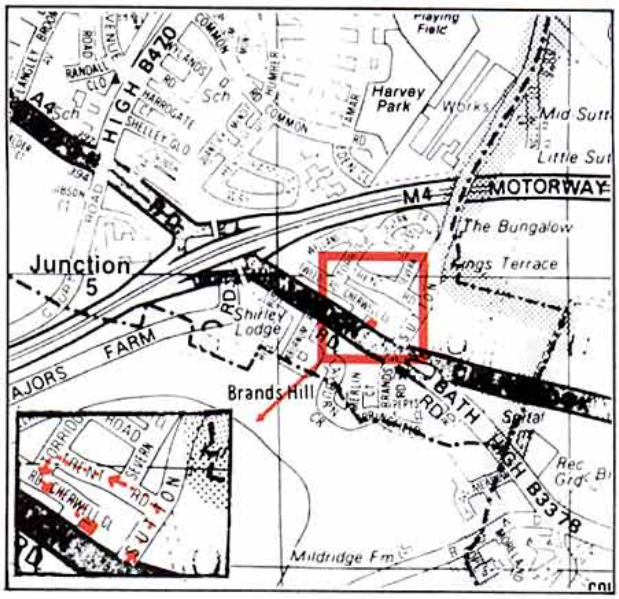
TS790E

223 Field End Road, Eastcote, Middlesex HA5 1QZ.
Tel: 081 429 3256

LOWE in HEATHROW

Steve Devine has been with us for just over a year and is proving himself to be a valuable member of our sales team. Steve, previously a Project Engineer with Rolls Royce has been licensed since 1987 as G1WSY, and currently working hard at CW to obtain a full licence so he can get the most out of his TS690. He enjoys weak signal work on VHF, particularly 50Mhz where he has 25 countries confirmed and holds the RSGB 50Mhz DX Certificate and Countries Award for 20 countries. Steve also enjoys contesting and portable operation and can often be heard in the West London area operating mobile with his TM741E, travelling to and from work or to the regular meetings of the Edgware and District Radio Society. He is also quite knowledgeable on Packet radio and runs stations both in the shop and at home.

Our Heathrow shop enjoys easy access from the M4 and M25 with plenty of free parking. We've recently been doing some alterations and increasing the demonstration area.



TM441E

6 Cherwell Close, Langley, Slough, Berkshire SL3 8XB.
Tel: 0753 545255

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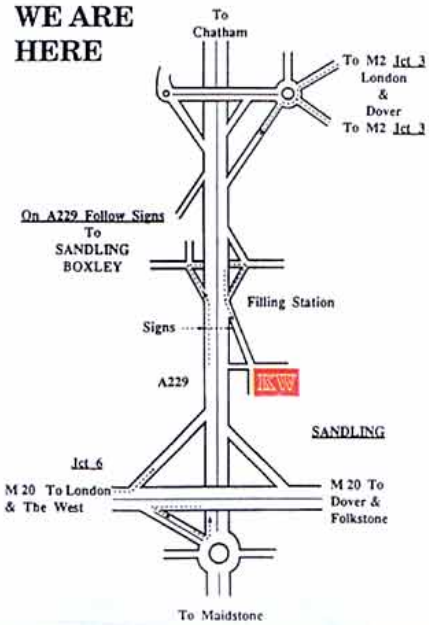
LOWE in KENT

Our Maidstone branch, formerly KW Communications, brings the benefits of Lowe expertise to the South East of the country. In terms of size, it's our biggest branch in the country, enabling us to have on permanent demonstration a huge cross section of equipment, not just from Kenwood but Icom, Yaesu and Alinco also. We've installed a wide range of antennas for you to try out the latest rigs on air.

There's also a wide range of accessories, including morse keys, antennas, cable, books, connectors, rotators and a permanent Datacomms station where customers old and new can get to grips with packet, AMTOR and RTTY.

Conveniently located between the M2 and M20, and close to the M25,access from Essex, London, Sussex and Surrey could not be easier. We'll also be the nearest amateur radio shop to the Channel Tunnel ! And with the shop standing in its own grounds, there is plenty of free parking.

Remember all of this now comes with total customer care - something only Lowe can promise and really deliver !



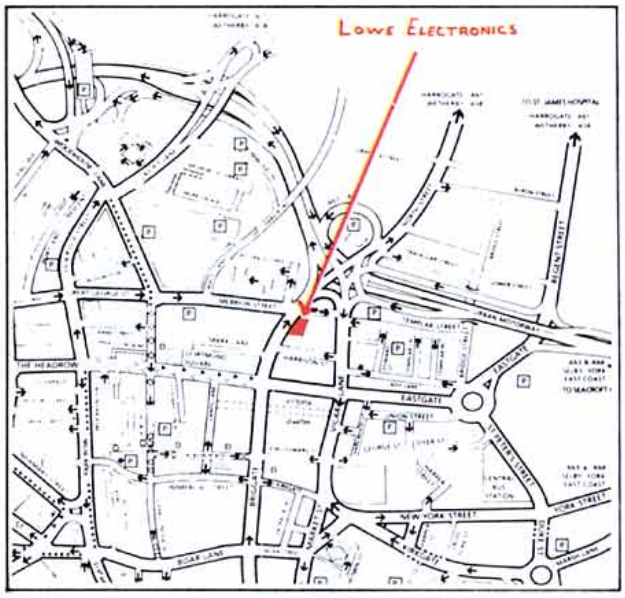
TS450S

Chatham Road, Sandling, Maidstone ME14 3AY
Tel: 0622 692773

LOWE in LEEDS

Tom Beaumont heads up our latest store in Leeds. At the tender age of 7, Tom was introduced to building simple shortwave receivers using Eddystone plug in coils, valves and 2v accumulators (is that something to do with football pools ? - G6PZZ) It was not long before a simple CW TX was built, followed by several visits from the powers that be who went away totally baffled when his mother pointed out they only had gas ! This little boy in short trousers knew nothing about licences in those days but now operates as G4DVZ.

Tom is now well out of short trousers, and has many years in the business behind him having built up a very successful operation retailing and manufacturing amateur radio equipment. Indeed, our new branch is located at Tom's original shop, in a purpose built showroom, where Tom, together with his wife Hazel, will be proud to show you the full range of Kenwood equipment, together with the largest range of accessories for radio hams, shortwave listeners and scanner enthusiasts.



HF225

34 New Briggate, Leeds LS1 6NU
Tel: 0532 452657

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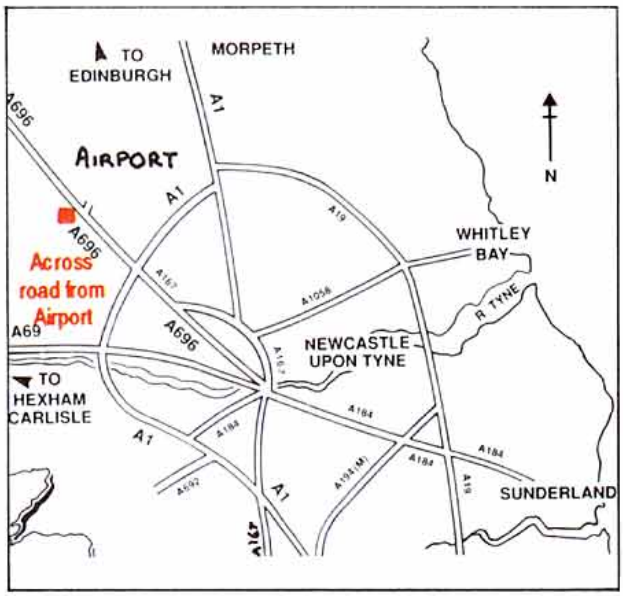
LOWE in NEWCASTLE

Dave Brown in our Newcastle branch is another of the company's nomads, having worked for several years in our Matlock showroom before joining the big bad world of PMR. Dave returned to the fold in 1991, once again at Matlock for several months before we deposited him at Newcastle Airport, with a bunch of keys in one hand and a bucket of whitewash in the other.

Dave's many years experience as an SWL prior to being licensed as G4KFN in 1979 makes him the ideal man to talk to about HF rigs and receivers. His twelve years in the business has given him wide experience of all types of equipment and this together with his warm friendly approach makes a visit to his branch a real pleasure.

Due to Dave's personal enthusiasm, our Newcastle branch is yet another of the company's success stories. We will soon be doubling the size of our existing showroom to cope with the local hunger for all things radio. Dave would like to pass on his personal thanks to the many new friends he's made in the area.



R5000

Newcastle Airport, Woolsington, Newcastle NE20 9DF.
Tel: 0661 860418

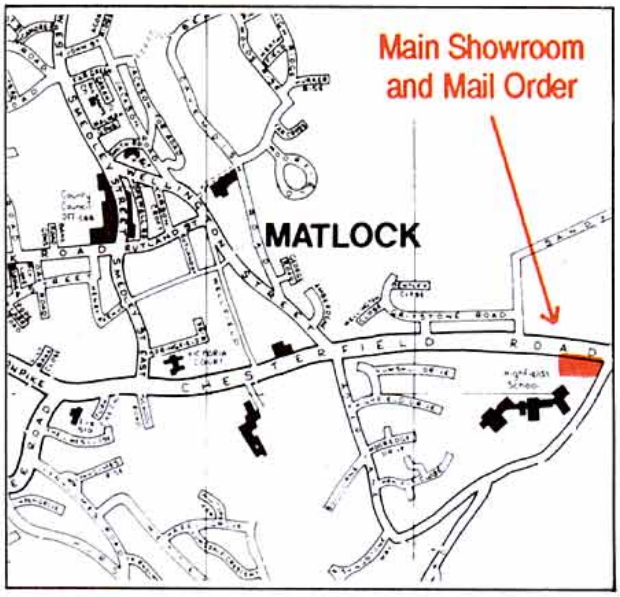
LOWE in MATLOCK

Our Matlock showroom is situated on the edge of the Derbyshire Peak National Park, right on the main road between the spa town of Matlock and the famous twisted church spire of Chesterfield. Why are we in Matlock ? Quite simply because it is virtually in the centre of the country and therefore as accessible as possible for all our customers.

We have the biggest showroom in the country devoted to amateur radio, with all facets of the hobby being covered. We also have the widest selection of receivers for the SWL to try out all alongside each other. We have huge stocks of Kenwood equipment, plus a selection of the most popular items from virtually every other manufacturer. We have an aerial farm that is the envy of our visitors. We have an R & D department working at the forefront of technology in communications receiver design. We have a workshop staffed by full time trained engineers equipped with a quarter of a million pounds worth of test equipment. We have a factory manufacturing our own communications receivers, of which 90% are being exported all over the World. Most of all we have our people, such as:-

Richard	G3OQT	Rob .	G8MPT	Beryl .	G7LME
John . .	G3PCY	Bill . .	G8LXN	Andrew	G7JOG
Tom . .	G6PZZ	Mark .	G7KNY	Barrie .	G8OTY
Keith .	G8YQX	Kevin	G4PXL	David .	G8LOW

That's why we say we are the biggest and best. We think that it's justified.



Chesterfield Road, Matlock, Derbyshire DE4 5LE
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IDEAS FROM ABROAD

Eurotek

TRANSLATED AND EDITED BY ERWIN DAVID, G4LQI

Gerard Scheepers, PA0GMS described in *Electron 5/89* how he built a **70cm power amplifier with RF VOX** to boost the FM output from his Pye Pocketphone to a respectable 15W for mobile use. He recently confirmed the reliability and reproducibility of the design.

THE 70cm BOOSTER I had built before, with BLX transistors, was bigger than I fancied for use in the car. Earlier discrete-component efforts towards reduced size had been difficult to stabilize and had caused problems with input and output matching. The use of a Motorola MHW710-1 three-stage module solved all that.

It should be mentioned that the MHW710-1 module works in class C and therefore is not linear; this is no disadvantage for FM, CW or data but precludes SSB usage. There are alternative modules which can be biased for class AB linear operation, eg Toshiba S-AU4 and Mitsubishi 57716, but these are much more expensive. [PA0GMS must have had an inexpensive source for MHW710-1. All three modules are included in the Mainline Electronics (Leicester) price list; the MHW710-1 is the most expensive, but both linear modules are rated for the lower output of 10W - *G4LQI*]

A 30 x 40mm PCB with the RF VOX circuit was re-used unchanged from another project (see *RSGB VHF/UHF Manual*, 4th ed. page 6.2) but is shown in **Fig 1** in sufficient detail for duplication. This VOX has proven most reliable. It requires very little RF input and by virtue of its high gain the drop-out time can be kept very short. This eliminates the loss of the first word from your QSO partner.

CONSTRUCTION

NO PCB IS USED FOR the amplifier proper. It is built into a 110 x 70 x 30mm tin-plate box, **Fig 2**. The module is bolted through the bottom of the box to a 120 x 70mm 30W heatsink. Heat transfer compound is used between the module and the box and also between the box and the heatsink; both must be as flat as possible. Care is required when tightening the bolts as the ceramic substrate of the module is brittle. The other components are soldered in directly.

COMPONENTS

THE POWER MODULE, Motorola MHW710-1, is unconditionally stable. With the DC decoupling and shielding shown there have been no parasitics regardless of output tuning or loading. Prolonged operation with an open or shorted antenna connector has done no lasting damage. The output PI circuit consists of a straight 25mm length of 2mm diameter silvered copper wire and two miniature 6pF Tronsor air trimmers.

Both relays are shielded miniature types, National model RH 12. They are not especially for RF but have carried as much as 40W RF into a matched load without difficulties.

The input attenuator consists of a 200Ω miniature preset resistor, thick-film on a ceramic substrate, and two 100Ω 0.5W composition resistors.

All other resistors are 0.5W composition types.

All capacitors are rated 25V or better. Those 0.1µF and larger are tantalum beads with their negative (-) lead earthed. Capacitors of lower value are disk ceramics, except for the 200pF unit which is a feedthrough model (though not used as such - see Fig 2).

The RF chokes were Siemens model VK200, but ferrite 6 x 3mm beads with three turns of 0.5mmD enamelled copper wire will also work.

Teflon-dielectric coax. 2.7mm OD was used from RLA to RLB and the attenuator.

The fuse in the DC supply lead protects the car wiring in case of a short circuit in the amplifier. With a normal operating current of 3A, a 4A fuse would be appropriate. If there is a fuse upstream in the supply lead, eg in the adapter taking the amplifier supply from the cigar lighter socket, the fuse in the booster is superfluous.

External connectors are BNC chassis sockets for RF and a binding post for 13.8VDC.

TUNING UP

ADJUSTMENTS COULD NOT be simpler. Set the input attenuator to maximum resistance and the two air trimmers to half-mesh. Apply 0.6 or 0.7W input from the hand-held and verify that both relays make. A few watts of output should be generated at this stage. Adjust the two air trimmers to peak the output, then reduce the input attenuation till the output reaches 15W with a supply current of approximately 3A. This completes the adjustment. Harmonics were found to be -60dBc and intermodulation -35dBc. These are satisfactory results.

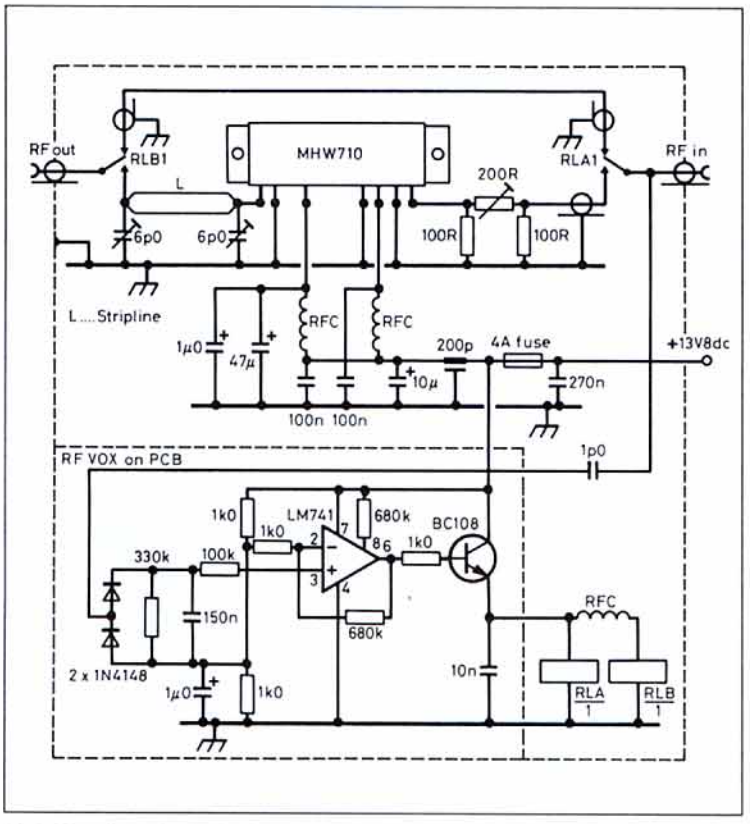

Fig 1: Complete circuit showing the RF Vox from the *RSGB VHF/UHF Manual.*

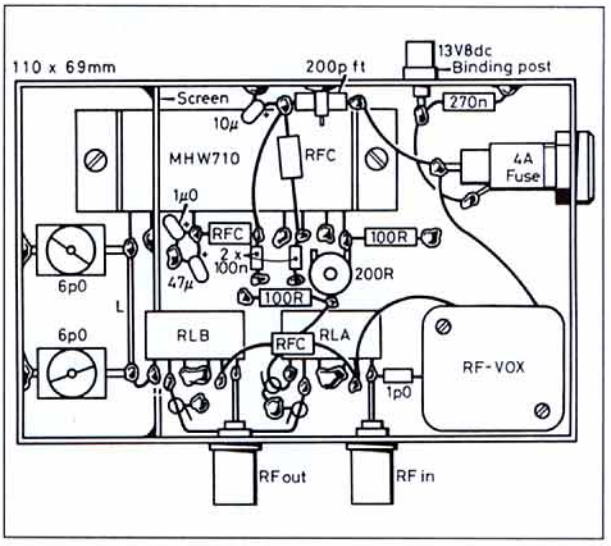

Fig 2: Layout diagram for the amplifier suggested by PA0GMS.

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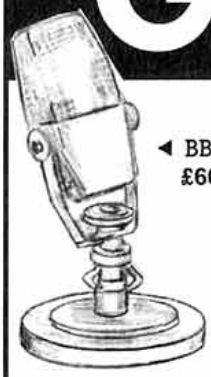

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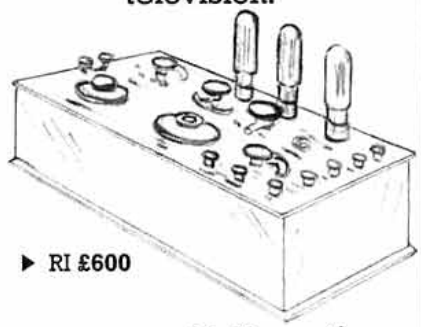

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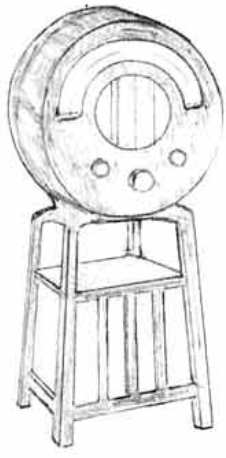

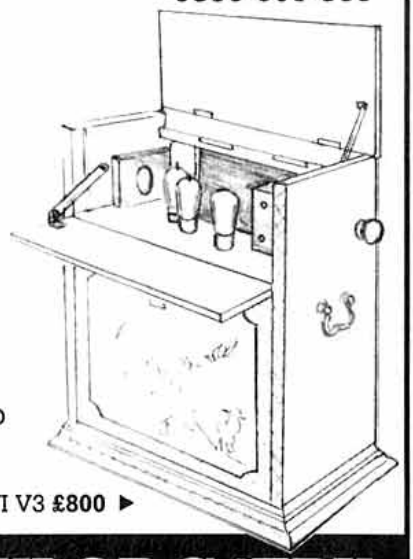

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EMC

MEGAN SMITH, G0MEG
EMC Committee Secretary

THE END OF ANOTHER YEAR looms and it is time to take stock of the old year and plan for the new. First of all I must wish you all Merry Christmas and a Happy New Year from the EMC Committee, and thank you for your letters and contributions to the column. This month I will analyse the small EMC survey we did at RSGB '92, look at a new book on EMC and discover not a hole in the ozone layer but a hole in our EMC co-ordinators layer!

By the way, congratulations are in order for David Lauder, G1OSC, as since he wrote the piece on power amplifiers he has passed his Morse test and is now G0SNO.

EMC GOES TO THE WEST END

AN ARTICLE BY ROSS BENSON appeared in the *Daily Express* on 24 June this year which showed that even top theatres are not immune (groan!) to EMC problems. There was a Press night performance of the new musical 'Spread a Little Happiness' at the Whitehall Theatre near Trafalgar Square. This is close to both the Admiralty and the Ministry of Defence and was made famous for its farces by G2DQU otherwise known as Lord Rix, Mencap Chairman and RSGB Vice-President.

No sooner had the performance started when the auditorium began to echo with the sound of civil servants from the MoD and the Admiralty making late-night telephone calls! On stage Rachel Robertson and the rest of the cast went on singing Vivian Ellis's songs in true show-business tradition while the company manager, Kevin Grant, struggled with the misbehaving public address system. He was hoping to be able to sort it out before the first public performance the next day. An MoD spokesman told Ross Benson "We're looking into it". I can only assume that the civil servants were using cordless telephones and that one of the lengths of wire connecting the public address system was behaving as a resonant antenna, although you may have other possible suggestions!

DOWN TO BUSINESS

THE EMC COMMITTEE has been down to some serious business this year. Apart from representing amateurs on various national and international standards Committees, two items which come to mind are the RA's BR68 booklet mentioned in October *Radcom*, and the DTI's 'Green Book'. You may recall from October that we had submitted changes to the RA (via the RSGB Licensing Advisory Committee) to the proposed additional paragraph to the *Terms, Provisions and Limitations Booklet* BR68. Most of these changes were included in the revised paragraph sent by the RA to the RSGB LAC at the end of September. One further small amendment was put forward by the EMC Committee and it is hoped that this will be incorporated.

In essence the changes emphasised the freedom to be able to eliminate a breakthrough problem using filters, ferrite rings etc, rather than having to reduce the field strength produced by the amateur station to a level which does not cause breakthrough in equipment which meets the new European immunity standards. If space permits, it may be possible to publish the original paragraph and the revised paragraph in a future *Radcom*.

Now, what is this 'Green Book'? Well it is a document from the DTI *EMC Draft United Kingdom Regulations - A consultative document* dated July 1992. The regulations were due to be implemented by 28 October 1992, along with similar regulations in other EC countries. The EMC Committee submitted comments on the 84-page document in September, after a busy Committee meeting and further work by Hilary Claytonsmith and David Lauder to put it all together.

After all that, helping solve people's EMC problems is almost light weight! This leads me nicely on to the survey results.

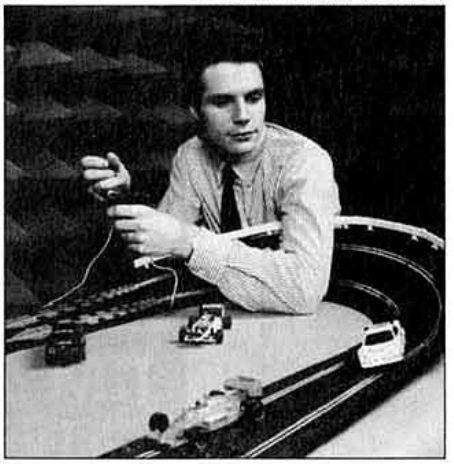
TOYS FOR THE BOYS

IN FESTIVE MOOD, I wonder how many people are going out to buy train sets or car racing sets for small relatives? It might be reassuring to know that at least some manufacturers are having them tested for RF emissions and susceptibility. The photograph shows a Scalextric track with cars being tested by Assessment Services Ltd of Titchfield a large EMC test house. The two hundredth product was a Hornby train set, and they have also tested a 'Wicked Ware Bear' toy. Assessment Services project manager, John Peacock, said that most tests are of short duration, three or four days. Products are tested for 'exported interference' - emissions - and for immunity to outside conditions. The tests are conducted in the company's open field test site or in the anechoic chamber shown in the picture. Other items tested have ranged from Motorway signs to desk-top computers.

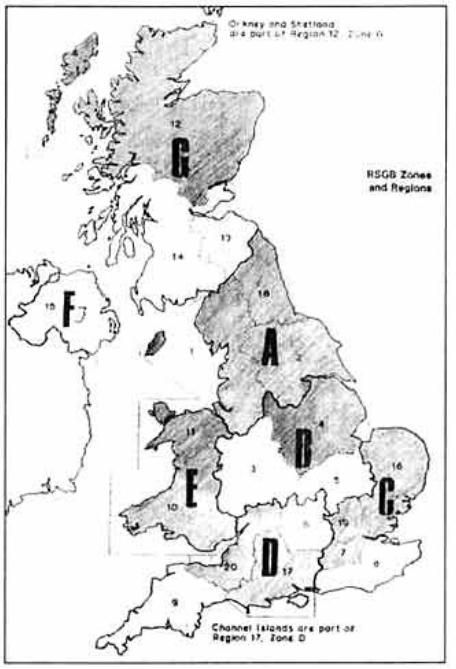
THAT HOLE IN THE EMC LAYER

HAVING A LITTLE TIME on my hands, I plotted out the EMC Co-ordinators on an RSGB Zone map. The results were rather surprising. A hole in the centre of England! No wonder EMC Chairman Bob Peace, G8SOZ, says he is overworked. He lives in Zone B Region 4 so has to cover Regions 3, 5 and 6 as well. Anyway, if you live in any of the areas which appear unshaded on the map and would like to find out what is involved in being a volunteer EMC Co-ordinator, please write to G8SOZ via RSGB HQ.

PHOTOGRAPH: ASSESSMENT SERVICES LTD



EMC testing on Scalextric Model cars.



EMC Co-ordinators in RSGB Zones and Regions.

NEW EMC BOOK NOW OUT

SEEING THE NEW VERSION of the ARRL book (see below) reminded me that the EMC Committee has produced its own book. Robin Page-Jones, G3JWI, has been slaving away over a hot word-processor ably assisted by David Lauder, Hilary Claytonsmith and the rest of the Committee. The RSGB is publishing it under the title *The Radio Amateur's Guide to EMC*. The book explains EMC with as little maths as possible and in the appendices gives lots of examples of how to cure problems. There is a comprehensive appendix on the characteristics of different EMC filters, including those supplied by the RSGB. [See *Bookcase* pages - *Ed*]

EMC SURVEY AT RSGB '92 BIRMINGHAM

A SMALL SURVEY was carried out on the Saturday of the Exhibition, to get a 'feel' for the EMC problems that were around, and whether the emphasis had changed because of, say, more computers in use in peoples homes. It can't be considered statistically representative, but is more of a 'snapshot'.

128 people filled in forms, 66 of whom had had EMC problems in the last 12 months. Only four had their stations inspected by the RIS and all thought that the RIS was "helpful" or "very helpful". 13 people wanted someone from the EMC Committee to contact them. Many people had managed to solve their problems themselves or with help from other local amateurs or club members.

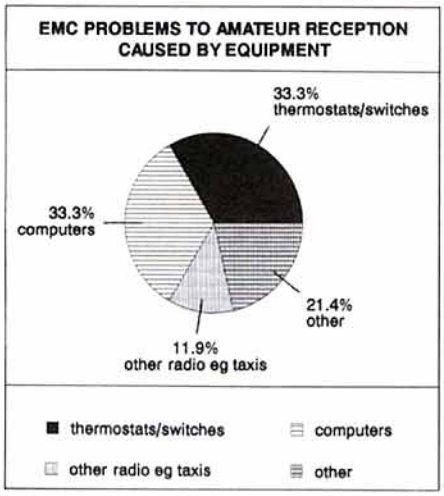
EMC PROBLEMS CAUSED BY EQUIPMENT

AMATEURS AND SWLs have their own EMC problems as well. How often have you been straining to catch that rare DX and the central heating turns on? Well, thermostats share joint honours at the top of the table with computers as the biggest cause of unwanted noises. The pie chart below illustrates the results.

The *other* category covers a very wide range. The following problems were reported:

- Telephone Exchange
- Lawnmower
- Welding
- Compressor
- Drill
- Hoover
- TV Time Base
- Spark Eroder
- Cable TV
- Cordless phone 2nd harmonic

Thank you again to those people who filled in survey forms.



TYPES OF EQUIPMENT WITH EMC PROBLEMS

THE SURVEY SHOWED THAT televisions are still the top of the league table of equipment susceptible to RF so 'TVI' is still a good description of a typical EMC problem. The league table is as follows:

1. Televisions
2. Telephones
3. Hi-Fi and Video Recorders
4. Answerfones
5. Radios
6. Others
7. Computers

Others include security lighting, burglar alarms and an electronic organ. The results are illustrated in the bar chart.

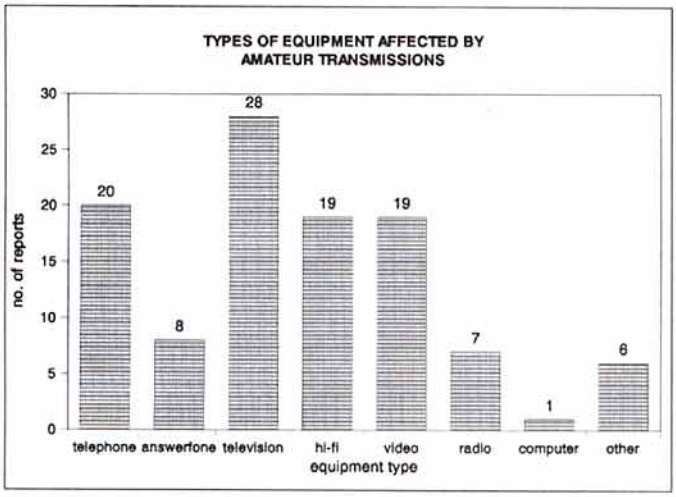
PHOTOGRAPH: LIVINGSTONE HIRE

Wave Meters: The Channel Tunnel's electrically noisy environment means that thorough EMC testing is vital. TRL Technology has been conducting tests with equipment suplied by Livingstone Hire.

BACK IN THE USA

IN THE JUNE COLUMN, I mentioned G8SOZ's letter from New Zealand. Following that I had one from Ed Hare, KA1CV, of ARRL. He sent me a real 'bumper bundle' of EMC items. I will probably include some of these in later issues. The ARRL does not have a regular column on EMC, but Ed writes a column in the ARRL *Field Forum* which often includes EMI issues, and EMI items are also covered in the 'Lab Notes' columns in February and March 1992 *QST*.

Some of you will know the ARRL book *Radio Frequency Interference* which you can get from the RSGB. Ed sent me a copy of the latest version which has been completely revised and updated. It is very much a book of 'how to fix it' for interference problems and is written in a light style, although some parts are not quite so appropriate for the UK. I hope that we can continue the contact with ARRL as I am sure that there is an advantage in the exchange of ideas and tips.



Q R P

GEORGE DOBBS G3RJV
St. Aidan's Vicarage, 498 Manchester Road, Rochdale OL11 3HE

FROM TIME TO TIME I like to comment upon unusual or interesting home-made QRP equipment. Recently I was shown a photograph of a curious little 80 metre transceiver built by Bill Watson, G4EHT, from Lichfield. Let Bill tell his own story from the letter that came with the photograph:

"It all started one evening just after eight. My XYL and daughter had just consumed the last few After Eight mints and passed me the empty tin! They suggested it might be of some use to me for QSL cards or components. At that moment my son Dez, G0DEZ, entered the room and suggested that it would be ideal to build an 'After Eighty QRP Transceiver'. It seemed a good idea, so the 'After Eighty Rig' evolved.

"The circuit is the home-brew ONER Transceiver (from the G QRP Club Journal *SPRAT*). The transmitter was designed by GM3OXX, and the other boards (receiver, change-over board and VFO) were designed by G3ROO *[see note below - Ed]*. Each board is only 1in square. The only additions being an RF Preamplifier (a BFY90) and an extra audio stage (LM386) to drive a loudspeaker.

"As can be seen, apart from the VFO, there are only two controls on the rig, RF and AF gain. The changeover is automatic: key up for receive, down for transmit. The loudspeaker is on the back panel as I did not want to degrade the appearance. Care had to be taken in construction as the case is easily scratched. The rig runs a good 2W of RF output and good reports have been given around the UK. The receiver is very lively.

"The ONER can be built from kits. As can be seen from the photograph, it is also a good idea to have some After Eight Mints to sample between QSOs. The photograph is by my nephew Paul, G7KMT."

ONER Kits can be obtained from Kanga Products, 3 Limes Road, Folkestone, Kent, CT19 4AU (Tel: 030 276171). There are four Boards for a complete transceiver: Transmitter, VFO, Receiver, Change-over with sidetone.

THE WINTER SPORTS ARE HERE AGAIN

EACH YEAR I EXTOL ITS VIRTUES in *RadCom* and each year more people enter it. The G QRP Club Winter Sports is probably the most friendly amateur radio event on the air. It is tucked into that short period of time, 26 December to 1 January, when many people are not working. Each year stations are asked to come on the air using *less than* five watts *output* and work as many other QRP stations as possible. The event is not run as a contest, it is what some people call a 'QSO Party'.

The idea is to simply enjoy working other low powered stations. All the amateur bands may be used. Many participants go for the highest HF band which is open at the time but others just stick to their favourite bands and work their friends and anyone else who comes along. The best bands for working UK QRP stations are 80 and 40 metres. Each year many trans-continental two-way QRP QSO take place especially on 14, 21 and 28MHz.

Although the event is not competitive, the G4DQP Trophy is awarded to the station which contributes most to the overall event. People taking part are asked to send logs, or log extracts, with information on the station, to A D Taylor, G8PG, 37 Pickerill Road, Greasby, Merseyside L49 3ND.

So, sort out your QRP rig, or turn the power down on the QRO rig to 5W and call or respond to "CQ QRP" on any band from Boxing Day to New Year's Day. The activity is centred around the International QRP Calling Frequencies:

CW: 1843, 3560, 7030, 10106, 14060, 21060 and 28060kHz

SSB: 3690, 7090, 14285, 28885kHz

Perhaps after sharpening up your QRP operating skills in the Winter Sports, you may wish to try a QRP Contest. There are two which follow the very next day . . . .

THE AGCW-DL QRP CONTEST WINTER 1993

DATE: 2-3 January 1993

TIME: 1500UTC Saturday to 1500UTC Sunday. 9 hours minimum rest time, in one or two blocks, are obligatory.

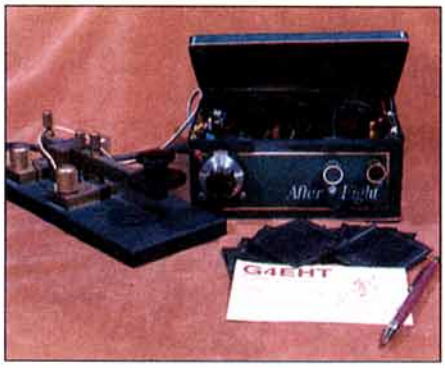
OPERATION: Single-Op in CW on 3.5, 7, 14, 21 or 28MHz. Call "CQ QRP TEST". Only one Transmitter and Receiver, or Transceiver, may be operated at the same time. QSOs with stations outside the contest are valid. Reception of RST is sufficient from non-contest stations. Contest stations exchange RST + Serial Number/Category.

Use IARU recommended sub-bands for contest operation.

CATEGORIES:

VLP – Very Low Power, up to 1W output or 2W input
QRP – 'Classic QRP Power', up to 5W output or 10W input
MP – Moderate Power, up to 25W output or 50W input
QRO – Above 25W output or 50W input

QSOs between QRO stations are not allowed.



In mint condition, the 'After Eighty Transceiver' is an 80m QRP rig built by G4EHT.

QSO POINTS: The Contest Manager will calculate 4 points for QSOs with VLP, QRP or MP stations having submitted a log. Other QSOs with own continent count 1 point, DX contacts count 2 points.

MULTIPLIER: The Contest Manager will calculate 2 multiplier points for each DXCC country worked in QSO with a VLP, QRP or MP station having submitted a log. Otherwise each DXCC country counts as 1 multiplier point per band.

FINAL SCORE: Total QSO points multiplied by total multiplier points. All calculations necessary will be done by the Contest Manager.

LOGS: Please list QSOs separately for each band and mark your claimed multipliers. The obligatory rest time(s) and inputs and outputs of all operated transmitters must be declared. More station details are appreciated. Do not forget your full address, and an IRC, for result lists. Your QSO Partner will only get full points if you send a log. So please send any kind of log, even 3 QSOs listed on a postcard, to: Dr Hartmut Weber, DL7ST, Schlesierweg 13, W-3320 Salzgitter, Germany. Logs to be submitted *before* 1 March 1993.

THE MICHIGAN QRP CLUB 13TH ANNUAL CW CONTEST

DATE: 1200UTC, 2 January 1993 to 2400UTC 4 January 1993 (36 hours), CW only, 160 metres to 6 metres (WARC Bands excluded). The contest is open to all amateurs and all are eligible for awards.

CLASSES:

A – 250 milliwatts or less output
B – 1 watt to 250 milliwatts output
C – 5 watts to 1 watt output
D – Over 5 watts output

EXCHANGE: RST, QTH (State/Province/Country) and MI-QRP Club membership number (non-members send power output)

FREQUENCIES: 1810, 3560, 7040, 14060, 21060, 28060 and 50060kHz

SCORING: Stations may be worked once per band for QSO points. Members contacts are 5 QSO points each, non-member contacts are 1 point each. Multiply the total QSO points (all bands) by the number of States/Provinces/Countries worked per band, for total points.

BONUS POINTS: Total points x 1.25 for battery or 1.5 for 100% natural power.

AWARD CERTIFICATES: Certificates will be issued for the highest score in each State/Province/Country. A separate log is required for *each band*, as well as your name, call, address, equipment description and *power output*.

LOGS: must be received by 6 February 1993. Please send an SASE (or IRC) for a copy of the results. All logs to: L T Switzer, N8CQA, 654 Georgia, Marysville, MI 48040, USA.

G3ROO TO WRITE FOR RADCOM

FROM NEXT MONTH, well-known QRP home-brewer Ian Keyser, G3ROO, will join *RadCom's* team of expert columnists. He will present a monthly construction feature aimed at Novices.

RADCOM CONTESTS FEATURE

VHF National Field Day 1992

by Andy Cook, G4PIQ.

THE 1992 VHF NFD will certainly not be remembered for the wonderful conditions. Most entrants suffered lousy conditions most of the time, though things began to improve on the Sunday. Despite this and the gale-force winds and rain that many groups experienced, the number entering the transmitting sections showed an increase for the first time in several years.

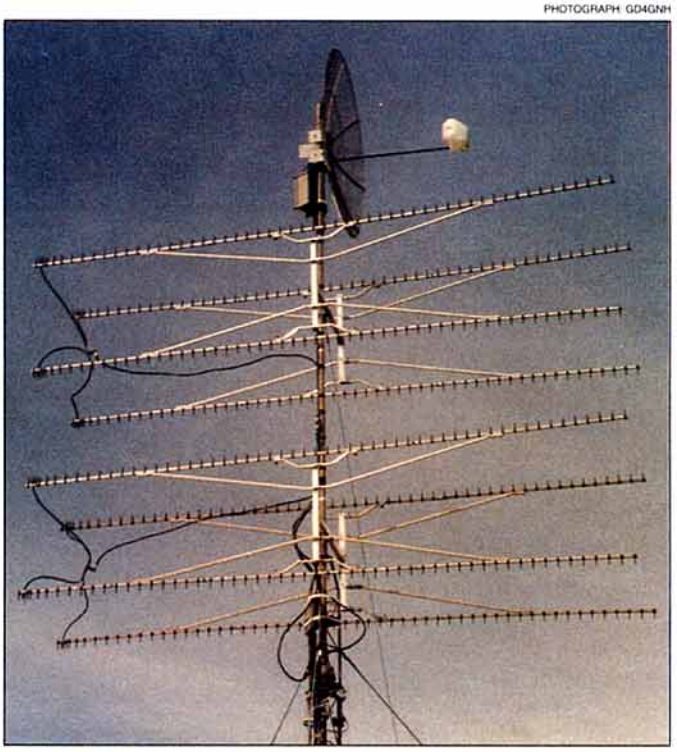
Groups suffered some of the worst NFD weather for many years, particularly in central England, with several dropped antenna systems and shredded tents. Several packed up and went home early. Sutton & Cheam RS erected one tent in a ditch to avoid it becoming a six-man hang-glider, and the Westmorland group thanked us for arranging the contest on the only wet weekend for seven weeks.

The Lichfield ARS and BBC groups comments sum it all up: "For the first time in about 30 years of /P contesting we were comprehensively defeated by the weather. Picture a mountain top at 1,700ft. Perched on top is a tent (roped down of course), a caravan and four masts. The view would be spectacular, but you cannot see it as you are enveloped in cloud . . . the wind begins to strengthen and strengthen. The tent is showing signs of wanting to go into the next county. Five people cannot keep it down, and at 2330 it collapses. The caravan lasts a little longer. Two years before we had seen a caravan's shattered remains 500ft lower down. We were truly fearful ours would go the same way. We abandoned it and sat in the cars till morning . . . Vive le sport!"

There were, however, places where you could turn lobster red and still enter NFD; unusually, the Isle of Man and Scotland!

It was not just station inspectors who were on the prowl during the wee small hours. Cousin Jack's Contest group received an overnight visit from the Police since they were concerned that 'New Age Travellers' had moved in!

PHOTOGRAPH: GD4GNH



The Northern Lights' impressive 23 and 13cm anntenna system, a 1.5m dish and 8 x 55 elements, helped them take first place in the Open Section.

Adjudication

AGAIN THE adjudication was done by the VHF Contests Committee over a weekend, and thanks go to Bob, G4UJS, and Martin, G4XUM, for their hospitality and provision of facilities.

As last year, the close competition was in the Open section. Here the un-adjudicated scores revealed only 23 normalised points between the leaders and the runners-up. However, as you can see from the tables, after the vast majority of both the Northern Lights' and Loadsamoneys' contacts were carefully cross-checked against other entrants' logs, this situation was not only reversed but by a very substantial amount. The final result was that the Northern Lights won by 91 points. This was a real education in the importance of accurate logging and the amount of care taken by the Northern Lights over their logs paid big dividends.

It was also very close for the runners-up slot in the Low Power section, but a reversal was avoided as *both* groups committed the cardinal sin of having logged unmarked duplicates.

There were more unmarked duplicates and silly errors in evidence this year, and as shown above these can be costly. Time spent checking the log before sending it off is very worthwhile. A number of groups are now using G3WGV's *LOG* program to score and format their entries. I would recommend using a version higher than v3.00, since, under certain circumstances, v3.00 will score your log erroneously. This time, entrants with logs in this condition were given an opportunity to re-calculate.

A couple of stations tried to enter the Low Power section after registering in the Open or Restricted sections. These groups were returned to the section in which they had registered and had 10% deducted from their scores. Also, stations not including cover sheets for each band lost 10%. One group sent their entry by registered post (outlawed in the rules) causing the committee chairman much inconvenience - they also lost 10%!

70MHz

THERE WERE five fewer entrants on 4m and this was reflected in the leading stations' QSO totals. Reduced activity combined with very poor conditions led to some unfavourable comments. In the 'conditions' box on the cover sheet, Clifton ARS, G3GHN/P simply said "Do you really want to know - unprintable". A number of stations were pleased to find ZB0T on the band.

Although some CW logs were very good, some scores took heavy casualties, with a number of stations' imaginations working to fill in the bits of QTH information they didn't copy. This year, errors in the SSB section were more prevalent - was this just poorer logging or a result of the high levels of Sporadic E Broadcast QRM on Sunday morning? The Es did, however, allow the contacts with Gibraltar and some contacts from the South of England to Northern Scotland.

144MHz

FOR MOST of the event, conditions were flat, but there was some improvement on Sunday towards Scandinavia with a few LAs and OZs being worked by many groups. If only the contest had been a day later when huge signals were available from Scandinavia! From DL, PA and ON, sporadic E contacts were made to UB5 and UA3 on the Saturday, but nothing was reported in UK logs.

Derbyshire Hills, in the Open section, had three separate 2m antenna systems - it was just a shame that the weather and conditions did not enable them to take full advantage of this.

The spectre of broadband noise from transmitters at close range raised its head once again - please remember that putting a high power contest station in an excellent site with a big antenna system, and needing to live in complete harmony with neighbouring groups is not a trivial exercise. In particular groups transverting and receiving reports of broadband noise should consider checking that there is not

PHOTOGRAPH: G0HUZ

Keith, G0NTP, atop the Clifton ARS 60ft mast which was loaned by Strumech-Versatower Ltd.

excessive gain in the Tx strip. It may well be better to run the HF exciter at close to its full transverter output power, thus minimising the gain in the system and therefore limiting the amplification of broadband noise from the early stages in the transmitter. This is of course only one aspect of a complex problem, but it is one that is often overlooked. Check your system carefully before you use it in anger.

432MHz

LEADING SCORES were 25% down, reflecting last year's comparatively good conditions. Nevertheless, similar distances were worked, including the same LAs who were in evidence on 2m. There was a dawn lift into OK, HB9 and Southern Germany which was not confined to the extreme east coast.

The prize for antenna system of the contest should surely go to G8KQW/P with a box of eight yagis, a directional colinear array, and another omni-directional colinear system - serious stuff indeed. It is interesting to see some of the new breed of very long yagis appearing, including a monster in use at G8ZHP/P with 40 elements on a single boom (they also had a 28 ele on 2m)!

Microwaves

WHEN THINGS are bad, the microwave bands seem to suffer worst. G0FIO/P found it "a merciful release when the generator failed on the Sunday morning", and GW1YFG/P said "13 QSOs in 4.5 hours - almost a relief to have the station blown away!" However, for those alert enough and prepared to tough it out there wassome good DX: The Northern Lights, GD0EMG/P worked LA1T on 13cm.

The early shutdown time on Sunday received favourable comments, although it did seem strange to others particularly as conditions were then improving in some areas. In spite of shortening the overnight closedown on 23cm in an attempt to catch the late night and early morning propagation peaks, the dawn lift was still missed. G4MRS/P at 0455 heard OK1KIR/P calling CQ but he faded out before the kick off at 0500 (70cm peaked to OK at about 0430)!

The rate of equipment improvement seems to be slowing, with the same three stations boasting full 400W output. G4IEV/P ran an interesting antenna system with, in addition to a conventional 6ft dish, a 3.7m 'pillbox' antenna, which is a form of rather large omni-directional radiator.

Comments

AS USUAL, NFD provoked some comments: should we ditch 4m and/or 13cm? should we add 6m? should we keep the 23cm shutdown period? and many others. The committee takes these comments seriously and we will be sending questionnaires to this year's entrants. It is impossible to please everyone, but we'll do our best to fit the rules to suit the majority.

Congratulations go to all the winners and runners-up. Certificates will be sent to section, band and country leaders and runners-up. Special congratulations go to the trophy winners: Northern Lights who retain the Surrey Trophy; Martlesham Radio Society who keep the Martlesham Trophy (both of these for the third year running); Sutton & Cheam RS who take the Arthur Watts Trophy; South of Scotland group who retain the Tartan Trophy, and Colin Roberts who takes the Scottish Trophy, operating single handed and on solar power!

OPEN SECTION

Pos	Group Name	Loc	70MHz	144MHz	432MHz	uWave	Total
1	Northern Lights	74SE	894	1000	614	858	3366
2	Loadsamoney CG	01KJ	510	765	1000	1000	3275
3	South of Scotland CG	85PS	1000	901	666	365	2932
4	Parallel Lines CG	03BF	462	756	983	642	2844
5	Derbyshire Hills CC	94WC	729	638	479	732	2577
6	Windmill CG	01LD	657	583	701	627	2568
7	Flight Refuelling ARS	80WP	560	484	510	707	2261
8	DeMontfort Univ	92NP	480	514	410	338	1742
9	Crawley & Reigate	01OC	323	365	546	417	1650
10	South Manchester RC	93EH	220	461	281	278	1239
11	Aberdeen VHF Group	86RW	546	368	271	10	1195
12	Reading & Dist ARC	91IH	444	140	155	330	1069
13	Surrey RCC	91XH	340	364	151	197	1052
14	Thornton Clevey's ARS	84VB	386	339	190	0	915
15	Clifton ARS	01DH	207	224	287	188	907
16	Cousin Jacks CG	70PP	605	218	76	4	903
17	Victory CG	90JO	306	593	0	0	899
18	11th Hour CG	91XG	357	132	210	144	843
19	Southdown & Hastings	00DR	214	327	93	122	756
20	Farnborough & D RS	91OF	202	124	225	111	663
21	Torbay ARS	80FP	355	79	61	65	560
22	Guildford & Dist RS	91TF	118	148	32	190	487
23	SEARS	01EN	0	186	203	54	443
24	Welwyn Hatfield ARC	94MJ	66	308	35	0	409
25	Aerial Radio Group	91RU	0	0	0	382	382
26	Guernsey ARS	89QK	0	61	44	56	161
27	Buchan ARG	87XJ	62	59	34	0	155
28	Bredhurst RATS	01HH	0	87	43	0	130
29	Hawick Station Group	85PJ	25	78	11	0	114
30	Dartmoor RC	80AM	0	56	25	0	81

RESTRICTED SECTION

Pos	Group Name	Loc	70MHz	144MHz	432MHz	uWave	Total
1	Martlesham RS	01QX	707	1000	1000	1000	3707
2	Bracknell ARC	80ST	679	341	473	494	1987
3	Scunthorpe VHF CG	94SC	764	369	314	393	1839
4	The Splinters CG	91GI	601	451	333	426	1811
5	Spalding & Dist ARS	03CE	593	463	400	68	1524
6	Telford & Dist	82NN	723	284	283	115	1405
7	Leicester RS	92MO	584	319	215	208	1325
8	Lagan Valley ARS	74AI	1000	122	66	0	1189
9	Aylesbury & Chesham	91PS	503	261	100	185	1049
10	Maidenhead & Dist ARC	91OS	551	201	199	0	952
11	Goole R & ES	93PW	367	170	226	0	763
12	Mid Cheshire ARS	83PF	428	206	115	0	749
13	Weston Super Mare ARS	81MH	396	178	148	0	723
14	Dorking & Dist RS	91UE	406	143	122	37	708
15	Hornsea ARC	93PV	0	212	154	308	674
16	Melton Mobray ARS	92MT	294	148	163	0	605
17	Northern Heights	70PP	380	101	105	0	585
18	Carncktergus ARG	74BU	184	233	95	0	511
19	HARIG	01OW	0	234	187	0	421
20	Aberystwyth & Dist ARC	82CJ	0	246	84	0	329
21	West of Scotland & YAGIS	75TX	196	57	14	15	282
22	Birmingham Univ RS	82JG	0	103	145	14	261
23	Bishops Stortford ARS	01DW	0	93	145	0	238
24	Kent Hoppers	82JD	0	69	62	0	131
25	Lerwick CG	99HX	0	38	11	0	49

LOW POWER SECTION

Pos	Group Name	Loc	70MHz	144MHz	432MHz	uWave	Total
1	Sutton & Cheam RS	93AC	859	1000	1000	964	3823
2	South Birmingham RS	82XJ	638	581	656	1000	2875
3	Westmorland/Eden Valley	84UR	1000	477	532	857	2865
4	Basingstoke ARC	91KG	786	623	488	755	2652
5	RSGB Bristol	81QJ	715	458	416	504	2094
6	Shefford & Dist ARS	92VB	568	541	291	570	1969
7	Lichfield ARS & BBC	82JU	389	973	417	134	1913
8	Nunsfield House ARG	93BA	416	429	249	609	1703
9	Cambridge & Dist ARC	02AD	458	572	260	334	1624
10	Salop ARS	82IP	679	579	257	0	1515
11	Edgeware & Dist RS	91PQ	557	418	213	161	1350
12	North Kent RS	01BH	0	562	441	233	1235
13	Kidderminster & Dist	82SK	434	341	313	24	1112
14	Hucknall Rolls Royce ARC	93GC	462	0	500	0	962
15	Mid Sussex ARS AFS	90WV	0	657	265	0	922
16	Doncaster ARS	93JK	302	186	207	0	695
17	Wythall RC	92BJ	117	245	89	12	463
18	Colin Roberts (Shetland Isles)	90KG	0	97	47	0	144

Disqualified: Warwick School ARS (Not Registered).
Check Logs gratefully received from G4OUT, G0MYE, G0CLP/P, G4FOH, G0ADH and G7LQD/P

BAND BY BAND RESULTS

PHOTOGRAPH: G0HUZ

The ladies from Clifton ARS in action: (l to r) Tracey, G0NTQ; Pat, G0BRV and Suzanne, G0LUZ.

PHOTOGRAPH: G0HUZ

Three hours before the start; all hands to the mast at Clifton's 70cm station, G0NTP/P.

The 2m station (GM4ZUK/P) of the Aberdeen VHF Group who came 11th in the Open Section.

CONTEST NEWS

All rules should be read in conjunction with the General Rules published in *Contest News* January 1992

VHF RULES

144MHZ CW SINGLE OP FIXED/ ALL OTHER

Date: 17 Jan at 1000-1600GMT

General Rules apply, plus rule 14. County & Country Multiplier.

Three sections: F Fixed station single operator: O Open (all others): L Listeners.

Adjudicator: G4DEZ, B Llewellyn, 110 South Avenue, Southend, Essex SS2 4HU.

70MHZ CUMULATIVES

Dates: 24 Jan, 31 Jan: 21 Feb, 28 Feb, 14 Mar

Time: 1000-1200GMT

General Rules apply, plus rules 10 and 24 (1993). Full QTH and Locator.

Please include a single 4422 summary sheet to show scores for each day, and single 427.

Three sections: F Fixed station single operator: O Open (all others): L Listeners

Best three logs of possible five. Please send all logs for checking purposes; normalisation will decide the best three.

Adjudicator: G8HHI, J Pilags, 43 Bartons Drive, Dungells Lane, Yateley, Camberley, Surrey GU17 7DW.

432MHZ FIXED/ AFS/SWL

Date: 7 Feb

Time: 0900-1500GMT

General Rules apply.

The contest is open to individual entrants (who must be RSGB members), or teams made up of a number of operators who must all be members of the same RSGB affiliated society (but do not have to be RSGB members themselves). All members of a team must operate from within 50km of the normal meeting place of the society. No station may represent more than one society. No operator is allowed to use more than one callsign during the contest. In the case of national societies each team must define a separate meeting place and each team member must operate within 50km of that designated meeting place. Multiple teams are encouraged from both national and local societies. The best three scores of each team will be used to form the entry, all team members logs must be included as the 'best' results may be downgraded if logging errors occur! ie the 4th placed member may well have higher points after adjudication, than those notionally above.

Sections: Single operator fixed: Multi operator fixed: Listeners: AFS team scores will be tabulated separately.

Note: *Please include RSGB Zone letter on each entry.*

Each team entry must also include a signed declaration that each operator is a fully paid up member of the entering affiliated society. The address of the meeting place is also required as is a summary of team members, callsigns and respective scores.

Awards: Certificates will be awarded to the following: Leading single operator in each RSGB Zone; Leading multi operator station in each RSGB Zone; Leading AFS in each RSGB Zone; Leading SWL

Adjudicator: G4DHF, D Johnson, 65 West Street, Bourne, Lincs PE10 9PA

THE TYPEFACE in Contest News has been reduced at the request of the HF Contests Committee in order to do justice to the large amount of contest information requiring publication, whilst retaining the same page allocation

VHF National Field Day (continued from p60)

70MHZ OPEN SECTION

Pos	Callsign/P	Loc	Score CW	Score SSB	Score Total	QSOs CW	QSOs SSB	Pwr	Ant	Best DX	km
1	GM3WOJ	85PS	989	1454	2443	67	98	130	14Y	ZB0T	2186
2	GD4UJS	74SE	866	1319	2185	72	107	120	2x8Y	ZB0T	2001
3	G4BVY	94WC	671	1109	1780	63	99	160	2x7Y	ZB0T	2033
4	G3GRS	01LD	578	1026	1604	66	108	120	2x6Y	ZB0T	1738
5	G4ADV	70PP	562	915	1477	45	73	50	2x17Y	GM3GG/P	791
6	G3PFM	80WP	520	847	1367	62	101	160	2x12Y	GM3WOJ/P	571
7	GM0FRT	86RW	243	1092	1335	17	57	70	7Y	GJ3YHU	857
8	G3XBY	01KJ	475	772	1247	55	92	100	15Y	GM0FRT/P	655
9	G3ORY	92NP	447	726	1173	68	100	160	2x3Y	ZB0T	1862
10	G4CWH	03BF	436	692	1128	52	82	160	2x5Y	GJ3YHU	471
11	G0RSR	91IH	378	706	1084	60	92	100	5Y	ZB0T	1713
12	G0GDA	84VB	424	519	943	48	57	25	2x4Y	G4ADV/P	416
13	G3NAT	91XG	347	525	872	49	65	100	2x5Y	ZB2BU	1728
14	G3LHJ	80FP	396	472	868	45	52	15	4Y	GM4FDT	784
15	G4FUU	91XH	372	459	831	58	81	25	2x6Y	GM3WOJ/P	526
16	G6RC	01OC	280	508	788	32	51	10	9Y	ZB0T	1739
17	G0ERS	90JO	127	620	747	24	66	100	12Y	GM0FRT/P	710
18	G8APB	93EH	208	329	537	36	53	15	5Y	G3PJX/P	353
19	G3WQK	00DR	199	324	523	38	36	10	4Y	EI7M/P	657
20	G3GHN	01DH	178	328	506	30	44	120	5Y	GI4TVV/P	
21	G4FRS	91OF	355	139	494	49	25	50	3Y	GM3WOJ/P	521
22	G3PJX	91TF	270	18	288	42	6	70	8Y	GM3WOJ/P	528
23	G3LXP	94MJ	161		161	19		50	5Y	EI2WW/P	368
24	GM7EEY	87XJ	3	149	152	2	8	5	3Y	GJ3YHU	901
25	GM1AQV	85PJ		60	60		8	15	5Y	G4CIZ/P	457

70MHZ RESTRICTED SECTION

Pos	Callsign/P	Loc	Score CW	Score SSB	Score Total	QSOs CW	QSOs SSB	Pwr	Ant	Best DX	km
1	GI4TVV	74AI	598	1098	1696	42	74	100	5Y	G3GRS/P	586
2	G3VIP	94SC	580	715	1295	58	67	150	6Y	ZB0T	2028
3	G3UKV	82NN	646	581	1227	68	91	50	8Y	GM0FRT/P	497
4	G4MRS	01QX	493	706	1199	51	70	150	8Y	GM8ESB/P	966
5	G4BRA	80ST	440	712	1152	52	76	150	6Y	ZB0T	1643
6	G4CIZ	91GI	319	700	1019	51	100	160	10Y	GM0FRT/P	624
7	G4DSP	03CE	463	543	1006	64	67	150	8Y	EI7M/P	476
8	G3HYH	92MO	399	591	990	62	93	110	9Y	GM0FRT/P	492
9	G3TWG	91OS	378	557	935	59	86	50	4Y	GM0FRT/P	586
10	G3MDG	91PS	365	488	853	57	76	40	5Y	GM0FRT/P	587
11	G4XUV	83PF	309	417	726	44	60	50	4Y	G3XBY/P	385
12	G3CZU	91UE	298	391	689	44	53	25	5Y	GM3WOJ/P	534
13	G4WSM	81MH	336	336	672	42	44	60	12Y	GM3WOJ/P	496
14	G3UI	70PP	270	374	644	36	51	50	5Y	G4ADV/P	398
15	G0GLZ	93PW	272	351	623	36	44	8	18Y	G3PFM/P	379
16	G4PZQ	92MT	183	315	498	33	54	25	5Y	GM0FRT/P	469
17	GM0EFH	75TX	60	272	332	6	18	100	10Y	G3GRS/P	642
18	GI1XLK	74BU		312	312		22	25	5Y	G3GRS/P	614

70MHZ LOW-POWER SECTION

Pos	Callsign/P	Loc	Score CW	Score SSB	Score Total	QSOs CW	QSOs SSB	Pwr	Ant	Best DX	km
1	G3FDW	84UR	483	674	1157	51	75	25	8LP	G3FDC/P	534
2	G2XP	93AC	435	559	994	64	88	20	5Y	GM0FRT/P	428
3	G3ZOI	91KG	374	535	909	54	74	25	6Y	GM0FRT/P	636
4	G4GCT	81QJ	416	411	827	49	59	10	5Y	GM3WOJ/P	486
5	GW3YDX	82IP	356	430	786	52	57	15	6Y	GM0FRT/P	479
6	G4OHM	82XJ	403	335	738	65	58	25	6Y	GM3WOJ/P	378
7	G3WRJ	92VB	284	373	657	42	57	25	6Y	GI4TVV/P	460
8	G4IUZ	91PQ	293	352	645	45	58	25	5Q	GM3WOJ/P	472
9	G0JJN	93GC	220	315	535		53	25	4Y	GM0FRT/P	432
10	G2XV	02AD	212	318	530	34	42	15	5Y	GI4TVV/P	467
11	G4SND	82SK	237	265	502	40	45	18	5Y	GM3WOJ/P	372
12	G3EEO	93BA	256	225	481	40	43	10	6Y	EI7M/P	336
13	GW3NKC	82JU	450		450	68		25	8Y	GM0FRT/P	456
14	G1XTN	93JK	130	219	349	26	39	25	4Y	EI2WW/P	329
15	G4WAC	92BJ	0	135	135		25	10	3Y	EI2WW/P	297

Disqualified: GW1LHD/P (Not Registered)

144MHZ OPEN SECTION

Pos	Callsign/P	Loc	Points	QSO	Pwr	Ant	Best DX	km
1	GD4APA	74SE	10340	772	400	4x15Y+4x17Y	F6EKG/P	990
2	GM4CXM	85PS	9321	593	400	4x19Y	DF8VU	965
3	G0RDI	01KJ	7905	618	400	4x9Y+2x17Y	OK1KYY/P	872
4	G4LIP	03BF	7822	585	400	4x17Y+2x17Y	LA5IH	860
5	G4ZAP	94WC	6592	505	400	2x4x17Y+4x9Y	F6EKG/P	818
6	G8LNC	90JO	6132	523	250	4x19Y	DK0UH/P	814
7	G0FBB	01LD	6033	539	400	36el	Y23SB/P	781
8	G3SDC	92NP	5311	505	400	4x17Y	F1HER	1200
9	G4RFR	80WP	5008	426	400	2x19Y	F6HPP/P	851
10	G3FVA	93EH	4764	422	250	2x17Y	DL1WM	866
11	GM4ZUK	86RW	3804	279	400	19Y	G4SSD/P	734
12	G3WSC	01OC	3773	300	400	18Y	Y35O	850
13	G6LX	91XH	3764	401	400	2x19Y	DL3AWW	826
14	G4ATH	84VB	3501	390	250	4x9Y	F6EKG/P	885
15	G1KAR	00DR	3377	350	385	2x13Y	DL0KC	786
16	G3WGC	94MJ	3183	269	400	4x14Y	LA5IH	768
17	G0GQT	01DH	2318	289	350	2x19Y	EI4ERC/P	712
18	G0HXO	70PP	2257	221	80	4x10Y	GM0GDL	676
19	G4RSE	01EN	1921	228	100	19Y	DF6NA	703
20	G5RS	91TF	1528	254	400	2x17Y	EI4GRC/P	675
21	G8FIF	91IH	1447	256	250	2x17Y	DF0OL/P	684
22	G6CTU	91XG	1364	208	380	2x17Y	HB9GQ/P	694
23	G1FRS	91OF	1280	223	200	9Y	DG9BDV	596
24	G0BRC	01HH	903	166	100	12ZL	DF0GVT	545
25	G3NJA	80FP	815	120	25	17Y	DL3EBM	690
26	GM1JKJ	85PJ	804	79	150	20Y	LA1T	687
27	GU8NIS	89QK	627	76	70	6Q	GM4CXM/P	704
28	GM7FYB	87XJ	608	56	160	16Y	G0OGD	701
29	G1RCD	80AM	579	63	25	17Y	GM4CXM/P	589

144MHZ RESTRICTED SECTION

Pos	Callsign/P	Loc	Points	QSO	Pwr	Ant	Best DX	km
1	G4MRS	01QX	7906	571	400	18Y	DG1ROD/P	784
2	G1DSP	03CE	3663	251	400	28Y	Y35O	839
3	G3WOI	91GI	3567	322	400	17Y	F6HPP/P	927
4	G4ERG	94SC	2917	344	350	17Y	LA5IH	784
5	G4BRA	80ST	2698	499	400	17Y	FC1FNY/P	286
6	G8FCQ	92MO	2520	135	230	19Y	F6EKG/P	
7	G3ZME	82NN	2243	343	200	18Y	F6APE	
8	G1MDG	91PS	2060	270	250	13Y	DF0WD/P	635
9	GW0ARA	82CJ	1943	228	80	10Y	DL0WU	765
10	G0RGH	01OW	1848	187	80	17Y	DF0MS	683
11	GI0LIX	74BU	1839	149	25	13Y	G0FBB/P	614
12	G4EKT	93PV	1679	199	175	19Y	DF0OL/P	698
13	G3ZTT	83PF	1625	246	150	17Y	F6APE	670
14	G3WKX	91OS	1592	260	70	16Y	GM0PYC/P	664
15	G8WSM	81MH	1407	200	160	17Y	FC1MXF	
16	G0OLE	93PW	1343	169	100	17Y	EI4GRC/P	568
17	G4FOX	92MT	1171	169	180	19Y	DF0OL/P	675
18	G7DOR	91UE	1131	143	100	13Y	FC1FNY/P	684
19	GI4GTY	74AI	966	88	200	15Y	G0FBB/P	586
20	GW8IUB	82JG	811	164	90	16Y	GM4ZUK/P	521
21	G2SU	70PP	799	129	25	10Y	FC1DES	573
22	G5ZG	01DW	733	94	25	13Y	DF0OL/P	622
23	GW1OGU	82JD	549	75	150	17Y	FC1DES	555
24	GM0MVZ	75TX	450	48	200	8+8Y	G0RDI/P	615
25	GM4CAQ	99HX	301	32	100	15Y	GM1JKJ/P	516

144MHZ LOW-POWER SECTION

Pos	Callsign/P	Loc	Points	QSO	Pwr	Ant	Best DX	km
1	G4FKA	93AC	2033	315	25	17Y	F6EKG/P	791
2	GW3WAS	82JU	1978	300	25	18Y	LX/PE1HUS	705
3	G3ZMS	90WV	1335	192	25	ZL	DL0TS	573
4	G3TCR	91KG	1267	208	25	17Y	DF0GVT	664
5	G1OHM	82XJ	1181	228	15	17Y	DK0IA/P	715
6	GW3NSY	82IP	1177	171	10	18Y	PA0GHB	512
7	G8EVY	02AD	1162	129	25	17Y	DL0PB	601
8	G3WMR	01BH	1142	158	25	16Y	GM4ZUK/P	649
9	G3FJE	92VB	1099	139	25	17Y	DL0TC	598
10	G0ANT	84UR	969	104	25	7LP	LA1T	706
11	G6YB	81QJ	932	140	25	14Y	DL0WU	683
12	G3ZBI	93BA	872	168	10	18Y	F6EKG/P	779
13	G3ASR	91PQ	850	138	25	17Y	DF0OL/P	644
14	G4GXP	82SK	693	112	10	13Y	GM4ZUK/P	500
15	G1WAC	92BJ	498	78	25	9Y	DL0WU	637
16	G0ITW	93JK	378	66	25	13Y	PA0FHG	428
17	GM0AVR	90KG	197	26	10	14Y	G3WGC/P	653

432MHZ OPEN SECTION

Pos	Callsign/P	Loc	Points	QSO	Pwr	Ant	Best DX	km
1	G8KQW	01KJ	3030	286	400	8x19Y+ 80CL+88 Omni	DK0TU	85
2	G4CLA	03BF	2980	241	400	12x21Y	DG7NBE/P	747
3	G4FAM	01LD	2123	196	400	4x21Y	DL0UL/P	687
4	GM4TXX	85PS	2019	136	136	8x21Y	DK0VKG/P	805
5	GD4GCM	74SE	1859	155	350	2x8x21Y	OZ7TOM/P	870
6	G5LK	01OC	1653	149	400	2x2x21Y	DL0UL/P	671
7	G0FRR	80WP	1545	163	400	2x26QLY	DF3BU/P	709
8	G6APZ	94WC	1451	114	400	4x21Y	DG7NBE/P	801
9	G7AYI	92NP	1242	162	350	8x17Y+2x17Y	DK9VD/A	644
10	G0NTP	01DH	871	135	180	2x18Y	GM4TXX/P	533
11	G3UHF	93EH	850	116	200	8x23Y	DK9VD/A	723
12	GM0JKF	86RW	821	47	100	4x21Y	G0FRR/P	700
13	G6FRS	91OF	683	108	120	2x21Y	PA3FBP	593
14	G8MNY	91XG	636	121	400	27QLY	GM0JFK/P	650
15	G6RSE	01EN	616	104	100	2x21Y	DK9VD/A	517
16	G6GMW	84VB	577	77	45	4x19Y	PA3BPC/P	483
17	G0CCC	91IH	469	92	100	2x19Y	DF0DA/P	581
18	G3ZPB	91XH	457	84	150	14Y	GM4TXX/P	526
19	G4RUL	00DR	281	42	50	2x23Y	GD4GCM/P	501
20	G3YJX	70PP	230	24	100	88Y	G6APZ/P	494
21	G8NJA	80FP	185	29	10	17Y	PA3BPC/P	553
22	GU8NIS	89QK	133	24	50	18Y	GD4GCM/P	547
23	G7BRC	01HH	129	50	50	2x17Y	G0CDB/P	311
24	G6YIQ	94MJ	106	16	50	23Y	G4BRA/P	411
25	GM4UFD	87XJ	103	9	30	8+8Y	OY6A	551
26	G6GS	91TF	97	27	100	2x21Y	GW1YFG/P	264
27	G1RCD	80AM	76	11	25	88Y	G4CLA/P	411
28	GM1AQV	85PJ	34	7	25	28Y	GI4GTY/P	238

432MHZ RESTRICTED SECTION

Pos	Callsign/P	Loc	Points	QSO	Pwr	Ant	Best DX	km
1	G4MRS	01QX	2488	198	250	21Y	OK2KKW/P	814
2	G4BRA	80ST	1176	124	400	21Y	DK3FB	706
3	G8ZHP	03CE	994	88	400	40Y	DL0MI	597
4	G4UHF	91GI	828	126	400	88Y	DL0FM/P	707
5	G0JRB	94SC	780	88	400	21Y	LA1T	657
6	G6ZME	82NN	705	114	70	24Y	PA0PLY	537
7	G8HSG	93PW	563	68	70	48Y	ON5DG	566
8	G3LRS	92MO	534	105	100	17Y	GI4TAJ/P	409
9	G1RDX	91OS	495	95	20	27Y	DK9VD/A	603
10	G0RGH	01OW	465	60	15	21Y	GM4TXX/P	497
11	G7FOX	92MT	405	73	100	21Y	DK9VD/A	658
12	G4YTV	93PV	383	57	250	21Y	PA0EZ	438
13	G1KHX	81MH	369	53	100	16Y	GM0JKF/P	625
14	GW3IUB	82JG	361	67	45	21Y	PA3BPC/P	501
15	G0POF	01DW	361	58	25	18Y	DK9VD/A	574
16	G4XYC	91UE	304	56	100	23Y	GM4TXX/P	534
17	G8ZTT	83PF	287	60	50	16Y	GM0JKF/P	413
18	G4XGN	70PP	260	52	35	21Y	PA3BPC/P	450
19	G7JUY	91PS	250	60	10	48Y	GM4TXX/P	463
20	GI4TAJ	74BU	236	20	25	17Y	G3GRS/P	614
21	GW3UYH	82CJ	208	32	1	12Y	G4FAM/P	354
22	GI4GTY	74AI	165	19	45	19Y	G8KQW/P	564
23	GW6RVS	82JD	154	29			G4FAM/P	308
24	GM4AGG	75TX	36	8	105	49Y	G4CLA/P	421
25	GM3ZET	99HX	28	6	1	12Y	GM8SVB/P	267

VHF NFD (from previous page)

432MHZ LOW-POWER SECTION

Pos	Callsign/P	Loc	Points	QSO	Pwr	Ant	Best DX	km
1	G4CQR	93AC	942	140	25	30Y	DK9VD/A	732
2	G8OHM	82XJ	618	104	25	21Y	DK9VD/A	705
3	G3IZD	84UR	501	48	25	21Y	OZ7TOM/P	721
4	G7HRR	93GC	471	90	25	48Y	PA0PLY	446
5	G0JSR	91KG	460	84	25	19Y	GM0JKF/P	
6	G8TNK	01BH	415	76	25	14Y	GM4TXX/P	529
7	GW1YFG	82JU	393	65	25	88Y	PA3BPC/P	495
8	G4WAW	81QJ	392	66	25	21Y	GM4TXX/P	486
9	G0KRC	82SK	295	58	15	24Y	PA3BPC/P	451
10	G3TVG	92VB	274	48	10	19Y	GM4TXX/P	444
11	G1ZMS	90WV	250	44	25	18Y	GM4TXX/P	569
12	G6ASH	02AD	245	43	25	19Y	GM4TXX/P	440
13	GW3SRT	82IP	242	44	24	15Y	GM0JKF/P	479
14	G0NHR	93BA	235	50	10	88Y	PA3BPC/P	421
15	G4RMD	91PQ	201	37	10	21Y	GM4TXX/P	472
16	G8JJR	93JK	195	39	25	21Y	PA0PLY	438
17	G4VPD	92BJ	84	24	25	15Y	G0FRR/P	195
18	GM0AVR	90KG	44	10	5	15Y	GM0IRB/P	302

MICROWAVE OPEN SECTION

Pos	Callsign/P	Loc	Score 1.3	Score 2.3	Score Total	QSO 1.3	QSO 2.3	Pwr 1.3	Pwr 2.3	Ant 1.3	Ant 2.3
1	G4IEV	01KJ	541	186	727	78	24	400	25	1.8m + 3.7m Pillbox	1.8m
2	GD0EMG	74SE	488	136	624	40	8	150	60	8x55Y	1.5m
3	G4NXO	94WC	411	121	532	41	11	150	40	4x55Y	2m
4	G0API	80WP	418	96	514	54	12	200	30	4x50Y	2m
5	G4HWA	03BF	369	98	467	46	12	400	40	16x23Y	2.4m
6	G8XIR	01LD	441	15	456	59	5	200	12	1.4m	1.4m
7	G3GRO	01OC	210	93	303	28	11	100	20	4x15+15Y	45QLY
8	G3YKI	91RU	203	75	278	48	11	400	20	2.4m Square	1.2m
9	GM4IGS	85PS	243	22	265	19	2	180	15	8x23Y	2m
10	G4OOR	92NP	229	17	246	42	17	40	1	2m	1.2m
11	G3ULT	91IH	220	20	240	46	7	25	25	55Y	
12	G8SMR	93EH	185	17	202	33	4	35	5	8x23Y	1.2m
13	G8TB	91XH	126	17	143	42	7	20	5	1.8m	1.8m
14	G4YPC	91TF	138	0	138	32	0	50		4x23Y	
15	G3JKY	01DH	128	9	137	40	5	85	25	4x23Y	1.5m
16	G4WGZ	91XG	105	0	105	45	0	50		64QLY	
17	G0FIO	00DR	89	0	89	21	0	10		2x23Y	
18	G0FRS	91OF	74	7	81	26	3	100	30	2x15+15Y	42QLY
19	G4VUD	80FP	47	0	47	8	0	8		2m	
20	GU8NIS	89QK	36	5	41	6	1	30	1.5	42QLY	32QLY
21	G0LTS	01EN	39	0	39	13	0	10		23Y	
22	GM6MGS	86RW	7	0	7	3	0	1.6		2x55Y	
23	G8XNH	70PP	3	0	3	1	0	12		23Y	

1.3GHZ RESTRICTED SECTION

Pos	Callsign/P	Loc	Points	QSO	Pwr	Ant	Best DX	km
1	G4MRS	01QX	812	80	200	55Y	DL4EAU/P	624
2	G4BRA	80ST	401	49	150	2m	PA0EZ	553
3	G3UAX	91GI	346	62	150	2m	PA0WMX	485
4	G4CCH	94SC	319	37	150	47QLY	G0API/P	401
5	G8EQZ	93PV	250	36	200	48QLY	PE0MAR/P	389
6	G4JDI	92MO	169	35	100	2m	GM4IGS/P	370
7	G4VRS	91PS	150	41	100	48QLY	PE0MAR/P	332
8	G4NKC	82NN	93	23	12	1.6m	G4MRS/P	296
9	G4SIV	03CE	55	9	100	2m	G4BRA/P	320
10	G3KZR	91UE	30	12	10	48QLY		
11	GM0GAS	75TX	12	6	12	55Y	GM4IGS/P	106
12	GW8IUB	82JG	11	3	0.2	23Y	G4WGE/P	187

1.3GHZ LOW-POWER SECTION

Pos	Callsign/P	Loc	Points	QSO	Pwr	Ant	Best DX	km
1	G3OHM	82XJ	335	55	25	55Y	PA3FBP/P	581
2	G4WGE	93AC	323	57	25	55Y	G0FIO/P	306
3	G3JYP	84UR	287	26	25	2m	LA1T	706
4	G8GTZ	91KG	253	51	25	55Y	F1FHI	459
5	G8KGC	93BA	204	45	15	55Y	EI4AEB/P	291
6	G4TXG	92VB	191	39	25	55Y	GD0EMG/P	369
7	G3TAD	81QJ	169	25	25	55Y	G4NXO/P	344
8	G6KWA	02AD	112	29	2	55Y	PE0MAR	279
9	G8BHD	01BH	78	24	10	55Y	G4HWA/P	213
10	G3SJE	91PQ	54	16	10	55Y	G4NXO/P	271
11	GW1YFG	82JU	45	13	15	36QLY	GD0EMG/P	
12	G6KRC	82SK	8	4	1	38QLY	G4WGE/P	81
13	G0ICJ	92BJ	4	2	1	56Y	G8KGC/P	69

VHF RESULTS

MARCH 1992 2M & 70CM CONTEST

A reasonable turnout, with conditions 'interesting', with some DX being worked. It appears that the low power sections were quite well supported. Congratulations to all winners and runners-up. *Fixed station* rules have been changed for *all* contests next year, please read the rules (General Rules, when published) carefully. Adjudication by GI4KIS, text by G4DEZ.

MULTI-OPERATOR PORTABLE 144MHZ.

Pos	Callsign	Pts	QSO's	Loc	Pwr	Ant	Best DX	Kms
1	GW0RDI/P	5065	495	82JS	400	4X9	DF2VJ	789
2	G4DEZ/P	4782	428	01IT	400	2X14	DG8NEL	797
3	G4DSP/P	4465	309	03CE	400	2X16	IC8FAX	1754
4	G6CMS/P	4342	328	02TG	300	2X16	DL0HER	713
5	G4RFR/P	3982	424	80UU	400	2X19	DF2VJ	679
6	GM4ZUK/P	2343	165	86RW	400	19	FF1ORH/P	814
7	GW1VDF/P	2005	278	81KW	300	19	PA3EFC	565
8	G6CTU/P	1521	237	91XG	350	2X17	GM4ZUK/P	650
9	GW4MGR/P	1152	160	83JA	150	13	F6IWV	610
10	G1FYC/P	938	184	81XW	25	17	DK0BN/P	721

MULTI-OPERATOR FIXED 144MHZ

1	G6RAF	1909	222	92QP	400	19	DF0UL	857
2	G3KMI	1230	182	90HW	150	4X17	GM4ZUK/P	673
3	G4SSD	809	99	80FI	190	2X12	GM4ZUK/P	735
4	G8KGC	384	79	92GV	25	10	GM4ZUK/P	455

SINGLE OPERATOR FIXED 144MHZ

1	G4PIQ	5197	419	01MU	300	4X15	HB9AHO	787
2	GW6ZUQ	729	101	81PP	180	9	ON4KF/P	610
3	G8HHI	622	64	91OH	400	2X15	DL0WAE	645
4	G8DWD	504	70	01AM	350	13	GM4ZUK/P	625
5	G8FBG	425	59	91SG	400	16	DF0RW/P	493
6	G8ZQZB	380	61	92JN	100	10	GM4ZUK/P	493
7	G8ZRE	314	56	83NE	100	8XY	ON7EG	515
8	G1NRM	270	57	91VR	80	10XY	PA3FBP	491

SINGLE OPERATOR FIXED 144MHZ QRP

1	G4FCD	835	119	91JW	25	17	DL0WV	586
2	G3FIJ	256	34	01KV	10	9	GM4ZUK/P	602
3	G8APB	246	42	83WD	25	16	F6EAS/P	488
4	GW7JML	215	63	83LB	10	6Q	G4PIQ	307
5	G0PEV	210	43	93MQ	10	10XY	ON7EG	376

SINGLE OPERATOR PORTABLE 144MHZ

1	G0CLP/P	1804	299	93AF	60	8	ON4CP/A	567

SINGLE OPERATOR PORTABLE 144MHZ QRP

1	G4BZP/P	921	111	84KD	10	8	FC1PEJ/P	561

MULTI-OPERATOR PORTABLE 432MHZ

1	G4VIX/P	2806	205	02TG	400	4X21	DK0TU	790
2	G0RFR/P	1577	157	80UU	400	2X24	DK3FB	694
3	G1DSP/P	1154	105	03CE	400	4X21	F6HEO/P	741
4	GW0RDI/P	1121	109	82JJ	400	4X19	F6HEO/P	778
5	G4CRA/P	666	82	01IT	100	4X17	DJ9BV	652
6	G8MNY/P	591	102	91XG	400	27	PA0ANS	475
7	GW1VDF/P	369	61	81HW	100	8B	G1GEY	349
8	GW4MGR/P	367	57	83TA	45	21	PE0MAR/P	—

MULTI OPERATOR FIXED 432MHZ

1	G8VHI	335	40	92QP	100	4X21	LX/PI4DEC	552
2	G7FDC	258	38	80FI	120	2X16	ON7EG	543
3	G8KMI	207	37	90HW	100	2X21	G1GEY	445
4	G8KGC	168	28	92GV	25	48	ON7EG	415

SINGLE OPERATOR FIXED 432MHZ

1	G4PIQ	1041	95	01MU	300	4X17	DG6AS	668
2	G1GEY	647	53	94FW	400	2X21	ON7EG	574
3	G8HHI	276	34	91OH	400	2X21	DJ9DL	552
4	G8FBG	206	30	91SG	400	21	PE0MAR/P	464
5	G8ZBQ	164	27	92JN	40	19	ON7EG	382
6	GW6ZUQ	98	19	81PP	100	19V	G4VIX/P	370
7	G1NRM	59	11	91VR	10	12XY	PE0MAR/P	—
8	G8DWD	6	4	01AM	3	9	G8HHI	62

SINGLE OPERATOR FIXED 432MHZ QRP

1	G4FCD	202	34	91JV	25	21	ON7WR/A	412
2	G0PEV	98	18	93MQ	10	8B	G0FRR/P	335
3	G3FIJ	86	14	01KV	10	—	GW0MGR	—
4	G8APB	56	10	83WD	20	21	G7FDC	325

SINGLE OPERATOR PORTABLE 432MHZ

1	G0CLP/P	259	57	93AF	50	47	G7AZP	274

Normalised Positions

MULTI-OPERATOR PORTABLE

Pos	Call	144	Call	432	Total
1	G6CMS/P	858	G4VIX/P	1000	1858
2	GW0RDI/P	1000	GW6—	400	1400
3	G4RFR/P	786	G0RFR/P	562	1348
4	G4DSP/P	881	G1DSP/P	413	1294
5	G4DEZ/P	944	G4CRA/P	237	1181
6	GW1VDF/P	396	GW1YBB/P	132	528
7	G6CTU/P	300	G8MNY/P	211	511
8	GM4ZUK/P	473	——	—	473
9	GW4MGR/P	228	GW0MGR/P	131	359
10	G1FYC	185	——	—	185

MULTI-OPERATOR FIXED

1	G6RAF	1000	G8VHI	1000	2000
2	G3KMI	644	G8KMI	618	1262
3	G4SSD	424	G7FDC	770	1194
4	G8KGC	201	G8KGC	501	702

SINGLE OPERATOR FIXED

1	G4PIQ	1000	1000	2000
2	G1GEY	—	622	622
3	G8HHI	120	265	385
4	G8FBG	82	198	280
5	GW6ZUQ	140	94	234
6	G8ZOB	73	158	231
7	G1NRM	51	57	108
8	G8DWD	97	6	103
9	G8ZRE	60	0	60

SINGLE OPERATOR FIXED QRP

1	G4FCD	1000	1000	2000
2	G0PEV	251	485	736
3	G3FIJ	307	425	732
4	G8APB	295	277	572
5	GW7JML	257	0	257

SINGLE OPERATOR PORTABLE

1	G0CLP/P	1000	1000	2000

SINGLE OPERATOR PORTABLE QRP

1	G4BZP/P	1000	0	1000

Thanks to those operators who supported the contest by 'giving away a few points' and to those who sent in checklogs. They are greatly appreciated. Those of you who gave away points, why not put in an entry? If you don't know how to go about it, ring a VHFCC member or G4DEZ on 0702 460747.

HF RULES

LF CUMULATIVE CONTESTS 1993

There are five sessions on each band, the best three of which will count. Please note that, as last year, the first 7MHz session is actually in **December 1992**! Each band is regarded as a separate contest. Entrants must operate from the same location for all sessions on a particular band.

1. The General Rules for RSGB Contests, as published in the January edition of *Radio Communication*, will apply.

2. Dates and Times:

1.8MHz - Mon 4 Jan, Tue 12 Jan, Wed 20 Jan, Thu 28 Jan, Fri 5 Feb. All sessions 2000 - 2200GMT.

3.5MHz - Sun 3 Jan, Sat 9 Jan, Sun 24 Jan, Sat 30 Jan, Sun 7 Feb. All sessions 1600 - 1800GMT.

7MHz - Sun 27 Dec, Sat 2 Jan, Sun 17 Jan, Sat 23 Jan, Sun 31 Jan. All sessions 1000 - 1200GMT.

3. Frequencies and Mode: 1835-1865, 3520-3550 and 7015-7040kHz, CW only.

5. Contest Exchange: RST + Serial Number, commencing with 001 *for each session*. Any station may be worked *once* in *each session* for points.

6. Scoring: 3 points per QSO. The final score for each contest is the sum of the best three sessions on that band.

7. Logs: Only one cover sheet is required for each band. Entrants should submit logs for every session that they are active. Address for entries as in General Rules.

8. Closing Date for Logs: 23 February 1993.

9. Awards: *Remember that each band is a separate contest!*

Certificate of Merit to the leading station in each contest.

Certificate of Merit to the entrant with the highest aggregate score from all three contests combined.

HF CONTESTS CALENDAR

5/6 Dec	*ARRL 160m (Dec 92, p15)*
12/13 Dec	*ARRL 10m*
27 Dec	LF Cums 7MHz (Dec 92)
2 Jan	LF Cums 7MHz
3 Jan	LF Cums 3.5MHz (Dec 92)
4 Jan	LF Cums 1.8MHz (Dec 92)
9 Jan	LF Cums 3.5MHz
10 Jan	AFS (CW) (Nov 92)
12 Jan	LF Cums 1.8MHz
16 Jan	LF Cums 7MHz
16 Jan	AFS (SSB) (Nov 92)
16/17 Jan	*HA DX CW*
16/17 Jan	*AGCW-DL QRP*
17 Jan	LF Cums 3.5MHz
20 Jan	LF Cums 1.8MHz
23 Jan	LF Cums 3.5Mz
24 Jan	LF Cums 7MHz
28 Jan	LF Cums 1.8MHz
30 Jan	LF Cums 7MHz
30/31 Jan	*CQ WW 160m (CW)*
30/31 Jan	*UBA SSB*
30/31 Jan	*REF CW*
31 Jan	LF Cums 3.5MHz
5 Feb	LF Cums 1.8MHz
7 Feb	LF Cums 7MHz
13/14 Feb	1st 1.8MHz CW
13/14 Feb	*PACC*
20/21 Feb	*ARRL CW*
26/28 Feb	*CQ WW 160m (SSB)*
27/28 Feb	7MHz DX
27/28 Feb	*REF SSB*
27/28 Feb	*UBA CW*

VHF CONTESTS CALENDAR

13/30 Nov	432MHz Cumulative (Jun 92)
6 Dec	144MHz AFS/Fixed/SWL (Jul 92)
7 Dec	1.3&2.3GHz Cumulative (Jun 92)
26-29 Dec	70, 144 and 432MHz Fixed Station (Jul 92)
17 Jan	144MHz CW Single Op/Fixed/All Other (Dec 92)
24 Jan	70MHz Cumulative (Dec 92)
31 Jan	70MHz Cumulative
7 Feb	432MHz Fixed/AFS/SWL (Dec 92)
21 Feb	70MHz Cumulative
28 Feb	70MHz Cumulative
14 Mar	70MHz Cumulative

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ALINCO DR112E 40 WATT FM
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REALISTIC DX200 HF RX
YUPITERU MVT 7000
CODAR AT5 160/90 AM TX
REALISTIC PRO 2004 SCANNER
50MHZ FREQUENCY COUNTER
DATONG FL3 AUDIO FILTER
SEM QRM ELIMINATOR
YAESU/SOMMERKAMP FC902 ATU
ICOM2 SET 2M FM HANDIE
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HF LINEAR AMP (SOLID STATE) TO 30MHZ
LOWE HF225 HF DIGITAL RX
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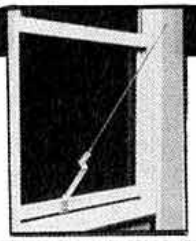

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FT902DM tcvr: £475. FV901DM ext VFO, scanning type: £200. FC902 ATU: £175. SP961 spkr: £30. Desk mic: £15 with manuals, original wrapping and boxes. Trio 230 ATU, unused, bxd, manual, receipt. All above mint condition. HRO rx, some coils PSU, spkr, needs work but going OK: £25. Various alloy poles, couplers etc. Prefer buyer inspects, collect. (Nr Cardiff) 0446 747223.

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ICOM 551 6M m/mode tx/rx, VGC, bxd, mic: £350 inc P&P or swap 70cm m/mode simlar type. Andrwe GD7JQI. (Douglas, IOM) 0624 626080.

ICOM 575H 10M and 6M all modes, DDS and 2 VFO and 99 memories, internal select 50 or 100 watts. Capable Duplex includes antenna change over relay, h/book and bxd, as new. Phone after 1800. Price: £700. (E Sussex) 0825 740310.

KENWOOD TS450S with ATU voice, as new: £1050. Kenwood/Trio TS830S, gwc: £600. 1kw amp 2x3-5002: £500. Philips procolour monitor 9CM073: £170. Mosley TA-33J with hi-power traps: £125. KR400RC with control: £125. Yamaha DSP-A1— surround sound amp: £550. Yamaha PSR-300 keyboard: £200. Two Bird 43s wattmeters without insures: £20 each. Heathkit transistor tester: £20. Most of above are as new. G4XTD. (Norwich) 0603 624573.

KENWOOD TS770E dual band 2M/70cm m/mode tcvr, CW filter: £425. FTV901 transverter with 6/2/70: £325. FV101DM digital keypad external VFO: £150. FC901 ATU: £235. All VGC, possible p/ex FT290, Offers?. G4UGV not QTHR. (Meopham) 0732 823662.

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KENWOOD TS850 sat, absolutely mint condition, purchased new from Lowes (1991), bxd with all accessories, instructions as supplied, used only as stand by base station tcvr: £1275 (list £1625. Kenwood power supply available if required, no offers please. G2FZU QTHR. (Southwell) 0636 813847.

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MAGAZINES: Over 1500 from 1921-1983. Wireless World, Practical Electronics, Practical Wireless, Elektor, ETI, Short Wave, RSGB Bulletin, RadCom etc. Some foreign books - over 300, some 1890; Electrical, Electronic, Ham Radio etc. Old service sheets, manuals, old TV's, Radios, laboratory equipment, valves, many 1000s, test equipment, 19" cabinet, 4Cx250BM's, from 10p. Everything must go due to moving. Sorry no lists, call to view. (Birmingham) 021 472 3688.

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YAESU FT-726R 2M/70cm/Sat: £590/ Altron 30ft crank-up tower: £250. Kenpro KR-400RC rotator: £75. Tonna beams 9-el 2m: £25. 2x21-el 70cm: £30 each. Tono MR-150W 2m linear: £85. Microwave modules 2m/10m transverter: £75. 10m valve linear 100W: £75. Adonis AM-503 desk/mic: £35. welz CH20N 2-way N-type antenna switch: £35. All ono. G4WVX not QTHR. (Maidenhead) 0628 664415.

YAESU FT102, AM FM boards fitted, spare matched PA, new, excellent performer, prefer buyer test and collects: £550. G0FBW QTHR. (Peterlee) 091 586 4500.

YAESU FT102, FC102 CW/filters/FM: £700. SC1: £30. MM432/100: £150. FT480 and/mobile bracket: £250. Rig synth/wx rcvr, SHF/input: £150. Apple 2E printer/VDU: £200. Portable typewriter/terminal Brother EP44: £50. (Instow) 0271 860530.

YAESU FT203R 2M txrx with battery, case, headset, mint condition: £120. Burndept BE470 70cm RB0 SU8 batteries, chrgr: £65. 10M 20W amp: £10. KW 201 HF rcvr, gd cond: £80. All ono, carriage extra, part exchange or WHY? considered. (Chester-Le-Street) 091 4100330.

YAESU FT726 inc 6M, 2M and 70cm units satellite and 1 tone sq boards - YM-48 DTMF mic - immaculate, never used on tx inc wk shop manual: £750ono. Yaesu FT207R hand held tone sqelch fitted, inc hand mic, base charger and mobile PSU & op manual: £80 ono. G3VGH. (York) 0904 769245.

YAESU FT790 Mk1 + FL7010 70cm allmode tcvr, nicads + chrgr, vinyl case, bxd, VGC: £275. Will not split. Commodore C128D computer, lots of software with manuals incl GEOS: £175. Peter G0KUX QTHR. (London) 081 882 2351.

YAESU FT902DM 160-10M (inc WARC) 100W HF tcvr plus Yaesu FTV901R transverter (2M fitted). Will deliver 60 miles but prefer buyer collects and sees in action: £475 the pair. Please call after 7.30pm on wk days. (Huntingdon) 0480 68693.

YAESU FTone fitted all options, Shure mic, DC lead, one owner, manuals: £850. FC102 ATU: £175. SP102 speaker: £45. Standard 430MHz tcvr: £135. Morse tutor Datong: £40. Morse tutor MMS1: £115. Shure mic: £40. Adonis mic AM502: £15. Micro pro daisy wheel printer: £60. Hi Mound squeeze key: £25. G4OWM QTHR. (Carshalton) 081 395 6890.

22 SET with 240V PSU: £40. Buyer Collects. GM0PXR. (Nr Paisley) 0505 862581.

2M ICOM micro 2E, bxd, manual, chgr case: £130. Icom 27H 40W 2M mobile, GWO, manual: £155. (Whitstable) 0227 274947.

2W - QRP tcvr by Mizuho (Jim) handheld size, CW AN14 loaded whip and AA nicads, VGC. G4FAS QTHR. (Manchester) 061 437 7784.

386 Motherboard 25MHz 1Mb RAM unused: £100. Kenwood TR751, hardly used: £450 or swap good HF linear amplifier. After 7pm. (Slough) 0753 883934.

486 motherboard 33MHz, 4Mb RAM unused: £375. Trio TR751, perfect condition: £450 or exchange GPS Trimble Garmain, WHY? After 7pm. (Slough) 0753 883934.

4Cx250BC Eimac, new bxd: £35. VHF bases with ceramic chimney: £10. Silver plated anode liners for 2x4CX250: £10, 4CX250 filament transformer: £10. QY4-400, used: £15. bases: £5. Pye Cambridge AM25B: £5. G4DZS QTHR. (Chandlers Ford) 0703 261638.

50MHz 700W amplifier/transverter: £299. 144MHz SOTA 70W amplifier: £60. FT707, FP707 9 band HF tcvr: £389. (Denbigh) 0745 812550.

50MHz oscilloscope hameg 512 twin trace. Working condition with manual, Some minor faults, hence: £75. (Sevenoaks) 0732 461658.

AOR2000 scanning rcvr, 1000 memories, 100khz to 1300MHz, bxd as new: £210. Microwave Modules 23cm to 2M transverter leads, instructions: £185. FO20 G3RUH modem, built working: £25. AO13 G3RUH modem, built working: £25. Rudac modem by Amsat-DL with most parts: £12. Cirkit 4 band VHF converter fitted 2 bands: £35. Windrush microprocessor development system for 6809, full software, working Eprom programmer: £350. (Guildford) 0483 34954.

ARCHIMEDES 310 20Mb hard disk, 3.5" and 5.25" drives, 14" HD Luxor colour monitor, software, satellites, technical accounts, 1x word +: £595. G2HCG QTHR. (New Milton) 0425 617090.

ASTATIC D104 mic: £30. FL2 filter: £50. FR50B rx: £45. BBC computer: £50. Hi-Mound iambic key: £10. SMC monitor scope (KW): £55. G3MBM QTHR. (Cambridge) 0223 860178.

ATARI ST E Morse tcvr up to 20wpm auto speed finding, noise filter, RTTY transceive up to 50 bands, auto speed finding. Both have split screen type head buffers and are written in STO5 V2.6 basic uncompiled when compiled will work up to 10 X, faster if required: £5 each + p&p £1.50. Mr V McClure, 43 Roman Way, Seaton, Devon EX12 2NT.

BARGAINS. Kenwood TH78E dual band as new: £325. Kamtronics KAM TNC 5.02 software etc: £225. 50M LDF450 and connectors new: £30. (London) 0831 800 846.

BBC B computer, solidisk DFS, twin floppies, 14" colour monitor, sideways ROM.RAM expansion board, discs, books etc, GWO: £190. Steve. (Wotton-Under-Edge) 0454 261478.

BBC B series 7 computer, ROM/RAM, twin 40/80T disk software inc Rx4, VGC: £90. Sweep osc, s/state Dinosaur Electronics: £30. (Wokingham) 0734 791488.

BUTTERNUT HF6VX vertical antenna, 80-10M: £95. G3XZO QTHR. (Stratford-on-Avon) 0789 740073.

CLARK 40 pneumatic brkts thrust bearing, completely refurbished: £200. AMT3, unused. Yaesu G600 RC Corsair II, filters, PSU Fritzell 3el. 3 bnd, HF beam. All mint, offers! Marconi voltmeter, TF1041B: £75. BC221AK PSU and phones: £50. 50M RG213, new: £40. Collins KWM2 PSU VFO, excellent condition: £400. G0GGI. (Kirkby in Furness) 0229 89635.

CLEARANCE. Bargains, Toshiba T1600 40meg hard drive Dos 4.01: £400. Bird thruline 5/50W element, as new: £100. Tatty AOR2002 scanner: £120 load UR67. (London) 0831 800 346.

COLLECTORS ITEMS. Transceiver WS C12. Wireless set, ZC1 Mk1. Rcvr C52 manpacks A41, A43, WS38. Hand helds Pf80, PF9. Starphone US PRC6 Codar tx & PSU. A13 manpack. Telereader CWR 680, RTTY to TV conv. MM2000 SSTV tx MM-MTV435 NC1 chrgr for FT202. (New Malden) 081 949 2317.

COLLINS 390A, VGC, excellent performance, full manual: £375. Sony CRF330K, first class condition: £450. CRF320: £350. (Middx) 081 813 9193.

COLOUR video camera with electronic viewfinder and Sony HVS 2000P video selector: £95. Solid state 20W 23cm linear in brass fan cooled enclosure, very robust: £95. 23cm JVL 48el quadloop: £38. 'MM' 70cm TV downconverter: £19. G4JMO. (Blackburn) 0254 661369.

COMPLETE station TS520 MC50 mike keys, Drake T2B, KDKFM2033, AC38 ATU, CR bridge, oscilloscope, cartons of bits and pieces, cable etc: £500 for the lot or will separate. GM4UND. (Lothian) 031 665 9626.

COMPLETE working station and shack for sale. Heathkit HW101 tcvr, SB600 spkr, HP23B PSU, phone/CW xtal filters, SB620 spectrum analyser, KW107 supermatch, fans, cables, all in matching console. All valves spared. More valves. D300 oscilloscope, CT160 valve tester, TE20D RF sig gen, multimeters, tape deck, CTV, PSUs, modem, amplifiers, all manuals, lots of gear, wire, RCL and digital components: £500. Complete G4EAQ QTHR. (Warrington) 0925 265813.

COMPUTERS, Amstrad PPC1512 laptop, new screen, fitted and never used, inc mono 12" monitor, PSU, manual and case: £175ono. BBC model B with choice of drives 40 80 or dual, CW, manual and various ham and games software. Also TiF 1 interface: £130ono. Dave. (Northampton) 0604 37769 day, 0327 842141 eves w/ends.

DRAKE R4C, late model (serial 27484). All filters, AM, SSB, 1500Hz, 500Hz, 250Hz, 4NB, T4XC, AC4, DX Engineering speech proc. Interface mod. Permits Amtor with AMT3, PK232 etc. Set of spare valves for both units original interconn leads: £500. G3RFI. (Potton) 0767 260800.

DRAKE R4C, T4XC MS4/AC4 cables, manuals, S/R2392B 500Hz 250Hz filters, 160-10M: £475. R4B 160-10M, manual: £180. All G C. Vibroplex standard Iambic squeeze key, vgc, boxed, as new: £55. All plus carr. Bill. (Hemyock) 0823 680778.

DRAKE R7 updated R7A, 5 filters N/B PBT filters - 05.1-9 2-2 4000 6000 AM, mint cond, first class rx: £700. (Southall) 081 813 9193.

EDDYSTONE 730/1 rcvr 480KH-30MHz AM/SSB 4 pole selectivity crystal cal: £95. Can deliver also Sky videocrypt decoder, 9 month guarantee: £60. (Huddersfield) 652553.

EDDYSTONE 7301/1 communications rcvr 45 switched selectivity BFO XTAL filter, CW filter, S Meter xtal calibrator with manual in very good order: £100. (Huddersfield) 0484 652553.

EDDYSTONE AM/FM receiver, model EB35, immac: £100. GW0NZD. (Montgomery) 0588 620548.

FR-50-B rcvr, 80-10M, calibrator, unmodified, ex cond, speaker, spare set valves: £80. Carriage extra, prefer buyer collects. G4COY. (Liverpool) 051 546 3235.

FREE standing lattice tower, 33' laying in garden: £1 per foot. Buyer collects, for details phone GW8YJN. (Haverfordwest) 0437 781265.

FT-ONE solid state, general coverage, all mode tcvr. AM/FM, all 6 filters, memory board, MH-1 scanning mic, operating manual, technical manual, original packing, new condition: £765. Alinco 2M handy with extras, VGC: £125. DJ100E. IC202S with mutek, VGC: £150. G4JXK. (Fareham) 0329 230737.

FT101 ZD, FM, FV101Z, mic, spare PA valves: £495ono. (Bath) 0225 743352.

FT101E, good working order, mic, manual: £300. Phone evenings after 8pm. G0AVX QTHR. (Potton) 0767 260245.

FT101Z WARC, SP901, VGC: £385 or ex VHF m/mode. Daiwa CN101 pwr/swr: £49. Europa B 2M tsvtr: £35. MM 35cm tsvtr (2M IF): £75. TR7500 2M FM tcvr: £85. All ovno. G0JJG QTHR. (Stowmarket) 0449 781827.

FT221 multimode 2M tcvr base station, 12 xtal channels digital display: £295. Trio K599 rcvr, amateur HF bands plus 2M converter: £120. 10/100W 2M linear with pre amp, RZ1 scanner: £200, FT690 6M m/mode tcvr with linear: £325. (Herts) 0582 715549 or (Cheshire) 0625 525 824.

FT23R 2M handheld FNB-10 battery pack, case, power supply, as new, bxd: £110. G3UXQ QTHR. (Stourbridge) 0384 442314.

FT2700RH 2M/70cm dual band tcvr: £275. FT203R 2M handy, nicads: 390. Sony AV3620-CE monochrome VTR and tapes: £40. Sony ST636 hi-spec synthesized hi-fi tuner, fault on AM, FM OK: £25. All ono. Phone after 7pm. (Macclesfield) 0625 431880.

FT290R Mk 1, mutek, 2 sets nicads, spkr mic, bxd: £225. 2M 14ele MET yagi, gd cond, instructions: £25. G4TVR QTHR. (Solihull) 021 745 8222.

FT290R Mutek nicad, 30W linear, SWR meter, colinear: £270. SEM Transmatch ATU ezitune: £55. BBC B 32K recorder, as new: £50. DX302 rcvr, digital 0-30MHz: £75. (London) 081 989 3471.

FT415, bxd, perfect, GW, nicads charger, manual, still under guarantee: £195ono. John G1GSM. (Stockport) 061 449 9176.

FT707 tcvr, new bands: £350, matching PSU FP707: £95. ATU FC707: £80. VFO FV700DM: £95. Complete station: £595. Morse sender keyboard ASC11 with MM1000KB converter: £75. AR900 h/held scanner: £110. BK100 bug key: £30. ETM8C memory keyer: £70. EK150 Iambic keyer: £55. Kenwood mic, MC60A: £65. 10M FM rig: £15. Will part exchange for JRC equipment, see wanted ads. G0MHQ QTHR. (Peterborough) 0733 230088.

GAP Challenger DX VI six band vertical, erected 1992 so very good condition: £130. G4OBK not QTHR. (Stoke on Trent) 0782 201001 or 0257 272561.

HEATHKIT electronic education course, 4 large manuals, DC electronics, AC electronics, semiconductors deuces, electronic circuits. Includes electronic laboratory PSUs/signal generator, breadboard, boxes of components and complete set of 8 lecture cassettes and 18 LP records - rare value at: £100. G4EAQ QTHR. (Warrington) 0925 265813.

HEATHKIT DX100U AM TX, working, VGC: £75ono. KW AM mobile pair, 160M to 10M, Valiant TX, KW76 RX: £45ono. Crystal filters; 1.4MHz, all bandwidths; 10.7MHz, 21.4MHz, 35.4MHz, 45MHz, 68.3MHz. Low prices, SAE for details. G3UUR QTHR. (Bath) 0373 830439.

HEATHKIT IM-16 FET volt/ohm meter. AC/DC volts !! megohms per/volt. Resistant ranges to 500 megohms, battery or mains, h/book: £15. HW-7 QRP tcvr 40/20/15 metres, unmodified, h/book: £45. GR-9900 b&w TV, 4 chan push button, h/book: £15. G4EDP QTHR. (Cheltenham) 0242 529758.

HEATHKIT linear amp SB200, good cond: £350 plus carr. Marconi RC626 20M FM xtalls for 70.450 70.425 70.475 25W output, VGC: £35 plus carr. Prefered buyer inspects and collects. Keith G0DAY QTHR> (Burntwood) 0543 685810.

HF5 vertical, covers 10 to 80 metres with ground plane: £55. G4INX. (Chester) 678679.

HYGAIN 3 ele beam 14/21/28MHz: £150. Versatower 30ft tilt over mast with mounting post, rotator and controller: £250. Both items together: £375. Cornot major universal wood working lathe 48ins bed, turning-centers 33ins diameter 24ins, 1kw motor: £350. (Christchurch) 0202 479132.

IBM compatible XT dual floppies 5 1/4" one external 40MB hard drive, many progs inc AMTOR RTTY FAX etc. Peter G3JXR. (Bletchley) 0908 642398.

IC701 HF rig, CW IC701 PSU, ICRM3 remote, ICSM2 desk mic, bxd, immac: £325. Luxor stereo rcvr: £325. Wanted CW & FM filters for FT902DM, SP901P ohone patch. G4JBH QTHR. (Yeovil) 0935 23873.

ICOM 471H, 70cms multimode, mint cond, little use, orig box, book etc, bargain: £425ono. (Bedlington) 0670 824788.

ICOM 720 HF general coverage, recent service Icom UK, VGC: £425. G0RWC. (Falmouth) 0326 374726.

ICOM 725 all band tcvr, CW filter fitted AM FM Board fitted, as new condition: £550 ono, bxd with manual. Buyer collects. (Broadstairs) 0843 867208.

ICOM 735 plus power supply, PS-55 plus Icom factory manual, h/book, narrow CW filter fitted, HM 12 hand mic, original packing: £700. (Cheltenham) 0242 584823.

ICOM 745, all bands HF tcvr, with general coverage rx. Includes optional internal PSU, mic and all leads. Hardly used, absolutely mint and still in original packing. Owner emigrated. Bargain: £650. G4EDJ QTHR. (Bedford) 023 02 2232.

ICOM IC02E VHF hand held, chrgr, manual, battery, battery adaptor, plus nicads pack plus high capacity batteries. All serviceable and in VGC: £180. Buyer collects or postage extra. G0NUO QTHR. (Tavistock) 0822 614682.

ICOM IC2025 144MHz SSB portable tcvr, built-in chrgr, nicads, h/book, orig box, crystalled for 144-148MHz: £110. G0EVZ QTHR. (Stevenage) 0438 369460.

ICOM IC251E with Mutek fitted, perfect: £400ono. Meet half way delivery. G0IMK QTHR. (Clowstop) 0299 832279.

ICOM IGR100HF 0.5-2000MHz, 8 months old, A1 cond: £900ono. Yaesu FT707, FP707 20amp ISU-FC902 ATU: £500ono. Call Steve G0SGR 5pm-8pm. (Bridlington) 0262 670540.

ICOM R1 scanning rx, gd cond, box, books, extra bettery case (empty): £250.ono. PK232 software only for Commodore C64 computer, includes cartidges, books and interface cable: £25ono. G0EZJ QTHR after 6pm please. (Bridport) 0308 25223.

KATSUMI EK150 keyer: £45. Star masterkey memory keyer: £45. Shinwa SR001 base scanner 25-1000MHz: £155. Phone John G4ZTR 6-9pm. (Colchester) 0206 860238.

KDK 2030 25/5W mobile 2M FM tcvr: £100 or swap for similar 70cm rig or handheld. FT707 with narrow filter: £325. Memory keyer ARRL design: £30. Sinclair spectrum with high speed MS keying interface and programme: £40. Audiofilter: £15. 14" VHF/UHF television: £15. HF amplifier 2xQB3-300's with spare tubes. Iambic keyer: £10. Prefer buyer collect certain items. Phone after 5pm please. (Rotherham) 0709 818128.

KENWOOD 4000A 2/70cm, 25W mobile mic, voice synth, gd cond: £310. Dave G0PYS QTHR. (Kimbolton) 0480 860915.

KENWOOD 751E 2M multimode with all accessories, little used, bxd and in VGC, Jim G0NHQ. (Altringham) 061 941 6443.

KENWOOD R-5000 receiver, VGC: £650. PK232 software and leads: £185. G7MCP, both bxd. (Northwich) 0606 77146.

KENWOOD TH215E 2M h/held, BC-7 rapid charger, Revco magnetic mount, all absolutely mint/bxd with instructions as supplied, base use only, purchased new from Lowes: £175. No offers please. Mosley Elan 3el beam, excellent condition, purchased new: £75. Daiwa 620A cross needle SWR meter 1.8-150MHz mint/bxd with instructions 20W/200W/1KW: £45. G2FZJ QTHR. (Southwell) 0636 813847.

KENWOOD TS140S HF all band tcvr, bxd and in absolutely mint condition, little used, one careful owner: £630. G0KSL. (Middx) 081 868 6815.

KENWOOD TS140S, excellent condition, bxd with manual, DC lead, MC425 hand mic: £600. Zetagi MB+5 base mic: £30. G3MIN QTHR. (Stamford) 0780 62675.

KENWOOD TS440S CW filter mic, as new, bxd. (Slindon) 0243 65312.

KENWOOD TS790E 2M/70cm all mode triband tcvr: £1050. Icom IC271E: £465. Icom IC229H mobile: £250. Offers! Malcolm G0HOG. (Ruislip) 0895 676919.

KENWOOD TS790E all mode 144MHV 432MHz base station with PS31 PSU and SP31 speaker: £1350. Phone 6-9pm. G6DBX QTHR. (W Sussex) 0444 248767.

KENWOOD TS790E m/mode 2/70/23cm tcvr, including 23cm module, h/book, mint: £1500ovno. Trio TS130S (+WARC bands) 100W HF tcvr, mic, h/book, mint: £380ono. Microwave modules 6M tvtr MMT50/144, h/book: £185. PK232 with fax, h/book, leads, mint: £185ovno. Standard C528 dual band handie, extended receive, remote, mic, mobile bracket, spare bttry case, as new: £310ovno. G3ZTZ QTHR. (Camberley) 0276 25430.

KENWOOD TS830S CW filters mic, vgc: £600ono. Yaesu FT7075 10W HF rig mic, vgc: £395ono. 5x200N scanner: £75ono. (Cardiff) 0222 392020.

KENWOOD TS940S incl 940 Lowe modification voice synth plus crystal filter, YK88C1 and YG455C1 fitted, excellent cond, boxed: £1200ono. Kenwood auto antenna tuner AT250: £220. Kenwood SP230 speaker: £35. G0FQG QTHR. (Northwich) 74776.

KENWOOD TS950SD, speaker SP950, mic MC60A, Butternut HF6V morse key: £1900. Buyer collects please write to me - don't telephone. Bill Legge GM0OSJ, Bogside Farm, Buckie, Banffshire, AB56 2AX.

KW1000 linear amplifier, gd cond with manual: £325. No offers. Butternut HF6V-X with instructions: £100. G3KIW QTHR. (Reading) 0734 713644.

KW107 antenna tuning system, 300W DL: £140ono. LF30A Kenwood low pass filter: £20. Drae VHF wavemeter: £10. Daiwa CS-201 coaxial switch 2x1 1KW: £15. HD coaxial switch 3x1: £5. 2KW. ONO, all bxd. (Peterborough) 0733 840268.

KW2000B, AC PSU, gd cond: £110. Sommerkamp TS280FM 2M mobile, mic, mobile bracket, bxd: £90. G4EKZ QTHR, (Lancaster) 0524 62775.

LINEARS. Dentron HF 2KW, recent recon: £850. Microset 2M 100W, near new: £85. M/M 100W 2M: £75. Tono 2M 100W, needs a tune up!: £45. Also Belcom LS102L 10M multimode: £95. (Teignmouth) 0626 773301.

MAGNETIC loop 40 thru 160 complete, standard cap plus vac cap, and remote controller for sale or p/ex for computer/laptop or IBM compatible, WHY? Land line and have a natter. FT757 GX11 full line up. FV101 DM digital memory Ex VFO, compliments the FT 101 ZD. Heathkit monitor scope SB610 with manual. (Lancs) 0704 880345.

MAST for sale, 50ft electronic controlled, telescopic, hydraulic, oil new, fully remote control, see it working: £150 ono. GM0MDB QTHR. (Helensburgh) 0436 76486.

MML 144/30LS L1 near amp, 1/3 watts in 30 watts out: £60. CTE 1600 2M FM H/held (same as IC2E) 4W out high power nicad pack, complete with chrgr & HM46 spkr mic: £115. BP4 battery pack 700MA nicads fitted: £10. BP5 nicad pack: £20. Weller PS2D temp controlled soldering station (current model): £25. Terry G4OXD after 6pm. (Hitchin) 0462 435248.

NRD 515 compl with NDH 515 memory unit, all filters, manuals, bxd, super rx, sad to sell: £450 as pair. (Watford) 081 428 7019.

OLD screwcutting bench lathe, motorised, accessories: £150ono. Eddystone EA12 receiver, gd condition: £125ono. G3XEG QTHR. (Hatfield) 0707 267352.

PAC-COMM TNC-220: 390. Tuning indicator for TNC-220: £12. BBC-B computer with 2 disk drives, packet and RTTY software, internal screening for use in radio station: £180. Creed 444 teleprinter: £25. Trio TR2400 2M h/held with base chrgr ST1: £105. All plus carriage. (Ashbourne) 0335 60755.

PACCOMM PC320 plug in HF/VHF TNC for any IBM PC, as new, bxd: £115. Peter Crosland, after 7pm. (Taunton) 0458 250970.

PANASONIC RF8000 World Radio, costing £1999 in mint condition: £450ono. Wanted: Zenith or Sony WHY? (Hitchin) 0462 441867.

PK232 with Aug 91 ROM, Packratt 2, mint condition. TAPR mod if required, demo pleasure: £260ono. Paul. (Abergele) 0745 833847.

PK232MBX: £200. Strumech 30ft tiltover tower with rotator cradle/winch and base plate, buyer to collect: £250. (Huntingdon) 0480 811549.

PORTABLE computer PCC640DD 640K twin 3.5 drives, LCD display, onboard modem, 12V lead including mono monitor, VGC: £210. (Canvey Island) 0268 697978.

PSION organiser II comms link printer formatter, various datapaks, mike, Shaws Guide, all manuals: £400 ono. Geoff G4XET. (Penrith) 07683 61745.

PSU 0-50VDC 40amps, laboratory supply: £50. Cambridge dynometer 0-500VAC 0-25amp: £20. Atari computer 600XL leads, PSU/books: £12. (Saffron Walden) 30763.

RACAL RA17L 0-30MHz rcvr, receives very well, untouchable at this price: £150, no offers. (Derby) 0332 372696.

RADCOMS. 1987-1991: £10. 6 radio books including CQ and ARRL antenna h/books: £4. 40 valves, some new: £6. (Farnborough) 0252 511086.

ROBOT 400 scan converter, manual, modulator, 625 CCTV camera, immac, gantry with lights and dimmers: £495. Reluctant Sale, moving. (Cerne Abbas) 0300 341451.

SHACK clearance: Trio 9RS90: £30. R1155: £30. Howes 2M to 6M transverter: £110. Liner 2: £30. 10M to 70cm transverter: £40. Codar CR-70A rcvr and PR40 preselector: £50. 7DB attenuator RF switched: £5. 2x9 element Tonnas for 2M with phasing link: £40. HMV vintage rcvr: £40. Peto Scott rcvr: £10. BC221: £5. Valve oscillocope: £10. 6M 3ele Yagi: £10. Heliax 25M: £50. Solidstate 100W audio amp: £30. Valve 100W audio amp: £25. Moseley TA33JR: £65. 30ft lattice mast: £35. G0MLE. (Stratford upon Avon) 0789 740108.

SILENT Key Sale - G1VJL. Kenwood TS680S with PSU: £600. Trio TH41E 70cm: £110. Icom IC02AT H T: £110. MFJ 949C tuner: £100. Azden PCS5000 2M FM: £130. Capco Loop antenna & controller: £120. Eddystone GDO: £20. Kenpro rotator: £25. 300PF wide-spaced capicitor: £15. 2M base colinear: £20. (Stroud) 0453 828011.

SILENT KEY sale - G3GRJ. FT1 + mic: £750. 20MHz oscilloscope, V222: £75. Robot: £80. SPC super transmitter ATU: £100. Homemade 40W linear amp: £150. TTV 901R: £100. Solarscope CD 1014 2: £150. 16mm TV lens (visual contact): £100. RF pre-amp mod rx. 430: £100, Marconi INS UHF wavemeter, TF6438: £100, AVO sig generator, type TFM: £80. AVO Universal bridge type 1: £90. Daiwa CN2002 PEP ATU: £125. Heathkit audio generator, mod AG-94: £100. Zetagi ATU 4-10W mod 131: £100. Kenwood DC supply PS 30: £100. APB 82A VHF linear booster: £50. Freq counter (B Davies HFC 600): £50. 60ft Lowes antenna, buyer to dismantle: £200. Plus other equipment, telephone only. (Welney) 0354 8388.

SILENT KEY sale - G3WLQ. FT227R: £130. KW204 tx: £80. FRG7700: £180. Tektronix 2213 60MHz scope: £200. Lucas 10FM: £20. (Harlow) 0279 418897.

SILENT KEY SALE - G8YDG. Yaesu FT726 tribander 2M 70cm 6M plus speaker SP102: £850ono. RN transverter RN 4/2/25 4M: £150. Sota linear 2M 100W includes PSU: £120. Turner expander mic: £25. BNOS 6M linear 10/50W: £100. Daiwa NS660P SWR power meter: £60. Yaesu FT290II: £300ono. ZX Spectrum + with RTTY items: Offers? Yaesu FT711RH 70cms mobile 35W: £200. G4IUT eves. (Newport) 0952 550235.

SILENT KEY sale. Diamond D130N antenna: £40. TET HB33 antenna: £75. Two antennas - 18" on mag base: £15 each. Kenwood AT230 antenna tuner: £110. Kenwood chrgr x 2: £5 each. Lodestar coaxial antenna switch: £5. Kenwood SP230 comms spkr: £30. Trio SMC

30 mic: £10. Yaesu YD148 mic: £25. Kenwood MC30s: £10. Lowe Electronics AR1000 monitor rcvr (scanner): £175. Morse key: £10. power supply/radio base holder: £10. Rechargeable battery x 4: £5 each. Kenwood rechargeable battery: £35. Tokomuro KR-400 horizontal rotator: £75. Stabilised power supply: £15. SWR Meter: £15. Midland 100M + mic tcvr: £15. Pye 6 chan tcvr: £15. Kenwood TH-215E H/held FM tcvr: £150. Trio TS-830S HF SSB tcvr: £500. (Preston) 0772 621377.

SOMMERKAMP tcvr: £175. Pye Vanguard: £35. Marine tcvr: £45. Various other items. GM4HRJ. Phone after 1800 QTHR. (Langbank) 047554 246.

SONY ICF PRO 80 tcvr, continuous coverage 100kHz-200MHz AM FM SSB wide and narrow, mint, boxed: £200. G3XFN QTHR. (Sutton Coldfield) 021 353 3364.

SONY ICF2001D, immaculate, bxd, manuals, accessories, 150kHz-30MHz, airband, 76-108MHz FM: £195. G0KYS ask for Bob Edgar, daytime. (Bournemouth) 0202 294881.

SPACE Radio h/book: £6. An introduction to Amateur Television: £425. RSGB tie, green: £2. G0OKY QTHR.

STANDARD twin band C528 H/H full cover receive, 2M 144/430 70cm, unmarked, bxd with software, 2 battery packs, charger, spkr mic - as new: £330. (Nuneaton) 0203 349156.

SWR meters 2M/70cm: £25. HF/2M: £15. Codar PR30: £10. 1000V @ 200M/a power pack, incomplete: £15. MM 70cm/10M rx converter inc sat band: £20. 140/150MHz FM tuner and 10.7 MHz IF strip: £10. 1930s tree valve and 1950/60s valve portable radios. Carriage extra. G8ATE. (Leicester) 0533 392842.

SYSTEM analyser:- Singer Alfred. Scope No 8000. Analyser mod7051. Airbourne instruments 201 oscillator 21064 BWO unit 4GHz to 8GHz. Singer 3 matched xtal detectors (in case) mod 1403. Pair narda mod 2290 .9GHz to 18GHz. Watkins Johnstone BWO. WJ2019-33, unused and sealed. (Beith) 05055 2118.

TEN TEC Argosy 525 with p/pack, manuals, VGC: £350. Can be air tested, buyer collects. G3TPN QTHR. (Durham) 091 388 4298.

TENTEC Paragon, all filters, FM board, matching PSU ATU: £1550 ovno. M294 4M crystalle 70.425, 70450, 70475: £75 ovno. M296 70cm crystalled RB10, RB15, RB4, RB5, RB0, RB8, preamp toneburst: £85. Micron QRP CW TX, nice: £100. Signal R535 VHF UHF air band rx, case, nicad charger: £200. Discone royal: £35. PX TS430 for Paragon plus cash. G0HZE QTHR. (Peterborough) 0733 342439.

TOKYO HX240 transverter, 2M to HF, bxd, manual, leads, mint condition, FB performance. (FT757 now acquired): £190. G0MZI. (Salisbury) 0722 337711.

TRIO HF separates JR599C, TX599, SP599 top band to two RX, 80-10 TX 180W matching spkr, absolutely mint: £300. G3SVL QTHR. (E Sussex) 0424 35384.

TRIO R1000 comms rcvr, 200kHz-30MHz, digital readout, S-Meter, clock timer, record socket 230V-12V, manual, bxd: £195. Pye Olympic mobile modified 144MHz S0 and S13, R3-R7 inclusive. 20w FM, mike, tone burst, make good packet TX/RX: £45. Prices include carriage. (Nottingham) 0602 602634.

TRIO TS120S HF tcvr 100W, bxd: £340. Trio AT120 ATU: £45. Trio MB-100 mobile mount for TS120/130, unused: £15. Star-Master CMOS memory keyer: £45. Kent twin paddle keyer: £30. Shure 444 mic: £18. Datong Morse tutor: £35. Carriage extra. John G0GDU QTHR. (Notts) 0636 830687.

TRIO TS520S HF tcvr, excellent condition: £300 or swap for HF mobile tcvr sim value. Contact Mike G0JXX after 1930. (Southampton) 0703 443781.

TRIO TS700E 2M m/mode tcvr, VGC, mic-manual: £300, inc carriage. Wanted Icom IC271/5E tcvr, pref Mutek, F/E fitted, TS711, FT726. GW4RLP QTHR. (Caernarfon) 0286 5264.

TRIO TS830S, superb condition, matching DFC230 external frequency controller, MC435 mic, owners manual, workshop manual. All in original boxes: £695. (Stockport) 061 477 6702.

TRIO TS940S complete with auto ATU, 1st class condition, Lowe mods, manual, fist mic, original packing £1300 ono. (Tony G4KHT. (Hull) 0482 84357.

TS120 100W c/p HF tcvr with CW filter and external VFO: £325ono. MMT144/28 2M transverter: £40. G3ZAY not QTHR. (Cambridge) 0223 424714.

TS830S YK-88-CN CW filter, manual, bxd, excellent: £550. Kenwood MC-50 desk mic, bxd, as new: £25. TAU SPC-300 ATU 3kw (PEP) 1.5kw (CW), with SWR, PWR meters, balun etc, excellent, bxd: £120. DL600 600W dummy load: £20. AKD WA3 HF wavemeter, as new: £35. Butternut HF6V-X plus TBR-160-5 and mounting post all bxd, never assembled, as new: £120. Altronics superscaf computerised audio filter (seperate the DX from the QRM) excellent: £80. SMC RU-12-04-06 regulated 12V power suppy 4amp continuous 6amp surge, as new, bxd: £25. Kantronics KAM: £180. Kenwood TH75E h/held with SC-23 soft case, HMC-2 headset with P+T and vox, 2X PB6 nicads, 1x PB7 nicad, BC-9 charger, bxd, manual, mint: £250. Kenwood TM221ES 45/5 watt FM mobile with MB201 slide mount, Hokushin gutter mount, OSCAR-2NE 7/8th wave colinear (4.5 DB) gain): £200. Oscar GP144W 2M base station colinear (6.5 DB gain) bxd, as new: £30. Kenwood SW200 SWR power meter with SWC-2 remote head, 100W FM/AM 150W CW, 200W SSB, bxd as new: £65. TR kits VHF wavemeter. (Okehampton) 064 723 423.

TS940S fox-tango CW filters, IF-10 interface chip: £995. Wayne Kerr B601 impedance bridge: £25. G3XTT QTHR. (Henley on Thames) 0734 724192.

TS940S: £1250 plus MC80 mic, power meter, NS660, all mint condition. (Ashbourne) 0335 330328.

WS 18 with mains power pack, mic included, offers! G3DMQ QTHR. (Reading) 0734 581481.

YAESU FC757 auto tuner, little use, bxd: £220ono. Peter G6SJU. (Gateshead) 091 495 0167.

YAESU FL2100Z WARC. Fitted 811's giving 200W PEP. Good SWR to solid state tcvr. Pair 572BS new bxd, spares, manual, gd condition: £420. Yaesu FT7, manual: £220. Telequipment servicescope S31 five new valves, spare manual: £6 fair. Taylor 45C valve tester, manuals, fair: £5. GEC R6S/CAP bridge 874B fair: £5. Buyers collect. (S Manchester) 061 437 7899.

YAESU FRG9600 scanner, UHF mod, gd condition. (Aldershot) 0252 541325.

YAESU FT101 tcvr, built-in AC and 12v DC power supply, USB/LSB CW AM 260W PEP, 160 thru 10M, WWV 10MHz and CB bands. Spare 12BY7A driver and matched 6JS6A valves, as new, h/book: £200. G3PVT. (Birmingham) 021 747 2329.

YAESU FT102 AM/FM CW filter, VGC: £450. FT690, mint condition: £250. 6M linear, Jaybeam antenna: £40. Kenwood TH27E, headset spkr mic: £200. Mike G4VOH. (Whitchurch) 0948 880460.

YAESU FT102, FV102DM, FC102, SP102, AM/FM fitted. Narrow filters, little used: £650, no splits. G3LLE QTHR. (Sheffield) 0742 482847.

YAESU FT290R, nicads chrgr, scanning mic, GWO: £180. Yaesu FT101 MkII in good working order: £200. Datong Universal speech clipper, VGC: £25. Yaesu desk mic, unused: £20. Carriage extra. Robin GM0NEG QTHR. (Garmouth) 0343 87356.

YAESU FT7 10W HF mobile, 160M cnvtr, GWO: £185. Zetagi B132 linear HF s/s 240v 200W PEP used with FT7: £90. (Worthing) 0903 240147.

YAESU FT707 SSB/HF tcvr 100W SSB & CW complete with FP707 power and loudspeaker unit also mic, manual, bxd, GWO. Can be used mobile with lead supplied: £375. (Southwell) 0636 813547.

YAESU FT726, fitted 2/70/6 and satellite, immaculate, bxd: £795. Yaesu FT4700RH remote dual band 2M/70cms mobile high power 50/40W complete with remote head kit and duplexer. immaculate, bxd: £375. BNOS 100W 2M linear, 10W in, FM/SSB, rx preamp, as new: £110. Alinco DJ-X1 wideband rcvr 100kHz-1300MHz with nicad battery and charger, bxd as new: £210. (Nr Basingstoke) 0252 844248.

YAESU FT757GX II tcvr plus desk and hand mic: £525. Prefer buyer to inspect and collect. Dave G0MLU. (Bracknell) 0344 488847.

YAESU FT757GX Mk 1: £475. Matching FC757AT automatic ATU: £175. Palomar R-X noise bridge: £50. Uniden HR2600 10M all mode mobile tcvr: £175. All items in immaculate condition with original packing etc. GM3SUZ QTHR. (Port Glasgow) 0475 744356.

YAESU FT890, latest tcvr, purchased early Sept, no longer features in station set up, cost £1075, sell: £950. Call after 6pm. (Leicester) 0533 674112.

YAESU tx/rx FT101EE, g/c plus manaul: £100. Buyer to collect. (Congleton) 0260 274418.

YC 7B digital readout for Yaesu FT7B: £50. Scopex oscilloscope, small, lightweight, mains, solid state 6 megs: £80. G0DOE. 081 391 0514 / 0784 259149.

ZENITH USA trans-oceanic world radio: £125. Philips D2999 radio: £175. PRO-2005 scanner, realistic, all vgc: £150. (Hitchin) 0462 441867.

WANTED

AP1086 issue 1 (RAF Radio Stores, ref Nos) Also Air Publications relating to radio, radar equipment, excellent prices offered. Would purchase post-war to current magnetrons, Klystrons, T/R cells, TWT's photo multipliers, microwave and special CV types. Required static or rotary converter AC or DC input with output of 80/115V 1500/2000 cycles. Also rx type R1355 10D/13032 unmodified. Please phone anytime. (London) 071 790 2846 or 071 511 4786.

FT200/FT250 with or without power supply. G3ETU ask for Les. (Salford) 061 792 9144.

HELP required how to interface ST5C to BBC B technical software, RX4 available or what software is suitable. G1NLU. (Weymouth) 0305 772759.

HELP! Do You remember BAYNHAM HONRI, G5HY? Licenced as 5HY in the 1920s, lived in North London/Richmond/Ascot areas. All reminiscences welcome. Particularly want QSL cards (originals/photocopies). All replies answered. David G4JLU QTHR. (Harrow) 081 954 9180.

IBM PC or compatible portable. G3JMR QTHR. (Walsall) 0922 30119.

PACKER 400-900MHz absorption wavemetr, good price paid for item in good condition and GWO. Phone Ned G8GZZ QTHR. (Woking 0483 723506.

RACAL transmitter unit, TA127 or parts thereof consisting: TA99, PU99, MA79, cabinet and telescopic slide rails. Also looking for TA349E units complete in cabinets with wiring trays and ATU. Also seeking Racal cabinets, table to and free standing. Would like to hear from anyone who collects Racal Radio equipment. Nigel Boyd, 2 Church Close, Lower Willingdon, Eastbourne, East Sussex BN20 9QY.

TEN TEC Argonaut 515 QRP tcvr. (Banbury) 0295 78331.

£5 EACH for Hammarlund ceramic UX 6 7 and octal valve holders. Bernard Litherland, G4IMT QTHR. (Chippenham) 0225 891254.

74C200 RAM chips for theatre organ. Please help if you can. Peter GM4AXS QTHR. (Oban) 0631 71442.

811A tubes, new and bxd. Dave. (Camberley) 0276 26919.

ANDREWS LDF450A Heliax coax, 40ft length or greater, must be in gd condition. (Port Glasgow) 0475 745009.

BELL + Howell standard 8 sportster 605 cine camera with trital or taytal lens. Bernard Litherland G4IMT QTHR. (Chippenham) 0225 891254.

COLLINS equipment for museum. KWM1, KWS1, 51J4, 5151-3, 3051, 312B5, DL1, 4A-45A, 32G, TCSTX, 180Y-1, 618T, 180U-2, RS90-1, black crackle speaker to match 75A RX, Information for library ie manuals, ADV lit, technical articles. Anything connected with Collins Radio Company. G3ZIG QTHR. (Dereham) 0362 88430.

COLLINS TCS rx, xtals any frequency, panel and cable end 12pin connectors. Remote control unit also cable. Cabinet vertical mounting angles, shock mounting base, PSU, rx power cable. (Kent) 0679 62775.

COMMAND receiver(s). Parts required to restore cannibalised BC-455. Need dials, tuning capacitor covers, bottom plates, align input, knobs and antenna terminals. Also complete BC-454 working/faulty, but good outward appearance, necessary. Sensible prices offered for suitable items, no rubbish or damaged bits (have plenty of my own). Circuit diagram of complete ARC-5 equipment wanted. Phone/write G3MOE QTHR. (Cheltenham) 0242 524217.

DAIWA ATU 3.5-54MHz antenna tuner, model CNW 319. Alan G7CDK QTHR. (Royston) 0763 262443.

FC902 ATU, must be in gd cond and reasonably priced. Jim G0BGY QTHR. (New Maldon) 081 949 5548.

FL2025 clip on linear amplifer, 25W for Yaesu FT290 R2, in GWO. G0OPG. (Wilmslow) 0625 531154.

FT708R wanted, must be mint and complete with packing and accessories if possible. GW4DYY QTHR. (Welshpool) 0938 76280.

HANDBOOK for advance millivoltmeter type 7713, Comm C64 computer with RTTY software disc drive, leads, complete for FT747. (Scarborough) 0723 371257.

HIRSCHMANN through rotator 250 for cannibalization, Diecast gear on my through tube is U/S. Roger G1HKT QTHR. (Didcot) 0235 813410.

ICR7100 with or without HF. Any condition. Cash waiting, will collect. (Guildford) 34954.

JRC, JST 125 or JST 135 tcvr. Must be mint with manuals. All offers considered. Will purchase or p/exchange equipment. See advert in for sale column. G0MHQ QTHR. (Peterborough) 0733 230088.

LARKSPUR control box J1, I need 2 in gd cond, also circuit details for J1 and J3, boxes. Pete. (Hemel Hempstead) 0442 69544.

LOST my recordings of Helen Sharman's shuttle transmission. Can you help me to replace them by copying yours, I will pay for tape, postage etc. G7EJO QTHR. Contact between 9am-9pm. Thanks. (Burton Upon Trent) 0283 217969.

McELROY bug key, any model, any condition, would consider any other heavyweight such as Telegraph Apparatus bug etc. G3TSS QTHR. (Corbridge) 0434 633125.

MICROWAVE diode from sampling unit for Hewlett Packard 5260A freq, divider, also service manaul or info on unit. (March) 0354 51289.

ONE PAIR, matching hi-fi audio output transformers to handle at least 10W output or working /non working valve amps. G4EIS. (Cornwall) 0736 798393.

RADCOM November 1981 required or copy of coil winding details for MK 1 G3WPO FET dip meter. G8HXE QTHR. (Manchester) 061 747 5099.

SIGNAL corps BC224 receiver (12 volt version of BC348), also BC348 model 'C' or 'S'. G8LIU QTHR. (Uxbridge) 0895 230006.

STRUMECH Versatower 45ft telescopic to fit ground post fittings. (Kent & Sussex area) 0797 344769.

TECHNICAL: manual and circuit for KW2000B tcvr to loan or purchase. Also 6146 valves. (Southampton) 0703 445201.

TENTEC 500Hz crystal filter, model 285 for Corsair II. For Sale, Curits electronic keyer: £40. Bill Wright G0FAH QTHR. (SE London) 081 693 9149.

TS280FM Sommerkamp data/circuits required to fix mine. Copy OK will pay costs plus. G0OPB. (Reading) 0734 667543.

VALVES: 6AG7, 6AC7, 931A, 8012, 956, 6F8G, 6J5G, 6C6, 6D6, 6F7, 75, 6Y6G, 5Z3, 5Z4G, R1355. American WW2 Airbourne equipment. H25 Mk 9A (V-Bomber) modulator. Information for army No 10 microwave sets, TR3519A. Looking for WW2 radar and radio equipment, WHY. G0JNT QTHR. (Grimsby) 0472 752794.

WANTED for FT208R, FNB-2 nicad FBA-2 battery adaptor. PA-3 DC-DC car battery adaptors. Ring Stuart G4OOK QTHR. (Middlesbrough) 0642 211685.

WANTED Good homebrew HF linear amplifier, pref using 813s or HCX250Bs preferably with self contained PSU, can collect, fair price paid. Also 6M m/mode, anything considered. Roger GW4BCD after 5pm not QTHR. (Porthcawl) 0656 788359.

WANTED to buy or borrow and copy, operating manual for Marconi 100MHz counter timer 2437. This is volume 1 of a 2 volume set (I have volume 2 - the service manual) Rod GW4SLK QTHR. (Holywell) 0745 560165.

WANTED. Tunnel diodes 10MA and 4.7MA Tektronix part no's 152-154 and 152-125 or supplier these can be obtained from. (Wolverhampton) 0902 781726.

WANTED: Daiwa SWR and power meter, model no CN410M (mint condition) G0KWS QTHR. (Whitley Bay) 091 252 7141.

WANTED: FT101 ZD with FM. (Nr Heathrow) 081 890 7091.

WINCH wanted. Roger G1HKT QTHR. (Didcot) 0235 813410.

YAESU ATU FC902 in good condition. G3NJP QTHR. (Truro) 0782 501487.

YAESU FL2100Z linear amplifier, must be in mint condition and reasonably priced. G3GAZ QTHR. (Dover) 0304 830691.

YAESU FP200 power supply matching PSU for FTFT200 HF trans. must be full working order. (Weymouth) 0305 773240.

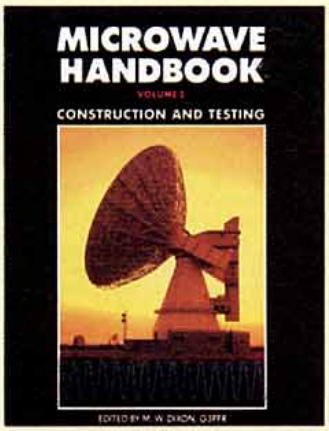
EXCHANGE

CUSHCRAFT R7 vertical, never used or fitted and assembled. Would like to exchange for a FT290 RII tcvr with matching 10W amp if possible. Consider sensible cash offer. Wanted 3el 15M yagi, must be in good cond. Require some 2W 100ohm carbon resistors. WHY? G3XNE. (Bude) 0288 354564.

HEWLETT Packard oscilloscope mod 1740A DC to 100MHz complete probes, RF screen, trolley, manual, VGC. Will exchange PC computer set up around £500. G0JIB. (Liverpool) 051 548 0452.

RSGB Books for Christmas

Microwave Handbook



Mike Dixon, G3PFR

A major publication in three volumes giving theory and practical designs for the microwave enthusiast

VOLUME 1 deals with operating techniques, system analysis and propagation, antennas, transmission lines and components, semiconductors and valves. 224 pages.

Members Price: **£8.08** Non Members Price: **£9.50**

VOLUME 2 continues with construction techniques, common equipment, beacons and repeaters, test equipment, safety, filters and data.

Members Price: **£12.33** Non Members Price: **£14.50**

VOLUME 3, published this year, contains practical designs for each band from 1.3GHz to 24GHz and beyond. A must for anyone active on the microwave bands or contemplating 'life beyond 70cm'.

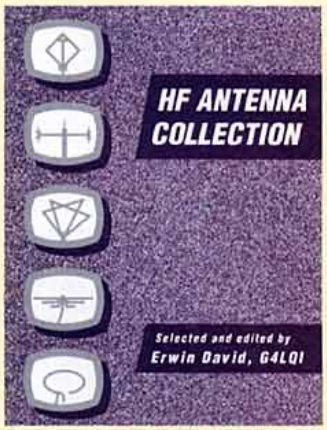
Members Price: **£12.32** Non Members Price: **£14.47**

Special Offer

For RSGB members only. All three volumes for just

£25.50

HF Antenna Collection



Edited by Erwin David, G4LQI

An invaluable collection of outstanding articles and short pieces which were published in *RadCom* during the period 1968-89. As well as ingenious designs for single element, beam and miniature antennas, there is a wealth of information on ancillary topics such as feeders, tuners, baluns, testing, modelling and the mechanics of mounting an antenna safely.

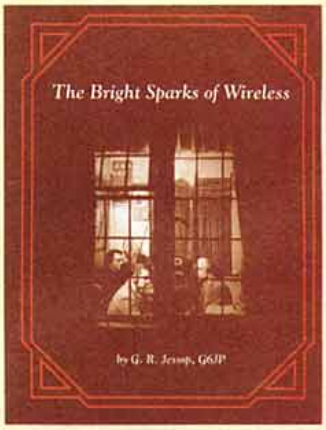
This book could just supply that vital idea for your next antenna project . . . .

Members Price: **£8.08** Non Members Price: **£9.50**

Out December — see page 78

The Radio Amateurs' Guide to EMC

The Bright Sparks of Wireless



George Jessop, G6JP

This is the story of the real experimenters: the radio amateurs from Marconi to the 'secret listeners' of WWII, who laid down the foundations of circuits and procedures that all radio amateurs now take for granted. 90 pages hardback.

Members Christmas Offer Price: **£7.50** (normally £8.29) Non Members Price: **£9.75**

Please add postage and packing on all except D-i-Y Ra

RSGB Books

RSGB Call Book 1993

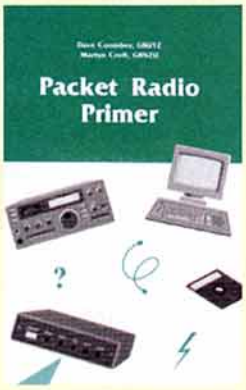
Edited by Brett Rider, G4FLQ

Just published - the biggest ever Amateur Radio Call Book and Information Directory. Contains over 60,000 UK and Republic of Ireland callsigns and a wealth of detailed information invaluable to the licensed amateur or short wave listener.

Don't struggle on with an out-of-date edition any longer - treat yourself this Christmas. 433 pages.

Members Price: **£7.00** Non Members Price: **£9.50**

Packet Radio Primer



Dave Coomber, G8UYZ
Martyn Croft, G8NZU

This light-hearted introduction to the exciting world of packet radio will help any beginner to get started with the minimum of fuss. Detailed, practical advice on connecting up equipment is followed by a guide through the maze of configurations possible. Sample logs of contacts with various types of 'mailbox' are included to help you get the best out of the network, together with much reference information. If you're a potential packeteer, this book is for you!

Members Price: **£5.95** Non Members Price: **£7.00**

Beginners and Novices

Amateur Radio For Beginners

FIND OUT ALL ABOUT Amateur Radio - this book by **Victor Brand, G3JNB**, explains: how to build a crystal set, how to listen to radio amateurs, how to understand Morse code and how to choose equipment, how to get a transmitting licence.

Members Christmas Offer Price: **£2.00** (normally £3.50) Non Members Price: **£3.50**

Practical Antennas for Novices

THIS GUIDE, written especially for UK Novice Licensees by **John Heys, G3BDQ**, describes in detail how to build simple but efficient antennas for each of the Novice bands from 1.8 to 434MHz, plus ancillary equipment to ensure that they are working correctly. A chapter is devoted to the safety and common sense aspects of installing and using a transmitting antenna. This book will be invaluable not only to Novices, but also to any beginning amateur looking for easy-to-build antenna systems that really work. 60 pages.

Members Price: **£3.83** Non Members Price: **£4.49**

D-i-Y Radio

EACH ISSUE OF THE RSGB's 16-page full-colour magazine, for beginners of all ages, (published six times a year) features a simple construction project, a review, ham facts, news features, a pull-out poster, a prize competition and a special offer. Subscribe now and get *D-i-Y Radio* for the next year, plus a pack of goodies (see page 34 this month).

Members Christmas Offer Price: **£6.00** (normally £7.65) post free

Non Members Price: **£9.00** (overseas rates on request).

Don't miss the Christmas present bargain of the year:

SAVE A FURTHER £1.83 on the offer price of *Amateur Radio for Beginners*, *Practical Antennas for Novices* and a year's subscription to *D-i-Y Radio*.

All three for the Members Only Price of: **£10.00** Offer expires 31 December

see page 79 for details. Special offers are available to members only and are valid until 31 December 1992.

CLUB NEWS

DEADLINE - Items for inclusion in the February 1993 issue must be sent to HQ marked "Club News - DIARY", to be received by 14 December latest. If news is received by the published deadline, it should appear in the listing. It is your responsibility to ensure that items are sent DIRECT to HQ in good time. News items should be sent in writing, preferably typed or written legibly, and be signed by the club secretary or the person responsible for publicity.

NOTE: This is primarily a service for clubs affiliated to the RSGB, to whom priority will be given.

AVON

BRISTOL ARC - 3, talk 'The (Infernal) Combustion Engine Explained' by Lance, G0CCU; 10, QRP/Homebrew play & display night; 17, management meeting; 24, computer evening. Details 0272 721744.
RSGB CITY OF BRISTOL GROUP - 14, Christmas party. Details 0275 855123.
SOUTH BRISTOL ARC - 2, talk 'The Basics of Good Operating' by Dave, G4WUB; 23, Let us see your photographic equipment - Jean, G0AWX; 30, Greetings to your friends - Len, G4RZY. Details 0275 832222 on a Wednesday evening.
WESTON-SUPER-MARE RC - 7, social and constructors evening; 21, home-brew and social evening; Jan 4, AGM. Details 0934 415700.

BEDFORDSHIRE

SHEFFORD & DARS - 10, the G4MEO challenge. Details Paul Bradfield, G1GSN, QTHR.

BERKSHIRE

BRACKNELL ARC - 9, radio festive; Jan 13, AGM. Details from G4AUC.
BURNHAM BEECHES RC - 7, Christmas outing; 21, year round-up plus speaker. Details 0628 25720.
MAIDENHEAD & DARC - Club meets at 7.30pm on 1st Thursday and 3rd Tuesday in the month. 3, Christmas social, prize giving and construction contest; 15, Christmas quiz. Details 0628 25952.
NEWBURY & DARS - 16, talk 'Compact Disc Technology' by Steve Price, G4BWE. Details 0635 63310.
READING & DARC - 10, Annual General Meeting with cheese & wine; 17, Christmas dinner. Details 0734 722489.

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 2, G6NB construction contest; Jan 13, annual dinner and presentations. Details 044 282 6651.
CHESHAM & DARS - 9, KZP's Christmas topic; 23, Christmas drink at the Queen's Head. Details 0923 283911.
CHILTERN ARC - 16, Christmas party. Details 0494 534216.
MILTON KEYNES & DARS - 14, open night. Details 0908 611005.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 4, Christmas party; 11, talk & video 'Kites' by a representative of Flexi Foil International. Details 0763 243570.

CHESHIRE

CHESTER & DARS - 1, radio ideas and discussion; 8, construction contest; 15, Grand Christmas Social. Details 051-355 2833.
WOODFORD (RATEC) - 14, talk 'Radio in the Air' by Jim, G4SSN. Details 061 485 3912.

CLWYD

CONWAY VALLEY RC - 3, talk 'EMC' by Mr J Lawrence, GW3JGA; Jan 7, talk 'Affordable Radio Equipment' by Dr Chris Barnes. Details 0492 530725.
DELYN RC - 1, talk and demonstration of Jandek Kits; 15, mince pie night. Details 0244 819618.
RHYL & DARC - ***NEW SECRETARY*** Alan Antley, GW3UTG, 'Fairholme', 12 Fairfield Avenue, Rhyl, Clwyd LL18 3EE, tel: 0745 351362. 7, CAD demonstration by GW7IPE; 14, social evening; 21, hotpot supper. Details from GW3UTG.
WREXHAM ARS - 1, TBA; 15, Christmas buffet. Details: 0978 845858.

CO ANTRIM

CARRICKFERGUS ARG - meets every Tuesday in Downshire Community School, Downshire Road, Carrickfergus. Details from Gavin, 0232 835650.

CORNWALL

CORNISH RAC - 3, Club Christmas party with RSGB videos and others; 14, computer section; Jan 7, talk 'Beetling Around Africa' by Peter, G3WKP; 11, computer section. Details 0209 820836.

DERBYSHIRE

BUXTON RA - 8, quiz night; 22, social evening. Details 0298 25506.
DERBY & DARS - 2, junk sale; 9, constructors' contest; 16, Christmas party; 23, video show. Details 0773 852475.

DEVON

APPLEDORE & DARC - 18, Club Christmas party. Details 0237 477777.
AXE VALE ARC - 4, Christmas Dinner. Details 0297 33756.
TORBAY ARC - 18, Club Christmas party. Details 0803 526762.

DORSET

SOUTH DORSET RS - 12, Christmas dinner - Sunray Hotel. Details from Mike Lenzi, G7HNY, tel: 0305 773860.

EAST SUSSEX

SOUTHDOWN ARS - 7, Christmas social. Details 0323 485704.

ESSEX

BRAINTREE & DARS - 7, junk sale; 21, cheese and wine party; Jan 4, talk/video 'Work of the Trinity House Lighthouse Tenders' by G7EIG. Details 0376 327431.
CHELMSFORD ARS - 1, talk 'Shack Test Equipment, EG Noise Bridge' by Fred Leach, G2HNF. Details 0245 260831.
LOUGHTON & DARS - 4, Packet clinic. Your packet questions (hopefully) answered by John, G8DZH; 18, talk 'Directional Aerials for 2m' by Ray, G0LWF; 31, seeing the old year out at the Victoria Tavern, Smarts Lane, Loughton. Details 081 500 2811.

FIFE

DUNFERMLINE RS - 10, talk 'Latest Developments in Broadcast Radio' by Ian, GM4AUP. Details 031 331 4340.

GLOUCESTERSHIRE

GLOUCESTER ARS - 2, talk 'Bees'; 9, construction group; 16, G4RHK's Christmas buffet. Details Gloucester 527227 on a Wednesday evening.
SMITHS INDUSTRIES RS - ***NEW SECRETARY*** Mr A J Hooper, G1JMF, 5 Nine Elms road, Longlevens, Gloucester GL2 0HA.

GREATER LONDON

ACTON, BRENTFORD & CHISWICK RC - 15, talk 'Modern Amateur Radio Up to EMC' by G3IGM. Details 081 749 9972.
BROMLEY & DARS - 15, Christmas party. Details 081-462 2689.
CLIFTON ARS - 4, contest discussion; 18, cheese and nibbles Society evening. Details 081 859 7630.
COULSDON ATS - 14, Annual General Meeting; Jan 11, talk 'Transformers' by Dr G Sowter, G2OS. Details 081 684 0610.
EDGWARE & DRS - 10, the 1992 club junk sale. Details 081 953 2164.
HAVERING & DARC - 16, Christmas dinner. Details from W P Drea, Secretary.
KINGSTON & DARS - 16, Christmas special. Details 081-398 1128.
RS of HARROW - 11, Christmas junk sale and social evening. Details 0895 632377 (H).
SILVERTHORN RC - 18, Christmas party. Details 081 529 4489 (eves, w/ends)
SOUTHGATE ARC - 10, Annual General Meeting. Details 081 360 2453.
SURREY RCC - 7, talk 'Workshop Practices'. Details 081 660 7517.
SUTTON & CHEAM RS - 17, Christmas buffet. Details 081 644 9945.
WIMBLEDON & DARS - 11, Christmas social. Details 081 397 0427.

GREATER MANCHESTER

ECCLES & DARS - 1, talk 'The Ferranti Argus' by G8DTF; Jan 5, talk 'History of the NARSA Exhibition' by G8VF. Details 061-773 7899.

GWYNEDD

DRAGON ARC - 7, Ron Watson-Jones - with more amazing pictures; 21, Christmas party. Details 0248 600963.

HAMPSHIRE

BASINGSTOKE ARC - 7, Christmas social and quiz night; 2m 'The Turkey Settler' Foxhunt - OS185 - Fox: Alan, G8FMH. Details 0256 25517.
HORNDEAN & DARC - 3, video evening; Jan 7, talk 'The Portsmouth Repeater GB3PC' by John Lewis, G3MYI. Details 0705 472846.
ITCHEN VALLEY RC - 11, open meeting. Details 0703 736784.
THREE COUNTIES ARC - 2, talk 'Amateur Television Transmission' by Mike Sanders, G8LES; 16, quiz night. Details 0420 83091.
WINCHESTER ARC - 18, Christmas party; Jan 15, AGM. Details 0962 89550.

HEREFORD & WORCESTER

BROMSGROVE ARS - 8, Christmas dinner. Details 0527 54607.
BROMSGROVE & DARC - 11, Christmas party - Waseley Hill Country Park. Details 0562 710010.
HEREFORD ARS - 4, talk on 'EMC' by Philip Martin. Details 0432 355297
VALE OF EVESHAM RAC - 3, Christmas dinner at Park View Hotel, Waterside, Evesham. Tickets from John Gealer, tel: 0386 446407.

HERTFORDSHIRE

CHESHUNT & DARC - 9, talk 'German World War 2 Radio Equipment' by Richard Walker, G4PRI; 23, Christmas social. Details 0992 464795.
HODDESDON RC - 10, Christmas social. Details 081-804 5643.
STEVENAGE & DISTRICT ARS - 1, suggestions & ideas for club activities for 1993; 8, practical night - testing HF & VHF antennas; 15, Dutch party & general knowledge quiz; Jan 5, practical night. Details 0438 724509.
VERULAM ARC - 13, Christmas Rally; 15; Annual General Meeting. Details 0923 262180.

HUMBERSIDE

BRIDLINGTON & DARS - 10, Christmas Dinner - Balmoral Hotel; Jan 7, talk 'Low Profile DX' by John, G3EZZ. Details 0262 673635.
GOOLE R&ES - 4, Christmas Dinner; 11, Christmas quiz; 18, video evening; 28; 'Lifeboat evening!'; Jan 8, contest review. Details 0405 769130.
NORTH FERRIBY UNITED ARS - 4, surplus equipment sale; 11, talk 'DIY RTTY' by Chris, G6KIA; Christmas natter. Details from Frank Lee, G3YCC.

KENT

DARENTH VALLEY RS - 9, Christmas Dinner (provisional). Details 0474 703322.
MAIDSTONE YMCA ARS - 4, RAE course; 11, Christmas social; 18, RAE. Details 0622 670936.
SOUTH EAST KENT (YMCA) ARC - 2, novice orientated amateur activities evening; 9, other members' shacks; 16, Christmas social (see Des). Details 0304 372656.
WEST KENT ARS - 18, Xmas Xtravaganza. Details 0892 664960.

LANCASHIRE

BURY RC - 8, Annual General Meeting. Details 0204 883212.
FYLDE ARS - 10, supper and social evening. Details from R J Bourn, G7CUL.
PRESTON ARS - 10, Christmas buffet - members and wives and friends; Jan 7, talk 'Paddle Keys - International' by Mr Crowhurst, G4ZPY. Details 0772 686708.

LEICESTERSHIRE

LEICESTER RS - 14, talk 'Raynet' by Derek, G1SPA; 21, mince-pie social evening; 28, TBA. Details Leicester 762241.
LOUGHBOROUGH & DARC - ***NEW SECRETARY*** Alan Hemmings, G0PHT QTHR, tel: Loughborough 231289. 1, Christmas dinner - Black Swan, Shepshed; 8, talk 'The Other Man's Shack' by G8AYG; 15, NoA construction; 22, Christmas quiz; 29, Christmas drink. Details Loughborough 218259.

LINCOLNSHIRE

LINCOLN SW Club - 16, Christmas dinner/social; 23, games night in the Pool Room, The City Engineers Club. Details 0522 750757.
SPALDING ARS - 11, talk 'Fitting RF Connectors' by G3XDA; Jan 8, AGM. Details 0778 425367.

MERSEYSIDE

HESKETH ARC - 8, live Packet/TCPIP demonstration; Jan 5, open evening. Details 0704 63344.
WIRRAL & DARC - 9, Chairman's night; Jan 13, AGM. Details 051 648 5892.

NORFOLK

ARC FAKENHAM - 1, Christmas party (bring the family); 24, GX4LSF Christmas Eve nets - venue G4DCJ's QTH. Details 0485 528633.
NORFOLK ARC - 2, visit to Anglia TV; 9, CW quiz - all can take part!; 16, Christmas party; 30, NARC film archives - Jack Simpson, G3NJQ. Details from G0KWP 0603 618810.
YARMOUTH RC - 3, debate 'We need more YLs in Amateur Radio'; 17, sherry and pies evening plus old films. Details Yarmouth 721173.

NORTHAMPTONSHIRE

Kettering ARS - 8, Christmas get-together and social (provisional). Details 0536 514544.

NOTTINGHAMSHIRE

ARC OF NOTTINGHAM - 3, forum; 10, quiz arranged by Alan, G7DII; 17, Christmas social - Greenwood Tree; Jan 7, talk 'How to Deal with Electrical Emergencies' by British Red Cross. Details 0602 232604.
MANSFIELD ARS - 3, Christmas social - families & friends welcome. Details from G0NZA, 0623 755288.
SOUTH NOTTS ARC - 4, open forum; 11, construction at Fairham College; 20, Christmas dinner; Jan 8, AGM. Details 0602 211069.

OXFORDSHIRE

OXFORD & DARS - 10, Christmas mince-pie party. Details from G0RFS, QTHR.

SHROPSHIRE

TELFORD & DARS - 9, Rally Group Annual General Meeting; 16, talk 'Strange Noises'; 23, Christmas frolics - Club HQ; 30, Club net 8pm, 144.6MHz. Details 0746 761203.

SOMERSET

TAUNTON & DARC - 4, talk 'Ionising Radiation' by Graham Wills, G0GTR; 14, Christmas dinner; 18, talk 'Encapsulated' by T G Brown. Details 0823 680778.
YEOVIL ARC - ***NEW SECRETARY*** Cedric White, G4JBL QTHR, tel: 0258 73845. 3, talk 'Getting the Best out of your Rig' by G3GC; 10, talk 'This is Packet Radio' by G7KBE; 17, mince-pies and RF; 29, club quiz. Details from the Secretary.

SOUTH GLAMORGAN

CARDIFF RSGBG - 14, Christmas dinner - Pantmawr Hotel; Jan 11, video show 'Amateur TV' by GW8LJJ.

SOUTH YORKSHIRE

BARNSLEY & DARC - *Club is running an 8-day trip to Friedrichshafen next year. Anyone interested contact E Bailey, G4LUE, 0226 716339* 7, Christmas buffet; 14, junk sale; 21, talk (provisional). Details from G4LUE.

STRATHCLYDE

KILMARNOCK & LOUDON ARC - 15, Bright Sparks quiz and social night; Jan 12, AGM. Details 0563 820052.
WEST OF SCOTLAND ARS - 4, talk 'Electronic Developments in WX predicting' by Angus, GM4JYZ; 20, equipment specification checking with Adrian, GM1FML. Details 0698 350926.

SUFFOLK

IPSWICH RC - 2, Morse tuition; 9, quiz v Stowmarket; 16, Morse tuition. Details 0473 742072.
LOWESTOFT DISTRICT & PYE ARC - 10, Christmas dinner & social; Jan 7, talk & demo 'Home-Brew Test Gear' by G4EOL. Details Lowestoft 564325.

SURREY

ECHELFORD ARS - 10, Christmas party. Details 0344 843472.

TAYSIDE

DUNDEE ARC - 1, talk 'RF Radiation' by Paul Bradbeer, GM7GUC; 8, construction night; 15, question & answer evening. Details from GM4FSB, QTHR.

WARWICKSHIRE

STRATFORD UPON AVON & DARS - 14, talk 'Aeronautic Electronics' by Nick Feakes, G0NKY; 25, Christmas morning greetings on the air, 11am, 145.275; Jan 11, New Year social. Details 060 882 495.

WEST GLAMORGAN

SWANSEA ARS - 3, Annual General Meeting; 17, Grand Xmas Quiz. Details 0792 403527.

WEST MIDLANDS

COVENTRY ARS - 4, visual entertainments evening; 11, Morse tuition/Novice licence class. Details 0203 311468.
MIDLAND ARS - 8, Christmas party. Details 021 628 7632.
STOURBRIDGE & DARS - 21, talk 'The Black Country' by Ned Williams. Details 0384 423938.
WILLENHALL & DARS - 9, Saudi Arabia speaker Gordon, G3RJD. Details 0922 404127.

WEST SUSSEX

MID SUSSEX ARS - 3, talk by Derek Atter, G3GRO; 11, Christmas dinner - Sergisons Arms

WEST YORKSHIRE

HALIFAX & DARS - 15, Christmas social - free pie and peas for members. Details Halifax 202306.
KEIGHLEY ARS - 17, Christmas buffet. Details from Kathy, tel: 0274 496222.
NORTHERN HEIGHTS AR&ES - 2, alignment evening; 16, social evening. Details 0274 673116.
SPEN VALLEY ARS - 3, talk 'Romania' by Ian, G4MLW; 17, Xmas event. Details 0484 716453.
TODMORDEN & DARS - 7, Annual Christmas talk by George, G3RJV; Jan 4, talk 'The Novice Licence' by Gerald, G3SDY. Details Halifax 882038.

WILTSHIRE

CHIPPENHAM & DARC - meets Tuesdays, 7.30pm, Sea Cadets HQ, Long Close, Chippenham. Details 0225 706265.
TROWBRIDGE & DARC - ***NEW VENUE*** Southwick Village Hall, Trowbridge. 2, Christmas party; 16, Goodbye '92. Details 0225 864698.

RALLIES AND EVENTS

This is a list of all rallies, hamfests, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Rally News - DIARY'.

13 DECEMBER

CENTRE OF ENGLAND Christmas Radio, Computer, Electronics & Communications Rally - National Motorcycle Museum, near NEC Birmingham, jncy 6 M42. Opens 11am (10.30 for disabled visitors). Admission £1 (reduction for RAIBC members). Over 60 traders, bar & restaurant; ample parking. Concessionary rates for those wishing to visit museum. Talk-in on S22. Christmas Special: 'Spot the Cracker' which will be on many of the trade stands to win a free prize. Details from Frank Martin, G4UMF, 0952 598173.

LEEDS & DARS Annual Rally - Pudsey Civic Centre, Dawsons Corner, Pudsey, Leeds (jnct of the Leeds Outer Ring Road with the Bradford Road). Doors open 10.45am. All usual facilities. Details from John, G0FWP QTHR, 0532 589652.

VERULAM ARC Christmas Rally - University of Hertfordshire (formerly Hatfield Polytechnic). From 11am to 5pm. Usual traders; bring & buy; raffle. Trade enquiries 0923 211643.

24 JANUARY 1993

LANCASTRIAN Rally - University of Lancaster. Admission £1. Doors open 10.30 for disabled visitors. Details from Sue, G1OHH QTHR, 0524 64239.

OLDHAM ARC Mobile Radio Rally - Queen Elizabeth Hall, Civic Centre, West Street, Oldham. Doors open for Morse Test participants at 10am, for disabled visitors at 10.30am and 11am for others. Admission £1, free for under 14's. Catering facilities in the Fallsworth Suite (back to their usual standard after kitchens refurbished last year); parking facilities free (space for approx 2000 vehicles). Talk-in on 2m S22 from 9am using callsign GB4ORC. Morse Test applicants should contact RSGB for application forms prior to 20 December 1992. General and traders' enquiries to Kathy, G4ZEP on 061-633 0550 (W) or 061-652 8617 (H).

7 FEBRUARY 1993

SOUTH ESSEX ARS Radio Rally - Paddocks Long Road, Canvey Island (at the end of the A130). Doors open 10am. Trade stands; bring & buy; home-made refreshments; free parking plus parking outside main door for disabled visitors. Talk-in on S22. Details from Ken Hendry, G0BBN, 0268 755350.

14 FEBRUARY 1993

CAMBRIDGE & DARC Radio and Computer Rally - Addenbrookes Hospital Ambulance Station. (Easy access from M11/A604). Doors open 10.30am. All the usual attractions. Bookings and details from George on 0954 719273.

2ND NORTHERN CROSS Rally - Rodillian School (jnct M1/M62). Details from Dave Gray, 0532 827883.

21 FEBRUARY 1993

EAST COAST AR&C Rally - Leisure Centre, Vista Road, Clacton-on-Sea. Doors open 10.30am. Major suppliers of radio and computer equipment; bring & buy; ample car parking; easy access for disabled; fully signposted from A12. Details from CLPK, 0255 474292.

KIDDERMINSTER & DARS Rally - Harry Cheshire School, Kidderminster. Opens 10am; usual traders; flea market; bring & buy; refreshments. Details G8JTL 0384 894019.

TRAFFORD Rally - Greater Manchester Exhibition Centre, Manchester. Doors open 10.30am (disabled visitors' priority queue). Admission £1.50. Usual traders; RSGB stand; bring & buy. Morse tests (apply via RSGB HQ). Free cash draw; licensed bar; refreshments; ample car parking. Talk-in on S22. Details G Oldfield, G1IJK, 061 748 9804.

28 FEBRUARY 1993

6th TAW & TORRIDGE Rally - Bideford Halls. Details 0271 860930.

6 MARCH 1993

VHF Convention - Sandown Park Exhibition Centre. Stand bookings to Les Hawkyard, G5HD, 0409 281 342. Details from Geoff Stone, G3FZL, 081 699 6940.

13/14 MARCH 1993

LONDON AR&C Show. Details 0923 678770.

14 MARCH 1993

WYTHALL RC Radio Rally. Details Chris, G0EYO, 021 430 7267.

21 MARCH 1993

NORBRECK ARE&C Exhibition. Details from Peter Denton, G6CGF, 051 630 5790.

TIVERTON RC Annual Rally - Pannier Market, Tiverton. Details from D G Clarke, G0IMJ, 0884 252604.

28 MARCH 1993

MAGNUM Rally - Magnum Leisure Centre, Irvine, Ayrshire. Details from Peter, GM0FCI 0294 72253.

29 MARCH 1993

PONTEFRACT & DARS 13th Annual Components Fair & Spring Rally. Details from Colin Wilkinson, 0977 677006.

4 APRIL 1993

LAUNCESTON 7th AR Rally - Launceston College. Details 0566 777027.

WHITE ROSE ARS Radio Rally - Change of venue to: Allerton High School, King Lane, Leeds 17. Detail from A A Bartram, G7ELS, PO Box 73, Leeds LS1 5AR.

12 APRIL 1993

CENTRE OF ENGLAND Easter Rally. (On Easter Monday this year). Details from Frank Martin, G4UMF, 0952 598173.

18 APRIL 1993

MARSKE-BY-THE-SEA Radio Rally - Marske Leisure Centre, High Street, Marske-by-the-Sea. Details 0287 610030.

SWANSEA ARS Rally - Swansea Leisure Centre. Details from Roger Williams, GW4HSH, 0792 404422.

25 APRIL 1993

BURY RS Hamfest. Details from Laurence, G4KLT, 061 762 9308 (eves).

2 MAY 1993

ANGLO-SCOTTISH Rally - Tait Hall, Kelso. Details 0573 224654 (eves).

BATC Rally - Harlaxton Manor, Nr Grantham. Details: Paul G8MJW, 0522 703348.

MID CHESHIRE ARS Rally - Civic Hall, Winsford. Details: David G4XUV, 0606 77787.

9 MAY 1993

MARS/DRAYTON Mobile Rally. Details: Peter G6DRN, 021-443 1189. Traders bookings Norman G8BHE, 021-422 9787 (eves).

9th YEOVIL QRP Convention - Preston Centre, Monks Dale, Yeovil. Details: G3CQR, 0935 813054.

16 MAY 1993

RSGB'93 Exhibition - NEC Birmingham. Details from Norman Miller, G3MVV, 0277 225563.

30 MAY 1993

17th EAST SUFFOLK Wireless Revival - Maidenhall Sports Centre, Ipswich. Details: Bob Baal G7HZV, 0394 271257.

MAIDSTONE YMCA Radio Rally. Details 0622 743317 for pre-Rally booking of camping/caravanning facilities. Trade bookings etc 0622 750709 (before 9.30pm).

6 JUNE 1993

25th SPALDING Mobile Rally. Details: Mr T Kettlewell, G4TWR, 0775 722940.

13 JUNE 1993

24th ELVASTON CASTLE Mobile Rally. Details from John Robson, G4PZY, tel & fax: 0332 767994; trade enquiries: Peter Neal, G3WFU, tel & fax 0332 700265 (evenings).

33rd RNARS Annual Mobile Rally - new venue Sports Field, HMS Collingwood, Fareham. Details: Cliff G4UJR, 0703 557469.

20 JUNE 1993

DENBY DALE & DARS Annual Mobile Rally - Shelley High School. Details 0484 644827.

NEWBURY & DARS Annual Car Boot Sale - Ackland Hall, Cold Ash. Details: N Jaques, 0635 863310.

27 JUNE 1993

36th LONGLEAT AR Rally. Details from Shaun, G8VPG QTHR, 0225 873 098.

4 JULY 1993

KINGS LYNN ARC Rally. Details 0553 841189.

11 JULY 1993

SUSSEX AR&C Fair. Details & traders' booking: Ron Bray, G8VEH QTHR, 0903 763978 (H) 0273 415654 (W).

18 JULY 1993

10th McMICHAEL Rally and Car Boot Sale. Details 0628 25952.

WOBURN National RSGB Rally. Details Norman Miller, G3MVV. 0277 225563.

25 JULY 1993

COLCHESTER Radio & Computer Rally. Details: Frank, G3FIJ, 0206 851189.

22 AUGUST 1993

WEST MANCHESTER RC Summer Rally. Details: G1IOO, 0204 24104 (evenings).

19 SEPT 1993

CENTRE OF ENGLAND Autumn Rally. Details: Frank Martin, G4UMF, 0952 598173.

21 NOVEMBER 1993

WEST MANCHESTER RC Winter Rally. Details 0204 24104 (eves).

GB CALLS

The list below shows all special event stations licensed for operation during this month. It was taken from the HQ computer on 6 November. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

1 DECEMBER
GB2GMM Guglielmo Marconi Memorial
GB4HSR Havenstreet Steam Railway

4 DECEMBER
GB2RWW Robert Watson Watt
GB4LUN Lundy Island

5 DECEMBER
GB6AQ Tops CW Club

11 DECEMBER
GB2DX 'DX'

12 DECEMBER
GB4DX 'DX'

16 DECEMBER
GB4RM Royal Marines

19 DECEMBER
GB0SBS Shoreham By Sea
GB4QRP QRP 'Low Power' Operation
GB4RN Royal Navy

22 DECEMBER
GB0HLC Harrogate Ladies College
GB1HLC Harrogate Ladies College

25 DECEMBER
GB0QRP QRP 'Low Power'

RSGB'93

NEXT YEAR, the RSGB's National Amateur Radio Exhibition will be held once again at Birmingham's National Exhibition Centre. The show will be on one day only - Sunday, 16 May. An added attraction will be the National Vintage Communications Fair which is being held in another hall at the NEC on the same day.

Trade enquiries for RSGB'93 should be made to the RSGB Exhibition and Rally Committee, c/o Norman Miller, 178 Warley Hill, Brentwood, Essex, CM14 5HF.

● The next RSGB National Rally at Woburn will be held on 18 July 1993. Note that this is a departure from the traditional 'first weekend in August' date.

SILENT KEYS

WE HAVE BEEN advised of the deaths of the following radio amateurs:

Francis S G Rose, G2DRT

Francis died suddenly on 19 October, a few days before his 72nd birthday.

Encouraged by his father, a keen and proficient wireless enthusiast, Francis became interested in the hobby at an early age. He obtained his experimental permit 2DRT in 1938 and after serving several years in the RAF, qualified for a full licence immediately after the war. He was an ardent operator on most bands UHF to HF, his friendly manner and droll humour establishing him as a popular character both on the air and at club events.

A strong supporter of the RSGB throughout more than 50 years as an active member, he gave considerable encouragement to others wherever located, his home station being open house to those professing interest or seeking help and encouragement. An avid correspondent, he missed no opportunity to advance the image of the radio amateur in both local and national press. His service to the Society spanned both local and regional appointments and culminated in a total of six years as an Ordinary Member of Council.

His personal statement recently, when offering himself as a candidate for election as a member of Council 1993-95 (see page iv of the *RSGB Annual Report* sent out in November) reveals Francis in his true light. It is sad that this now becomes his epitaph.

Tom Tatton, G2BSR

G0COS	Mr W F Fowler	11.9.92
G0HUM	Mr P N Pronger	19.8.92
G0IQE	Mr T Jackson	16.12.91
G0JCV	Mr R D C Baker	04.7.92
G0LMW	Mr A J Sewell	May 92
G0RFU	Mr M Savegar	15.9.92
G3DZA	Mr E Andrews	29.8.92
G3PDT	Mr C V Taft	
G3VSA	Mr S Aspinall	31.8.92
G4CL	Mr C W Kirk	06.9.92
G4MU	Mr P W Smith	
G4PS	Mr P R Burkitt	18.8.92
G4SBK	Mr P Keel	
G4SHL	Mr D Green	06.9.92
G4SZE	Mr C Grime	03.8.92
G4VOE	Mr G Bowes	30.8.92
G5GX	Mr M Rix	09.9.92
G6LBP	Mr J Dunkley	14.12.91
G6UCV	Mr K E J Bowden	02.12.91
G8DCS	Mr A H A Herod	Aug 92
G8OAR	Mr R Watson	25.8.92
G8TK	Mr A Browning	29.8.92
GI4CXO	Mr I A Kernohan	21.3.92
GI4YQB	Mr W Archer	22.7.92
GI8FOK	Mr H Campbell	07.5.92
GM0KGZ	Miss J L Muir	17.7.92
GM3AYR	Dr A A Marr	
GW0FPR	Mr A Brown	
GW3IFV	Mr W P Lewis	10.9.92
RS19040	Mr P C H Dickerson	28.10.91

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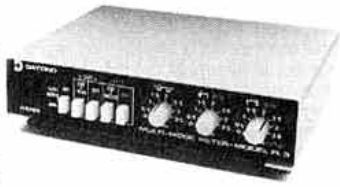

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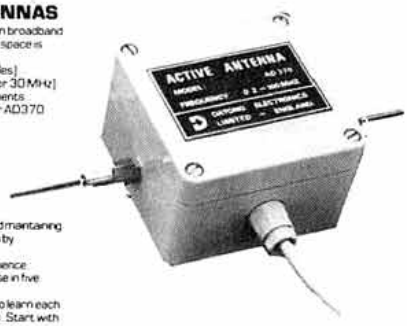

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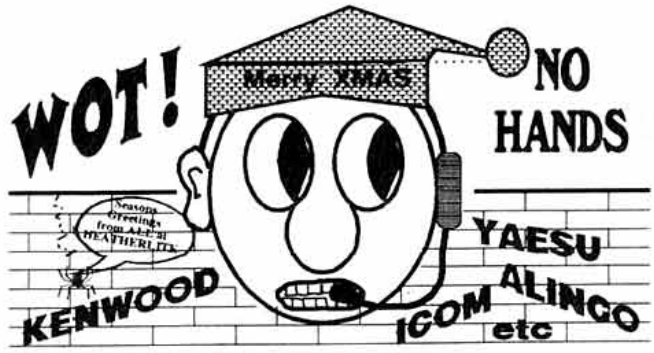

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The Last Word

NO UPPER AGE LIMIT . . .

I take exception to Mr O'Neil's letter (*The Last Word*, October) on three counts. First, for his imputation of deceit. It is true that the idea of Project YEAR and the plan for a 'student' licence were born of concern at the dearth of young people coming into amateur radio. David Evans' leading article in November 1987 expressed this concern quite forcefully. But the 1988 Consultative Questionnaire contained no implication of an upper age limit. Victor Brand's article in January 1989 referred to "training novices of all ages" and specifically mentions the attraction of the proposed licence to "those of mature years, and the disabled" as a bonus of the scheme (maybe not originally envisaged by the proposers but emerging from the views expressed by ordinary members, and all the more welcome for that reason). I know of no country where a beginners' licence is subject to an upper age limit.

Secondly, for his suggestion that the Novice Licence course is merely 'an easy option'. Most people who have studied the syllabus and the training manual for the course agree that its essentially practical content and 'hands on' approach make it, if anything, a better introduction to amateur radio than the RAE, which can be - and has been - passed by someone who has never touched a soldering iron or listened to a QSO. Those who have listened or spoken to Novice licensees on the air are agreeably surprised by their knowledge, self-confidence and mastery of procedure, which put many old hands to shame. So much so that there is a growing feeling that the RAE qualification should be restructured along similar lines.

Thirdly, for the narrow viewpoint implicit in his letter. Most Novices, young or old, see their licence as a first step, and many are already studying for the 'Full' licence. But having worked up to it through the Novice course, they are more likely to recognise that it is not the ultimate rite of initiation to some amateur radio freemasonry but (as para 1 of the licence document explains) simply a permit to enter the next stage of their self-training in the art of radio communication. One reason why amateur radio is a lifetime hobby is that we are all still learning.

Phil Mayer G0KKL

. . . OR LOWER LIMIT . . .

The Novice Licence *seems* to be a success - as far as it goes. However, is it not time to consider the possibility of a move to a US-style licensing system? In the US, if you can pass an Extra Class exam at 5 years old, you can have an Extra Class licence. In the UK we tell our kids "even if you pass the RAE, you're too irresponsible to have a 'real' licence until you are 14!".

What hypocritical nonsense! We consider that our educational system is one of the best in the world. And yet, our 'colleagues' in the States have no lower age limit. Who are we kidding? Is their education system so superior to ours? Are their children so much more intelligent/receptive/mature than ours? I think not!

Please don't discourage those kids who are willing and keen to join our ranks by letting them get only so far and then tell them that they are too immature to progress, irrespective of their abilities. Let's see the lower age limit abolished soon to retain the interest of this new blood that the hobby so sorely needs!

John Carp G8XFT/5B4ZL

. . . BUT ALL AGES

I am writing to you in response to 'Deceit?' written by GM4PRO (*The Last Word*, October). I am 15 years old, have taken the Novice course, and in June of this year I sat the exam. In my opinion the Novice Licence is suitable for beginners, no matter what the age. An adult starting out in amateur radio will only have the same knowledge of the hobby as a younger person coming in to the hobby. The Novice course requires just as much hard work and effort from a beginner as I am sure the full RAE requires from somebody who already has some knowledge of radio.

The Novice course and licence give vital training and experience to beginners of all ages, especially in the practical side of things and in operating procedure, which in my short experience of operating is needed more by the older generation of radio amateurs than by us. Not once have I come across a fellow Novice Licensee who has displayed a lack of good operating procedures, whereas I have frequently come across adults who display bad operating habits. The Novice course is by no means an 'easy route', as I am sure Mr O'Neil would have seen if he had taken it when he began in the hobby before he took his RAE. It takes a lot of effort and commitment from a beginner, no matter what the age.

Robert Aley 2E1AXZ

AN ILL WIND

I have just returned from a holiday in Hawaii where I was operational on 2m. My first night's sleep was disturbed by loud sirens and I soon discovered that the arrival of Hurricane Iniki was imminent. I turned on the FT290 and heard a very organised emergency network operating via a repeater. I was on the island of Oahu but the repeater was linked to a chain of others stretching from 'The Big Island' in the south to Kauai in the north. The network controller at the Civil Defence Headquarters asked stations to check in on an hourly basis as Iniki approached.

We were preparing for the worst but at the last moment the hurricane changed direction, passing by Oahu and hitting the less populated island of Kauai. As phone lines went down the hams maintained communications with the devastated area. The repeater chain to Kauai was broken but limited communication was maintained via 2m simplex and on 40m.

As I listened over the next few days the local amateurs were able to reassure hundreds of people of the safety of their loved ones on Kauai. When I left Hawaii two weeks later 95% of Kauai was still without power and amateur radio was still the only means of communication for many.

This was an example of amateur radio at its best. Radio procedures were of a very high standard and I witnessed no abuse of the extensive repeater network. Also phone patches proved to be a very useful facility. Well done KH6-land for setting such a good example for us all.

David Webber KH6/G0PBS

KENT IS SUPER MAN

On 11 May I ordered a Morse key from R A Kent of Preston who advertise in *RadCom*. When it had not arrived by 24 June I wrote informing them of the matter. I also FAXd them and phoned in July when I was eventually told that they had despatched a Morse key. After waiting two further weeks I again wrote to R A Kent and asked them to initiate their 'lost items in mail' procedure, ie send another and claim insurance.

By 14 September, after four months, I was still waiting for the item to arrive so asked them to refund my money and cancel the order. Yesterday a package arrived from R A Kent containing a Morse key and the compliment slip endorsed "Key No. 3".

The original purpose of this letter was to complain of the service of one of your advertisers, but now I come to praise Caesar, not bury him. It looks as if Kent's have been unfortunate to have two items they despatched go missing in the mail, yet they persisted in maintaining a good service to their customers and sent the required item yet a third time. Service of this quality deserves to be recognised and I would like to take this opportunity of making the recognition public.

T Taylor, Hong Kong

Please note that the views expressed in *The Last Word* are not necessarily those of the RSGB. We reserve the right to edit letters for publication. All letters are acknowledged and may be passed to the relevant department or committee.

PC AND GOODWILL TO ALL MEN?

And it came to pass that the invisible hand of God did smite and render useless all packet radio and PC equipment. There was a great wailing and gnashing of teeth from the evil operators of such devilish machines, but from the others, who greatly outnumbered the devils (and who were righteous in their ways), there was a sigh of relief. "At last" they cheered, "the hand of God has freed us from the terrible squawking sounds which are slowly but surely blighting our bands".

The Almighty has also put paid to the monsters who place their desk mics next to their PC keyboards so that all we hear is tap-tap, mumble, tappety-tap, grunt, curse, tap etc, and who say things like "well Brian, since I installed that extra two Megabytes of RAM my Windows version 15.8 keeps crashing, not that I am really bothered because I can't hear anything on the radio with the computer switched on anyway . ."

This morning I prayed to the Lord, asking "is it today, Lord?". And a voice from on high replied "Nay, but when I can get some sense out of my DEITY DIARY 486 dx turbo version 2.4, I'll let you know". If anyone would like to join my Amateur Radio Luddites Society, please send your spare cash to me, QTHR.

Andrew Howlett G1HBE.

APPEAL SUCCESS

May I place on record my appreciation and grateful thanks to the RSGB Planning Panel for their help, guidance and work, which I am delighted to say led to a successful outcome in my appeal to the Planning Inspectorate against the refusal of Wansdyke CC to grant permission for antenna supports at my QTH.

In particular I would like to thank Shaun O'Sullivan, G8VPG (RLO for Avon); Harold Fenton, G8GG (Chairman of RSGB Planning Panel) and Louis Thomas, GW4ZXG (Planning Appeal Adviser for this area).

Louis very kindly agreed to construct and mount a written appeal which has been 100% successful, and I am greatly in his debt. A fact not so well-known perhaps, is that the Planning Panel Advisory and Appeal Service is totally unpaid, and done during private 'off duty' time and is therefore worthy of special commendation and praise as a service to RSGB members. My special thanks to all concerned for a job well done.

Stuart E Green G3ISG

A PROFESSIONAL VIEWPOINT

I was puzzled by the letter from Neil Smith, G4DBN (*The Last Word*, November). He began with some rather silly analogies and then failed to make a single technical point against Colin Richards' 9M2CR article, instead, accusing Colin of "limited knowledge of the subject".

Colin is a professional telecommunications engineer of some considerable standing. His extensive knowledge has been used by HM Government in secondments to countries where his expertise is needed. His experiences of error correcting data transmission dates from the 1950's with considerable experience in their recent use over long distance paths.

Bob Price GW3ECH

A MONSTER UNLEASHED

I was delighted to see, 'Stop the Packet Racket on HF' by Colin Richards, 9M2CR (*Radcom*, September). At last someone has said it all, *and* had it published. Packet on HF is a disaster and with hindsight it is apparent that the Tucson Amateur Packet Radio Group unleashed a monster. In terms of traffic passed and bandwidth utilised HF Packet is probably the least efficient mode since spark. Truly a case of 'never in the history of Amateur Radio have so few occupied so many channels for so long, in order to pass so little traffic'.

Jack Hollingworth ZF1HJ G0LYU etc

[We hope to publish an article shortly which shows how the packet fraternity are developing more efficient systems - Ed]

TOWER OF STRENGTH

I recently purchased a second hand mobile Versatower but it came without cables or winches. I wrote to Strumech-Versatower in England, asking their advice. They sent me an assembly booklet explaining prices for ropes and winches, the length of rope and correct type of winches and the way the ropes should be put on the tower. In fact everything I needed to know. I cannot praise them enough as they have been more than helpful to me and I am sure that anybody who deals with them will be a satisfied customer.

Jimmy Ryan EI8FC

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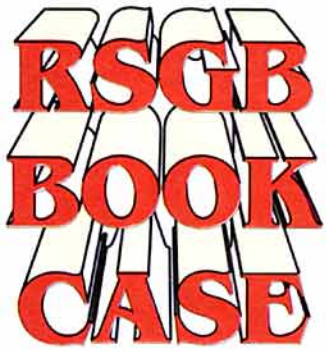

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AND AFFILIATED SOCIETIES

Re – RADIO SHOPPER

OF STOKE-ON-TRENT

Members will be aware that, in the past, the Society has declined to accept advertising copy from the above company.

The only reason for this, despite uninformed and speculative comments circulated elsewhere, was the Society's very real concern about the anticipated style and content of advertising material destined for RadCom.

For their part Radio Shopper have maintained from the beginning that those fears were unfounded.

At a recent meeting with representatives of Radio Shopper the Society raised a number of questions which it felt necessary to put to the company in order to ensure that members' interests were adequately protected. Radio Shopper in turn raised a series of points which were clarified by the Society.

The Society was given assurances by Radio Shopper that have allayed the Society's concerns and both parties consider the matter to be closed.

Members are thanked for their forbearance in this matter and will understand that a statement could not be issued by the Society until all relevant matters were resolved.

J. Hall
Company Secretary

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February 1993 — ICOM IC32/38, Dual Band Transceiver by Peter Hart

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- 10 programmed scan ranges
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- Priority scan.
- Auto memory write mode.
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For further information about ICOM products and your nearest authorised dealer please contact:
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- ✔ **Selectable Scan Skip:** For busy channels.
- ✔ **Backlit DTMF Microphone.**
- ✔ **One-Touch Instant Recall:** Recall of CALL channels for each band.
- ✔ **Priority Monitoring.**
- ✔ **Dual External Speaker Jacks:** One for each band.
- ✔ **Built-In Antenna Duplexers:** Standard feature.
- ✔ **Reversed Masked Full Frequency LCD.**
- ✔ **8 Level Automatic Display/ Key Lighting Dimmer.**
- ✔ **Accessories Options:** FTS-22 (CTCSS Dual Decode Unit), FRC-4 (Pager Unit), DVS-3 (Voice Memory and Pager Unit), YSK-1L (6m Separation Kit Cable), SP-7 (External Speaker).

Performance without compromise

YAESU

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